



**Australian Government**  
**Australian Research Council**

*25 May 2011*

*DSTO Strategic Context Seminar*

***Research Leadership:  
Encouraging and Evaluating  
Excellence***

Professor Margaret Sheil

*CEO, Australian Research Council*

*Research*

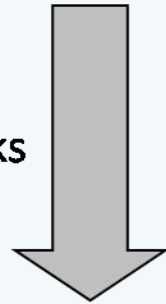
## Objectives of ERA

- Establish an *evaluation framework*;
- Provide a *national stock take* of discipline-level research;
- Identify *excellence* across the full spectrum of research performance;
- Identify *emerging research areas* and *opportunities for further development*;
- Allow for *comparison* of Australia's research *nationally* and *internationally* for all discipline areas.

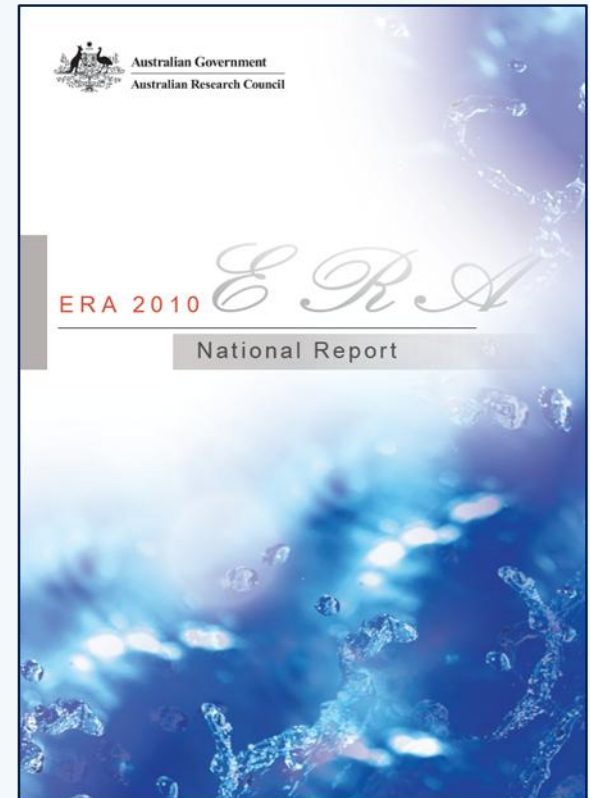
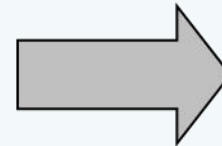
# ERA Process Overview

Volume & Activity	Ranked Outlets
Citation Analysis	Esteem
Research Income	Applied Measures
Peer Review	

International Benchmarks



Research Evaluation  
Committees





**ERA approach =  
one size does NOT fit all**

## Why a matrix approach to indicators?

- Not all indicators are suitable for all disciplines
- Pick and choose what is right for each discipline
- The indicator suite must ensure comparable quality across a range of indicator types
- Journal Rankings are not THE indicator

# Examples of the matrix of some defence-related disciplines

## 08 – INFORMATION & COMPUTING SCIENCES

### Information Systems (0806)

- Citation Analysis
- Ranked Journals *AND* Conference Publications
- Patents and Registered Designs
- Research Commercialisation Income

## 16 – STUDIES IN HUMAN SOCIETY

### Political Science (1606)

- Peer Review
- Ranked Journals only
- Research Commercialisation Income
- Editor of Prestigious Works of Reference

## Scale of ERA 2010

- All 41 eligible institutions submitted data
- Over 330,000 research outputs and 55,000 researchers represented
- 2,435 units of evaluation assessed at the two- and four-digit level
- 149 Research Evaluation Committee (REC) members and 500+ Peer Reviewers contributed evaluations
- All aggregated data presented in the *ERA 2010 National Report*.

## The ERA 2010 Rating Scale

Rating	Descriptor
5	The Unit of Evaluation profile is characterised by evidence of outstanding performance <b>well above world standard</b> presented by the suite of indicators used for evaluation.
4	The Unit of Evaluation profile is characterised by evidence of performance <b>above world standard</b> presented by the suite of indicators used for evaluation.
3	The Unit of Evaluation profile is characterised by evidence of average performance <b>at world standard</b> presented by the suite of indicators used for evaluation.
2	The Unit of Evaluation profile is characterised by evidence of performance <b>below world standard</b> presented by the suite of indicators used for evaluation.
1	The Unit of Evaluation profile is characterised by evidence of performance <b>well below world standard</b> presented by the suite of indicators used for evaluation.



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# ***ERA 2010 - The National Results***

*Research*

## Strengths in Australian universities

- Astronomical and Space Sciences
- Optical Physics
- Quantum Physics
- Macromolecular & Materials Chemistry
- Physical & Structural Chemistry
- Geology
- Ecology
- Evolutionary Biology
- Plant Biology
- Zoology
- Electrical and Electronic Engineering
- Historical Studies
- Cardiovascular Medicine and Haematology
- Human Movement and Sports Science
- Immunology
- Oncology and Carcinogenesis
- Pharmacology and Pharmaceutical Sciences
- Medical Physiology

## Gaps

- Agriculture, Land and Farm Management
- Automotive Engineering
- Maritime Engineering
- Engineering Design
- Complementary and Alternative Medicine

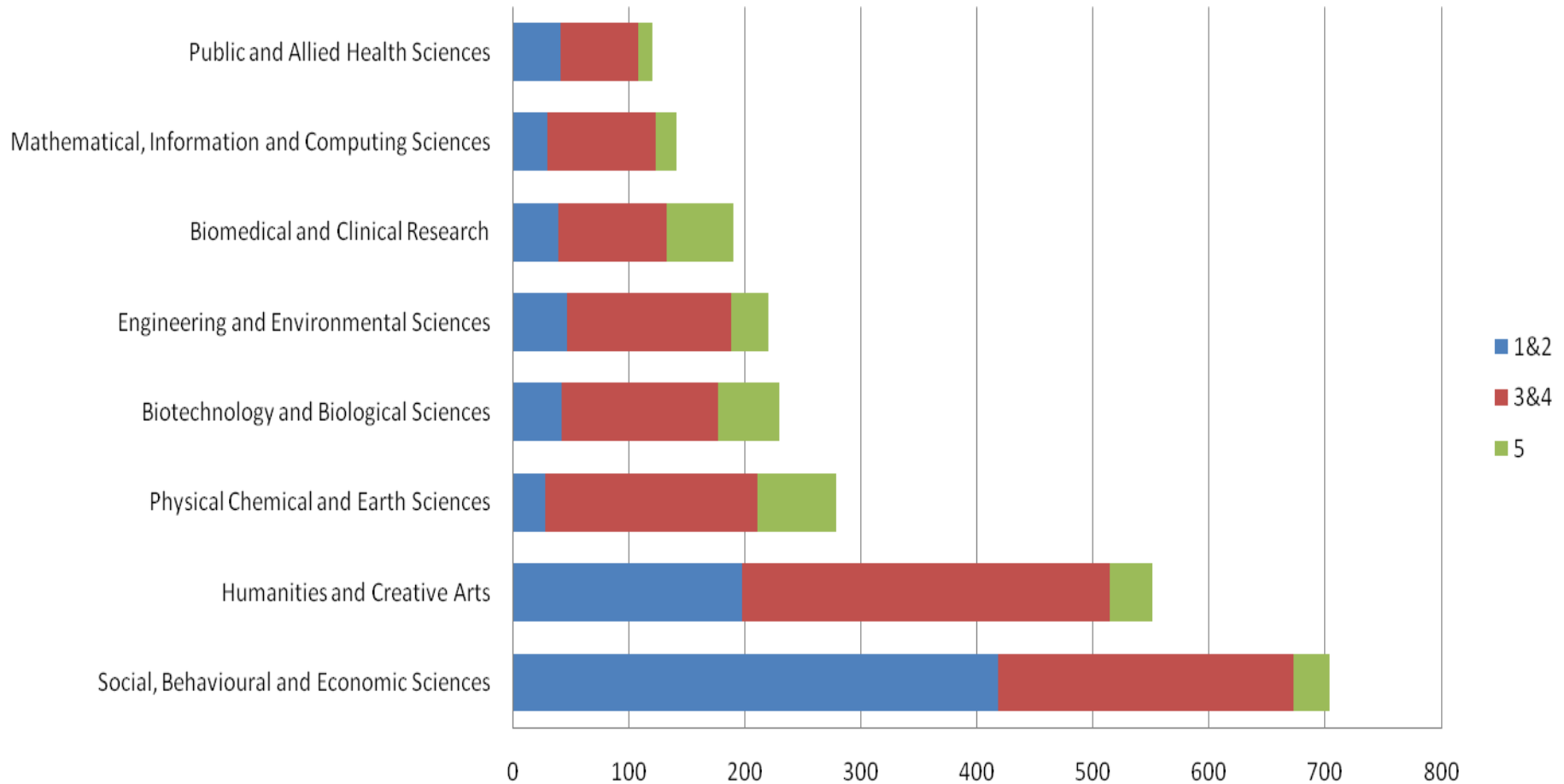
## Pockets

- Classical Physics
- Aerospace Engineering
- Transportation and Freight

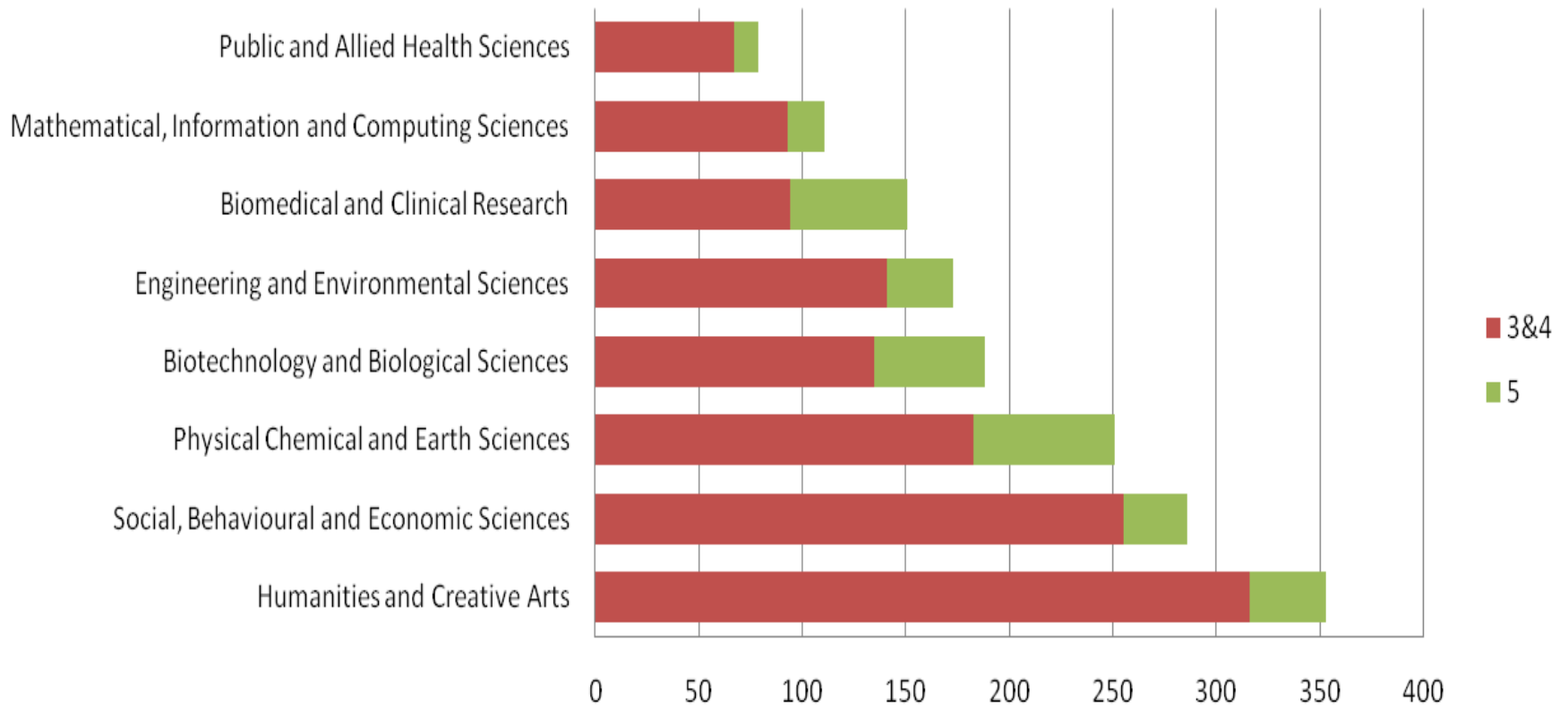
## Strong Applied Research

- Electrical and Electronic Engineering
- Crop and Pasture Protection
- Resources Engineering
- Materials Engineering
- Extractive Metallurgy
- Nursing

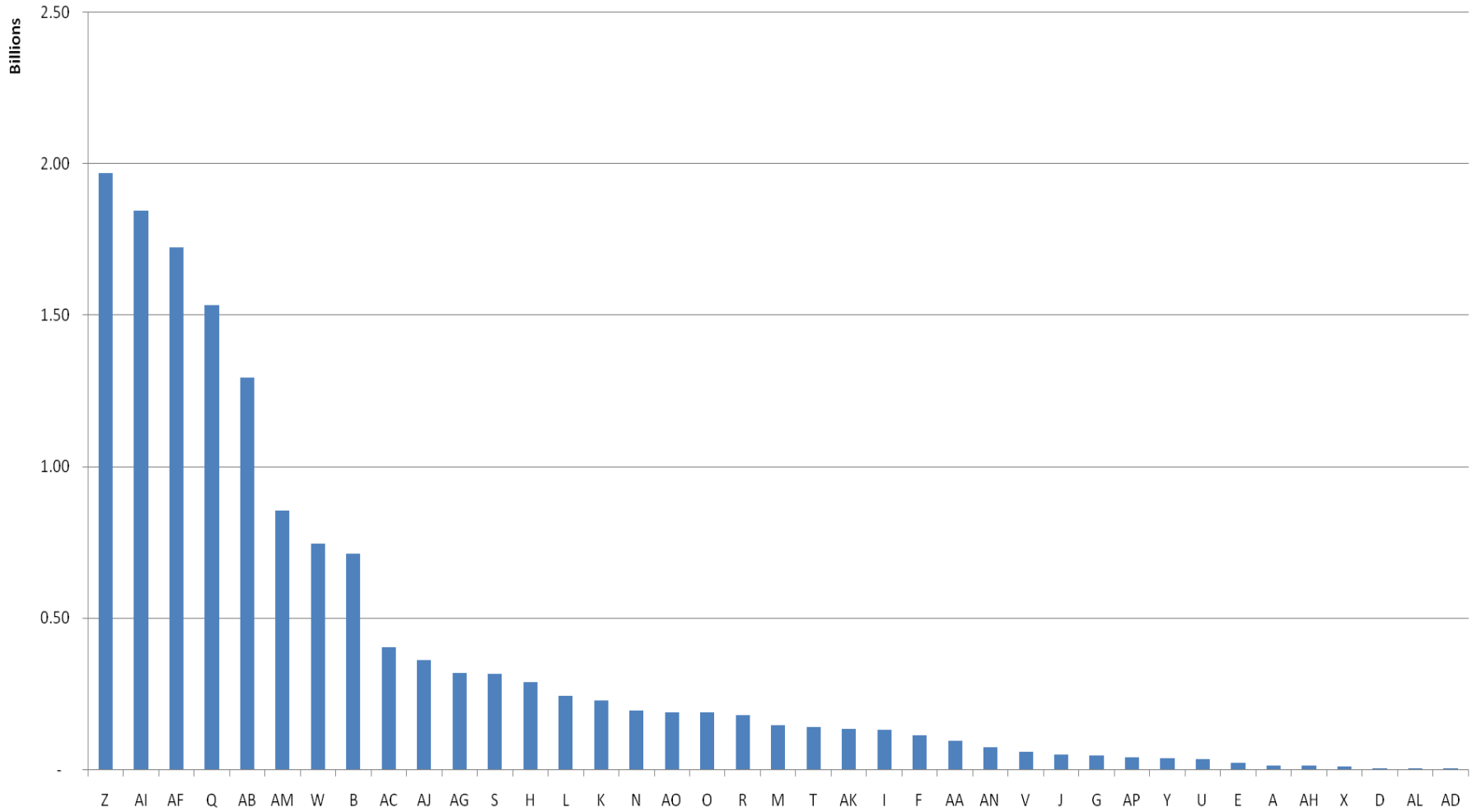
## ERA 2010 Ratings by Cluster



## ERA 2010 Rating by Cluster - at, above, or well above world standard (i.e. 3s, 4s, & 5s)



Research Income by de-identified institution (2006-2008)



# Reading the national results

86% of assessed UoEs received a rating at or above world standard (i.e. rating of 3 or above).

Of all assessed UoEs at the four-digit FoR code level (58 UoEs), the average rating is 3.4. See **Section 1** for two-digit FoR code average rating.

Mathematical, Information and Computing Sciences							
01 Mathematical Sciences							
% assessed UoEs rated at or above world standard  <b>86%</b>	FTEs	880	Esteem count(s)			106	Average National Rating  <b>3.4</b>
	Research outputs	8,659	Patent(s)			1	
	Research income \$	104,624,740	Research commer. income \$			22,368,469	
	UoEs assessed	58					
	Rating:	1	2	3	4	5	Total
	Distribution:	1	7	25	16	9	58

There were seven UoEs which received a rating of 2.

A total of 58 UoEs were assessed for Mathematical Sciences at the four-digit FoR code level.



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***ERA 2010 -  
Some Defence-related  
Examples***

*Research*

0806 Information Systems								
% assessed UoEs rated at or above world standard  <b>100%</b>	FTEs	530			Esteem count(s)	24		Average National Rating  <b>3.7</b>
	Research outputs	7,892			Patent(s)	4		
	Research income \$	58,000,706			Res. comm. income (\$)	7,604,359		
	UoEs assessed	6						
Rating:		1	2	3	4	5	Total	
Distribution:		0	0	3	2	1	6	

08 – INFORMATION & COMPUTING SCIENCES

Information Systems (0806)

- Citation Analysis
- Patents and Registered Designs
- Ranked Journals *AND* Conference Publications
- Research Commercialisation Income

Mathematical, Information and Computing Sciences								
08 Information and Computing Sciences								
% assessed UoEs rated at or above world standard  <b>91%</b>	FTEs	1,792			Esteem count(s)	101		Average National Rating  <b>3.4</b>
	Research outputs	24,656			Patent(s)	14		
	Research income \$	238,748,216			Res. comm. income (\$)	14,849,644		
	UoEs assessed	23						
Rating:		1	2	3	4	5	Total	
Distribution:		0	2	11	8	2	23	

## 08 INFORMATION AND COMPUTING SCIENCES

2-digit

- + 0801 Artificial Intelligence and Image Processing
- + 0802 Computation Theory and Mathematics
- + 0803 Computer Software
- + 0804 Data Format
- + 0805 Distributed Computing
- **0806 Information Systems**

4-digit

- > 80601 Aboriginal and Torres Strait Islander Information and Knowledge Systems
- > 80602 Computer-Human Interaction
- > 80603 Conceptual Modelling
- > 80604 Database Management
- > 80605 Decision Support and Group Support Systems
- > 80606 Global Information Systems
- > 80607 Information Engineering and Theory
- > 80608 Information Systems Development Methodologies
- > 80609 Information Systems Management
- > 80610 Information Systems Organisation
- > 80611 Information Systems Theory

6-digit

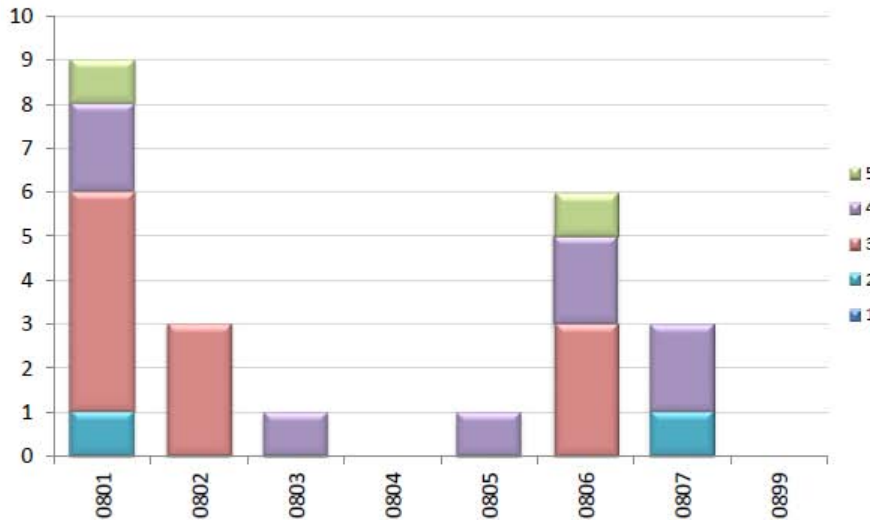
- + 0807 Library and Information Studies
- + 0899 Other Information and Computing Sciences

The ERA Unit is not the department nor the individual researcher

Mathematical, Information and Computing Sciences

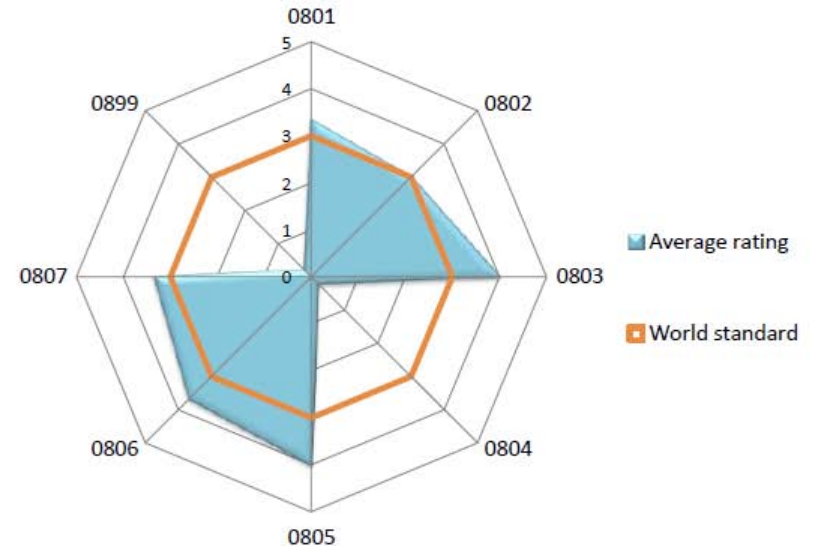
08 Information and Computing Sciences

Number of UoEs per rating scale score



Disciplinary profile

Four-digit FoR ratings

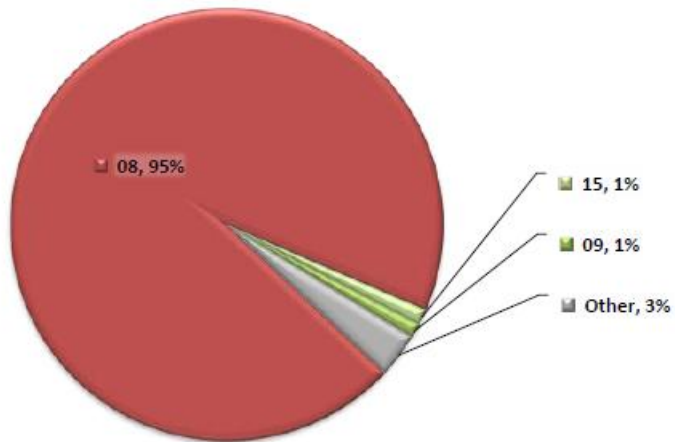


Contribution to national landscape (%)

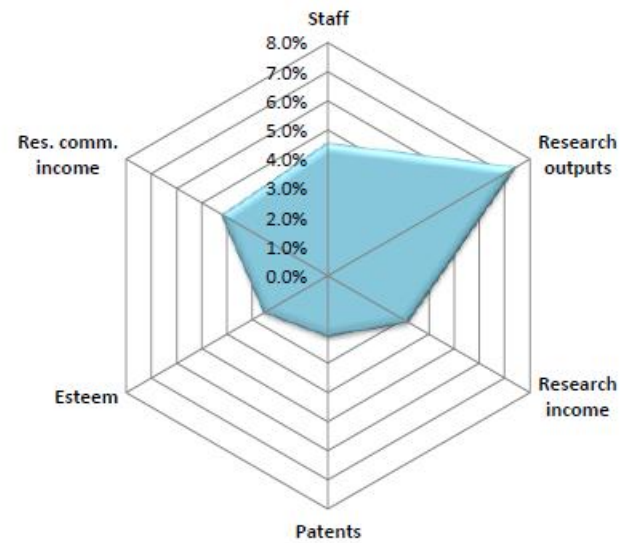
Mathematical, Information and Computing Sciences

08 Information and Computing Sciences

Disciplinary profile



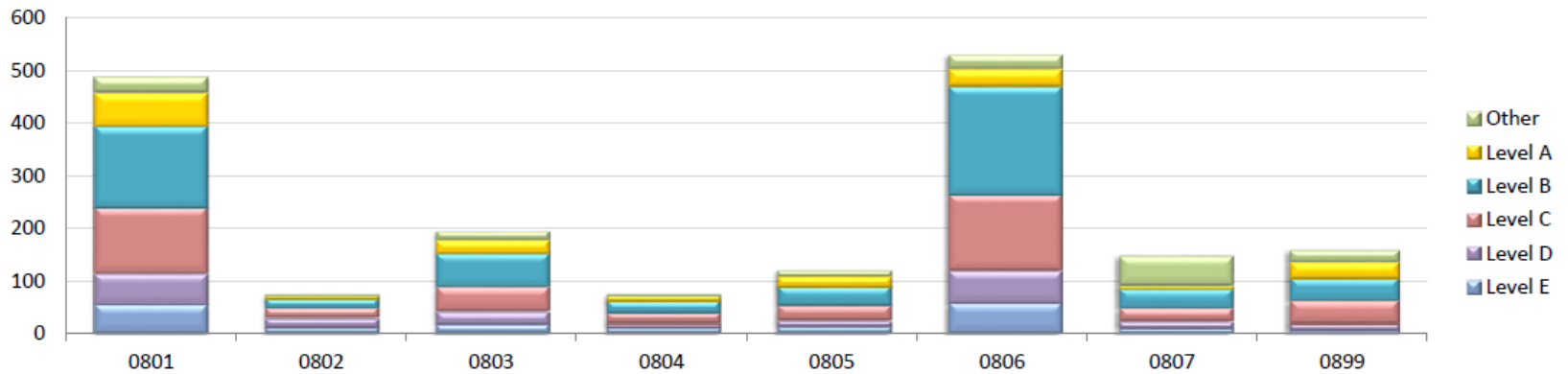
Contribution to national landscape (%)



Mathematical, Information and Computing Sciences

08 Information and Computing Sciences

Staffing profile by academic level



	Level E	Level D	Level C	Level B	Level A	Other	Total
0801	53	59	125	156	64	30	487
0802	11	18	19	19	8	2	76
0803	16	25	46	65	27	17	195
0804	10	8	20	24	11	4	76
0805	12	11	29	36	21	11	120
0806	56	61	144	208	34	27	530
0807	9	13	25	37	7	56	148
0899	7	11	43	43	32	22	159
<b>Total</b>	<b>175</b>	<b>206</b>	<b>450</b>	<b>588</b>	<b>204</b>	<b>169</b>	<b>1,792</b>

1606 Political Science								
% assessed UoEs rated at or above world standard  <b>37%</b>	FTEs	456			Esteem count(s)	55		Average National Rating  <b>2.3</b>
	Research outputs	4,300			Patent(s)	-		
	Research income \$	36,523,512			Res. comm. income (\$)	0		
	UoEs assessed	30						
Rating:		1	2	3	4	5	Total	
Distribution:		8	11	6	4	1	30	

16 – STUDIES IN HUMAN SOCIETY

- Political Science (1606)
- Peer Review
  - Research Commercialisation Income
  - Ranked Journals only
  - Editor of Prestigious Works of Reference

Social, Behavioural and Economic Sciences								
16 Studies in Human Society								
% assessed UoEs rated at or above world standard  <b>45%</b>	FTEs	2,200			Esteem count(s)	275		Average National Rating  <b>2.5</b>
	Research outputs	16,480			Patent(s)	-		
	Research income \$	239,244,308			Res. comm. income (\$)	50,975		
	UoEs assessed	170						
Rating:		1	2	3	4	5	Total	
Distribution:		30	63	49	26	2	170	

## 16 STUDIES IN HUMAN SOCIETY

2-digit

- + 1601 Anthropology
- + 1602 Criminology
- + 1603 Demography
- + 1604 Human Geography
- + 1605 Policy and Administration
- **1606 Political Science**

4-digit

- 160601 Australian Government and Politics
- 160602 Citizenship
- 160603 Comparative Government and Politics
- 160604 Defence Studies
- 160605 Environmental Politics
- 160606 Government and Politics of Asia and the Pacific
- 160607 International Relations
- 160608 New Zealand Government and Politics
- 160609 Political Theory and Political Philosophy
- 160699 Political Science not elsewhere classified

6-digit

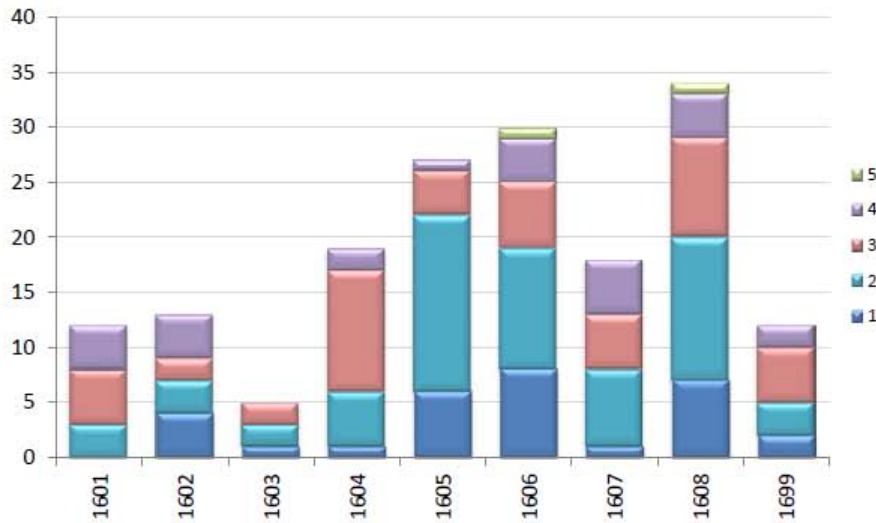
- + 1607 Social Work
- + 1608 Sociology
- + 1699 Other Studies in Human Society

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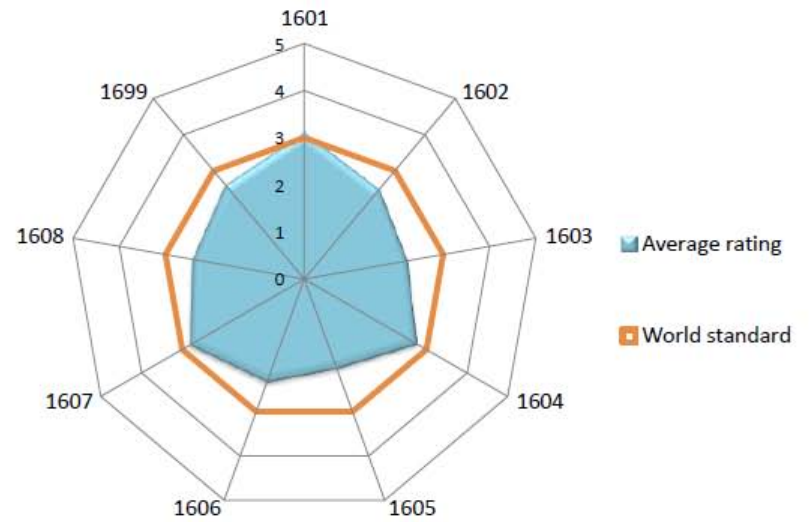
Social, Behavioural and Economic Sciences

16 Studies in Human Society

Number of UoEs per rating scale score



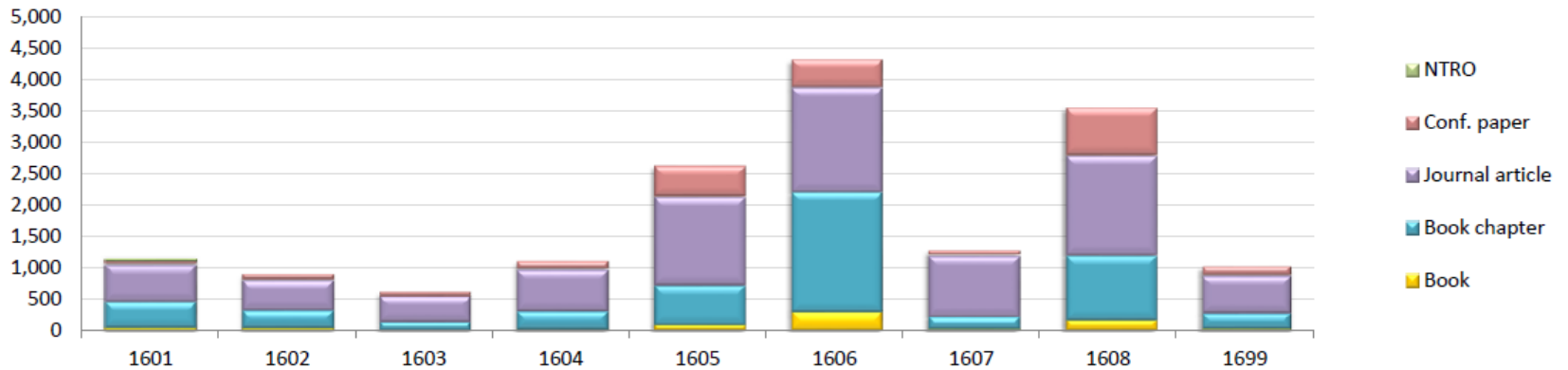
Four-digit FoR ratings



Social, Behavioural and Economic Sciences

16 Studies in Human Society

Research outputs submitted by type

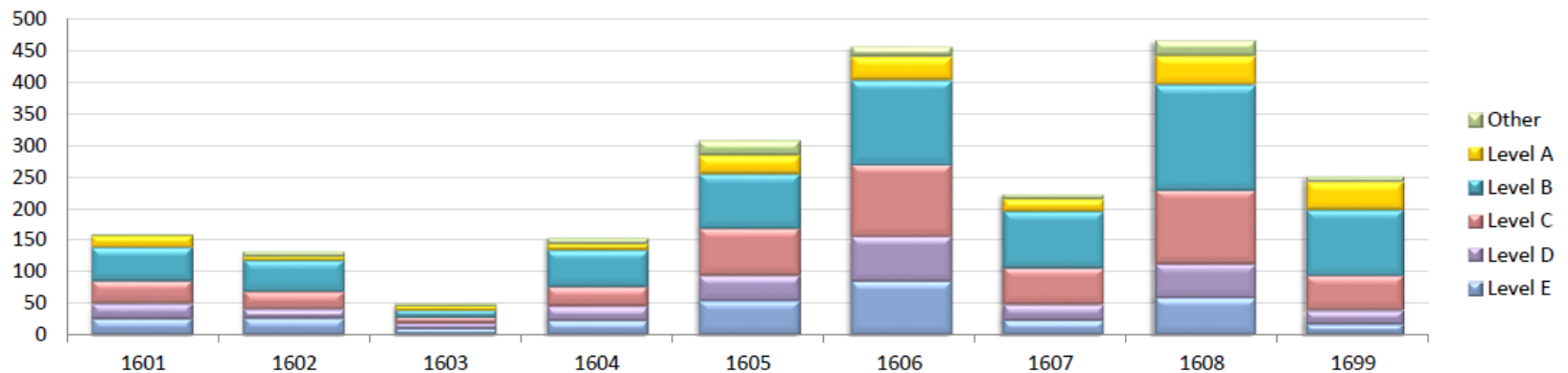


	Book	Book chapter	Journal article	Conf. paper	NTRO	Total
1601	52	419	586	61	36	1,153
1602	49	281	476	86	-	892
1603	14	140	409	45	-	608
1604	29	286	661	120	-	1,096
1605	94	633	1,402	485	-	2,613
1606	297	1,902	1,661	440	-	4,300
1607	35	198	961	72	-	1,265
1608	170	1,033	1,582	753	-	3,537
1699	40	245	591	139	-	1,016
<b>Total</b>	<b>779</b>	<b>5,136</b>	<b>8,328</b>	<b>2,200</b>	<b>36</b>	<b>16,479</b>

Social, Behavioural and Economic Sciences

16 Studies in Human Society

Staffing profile by academic level

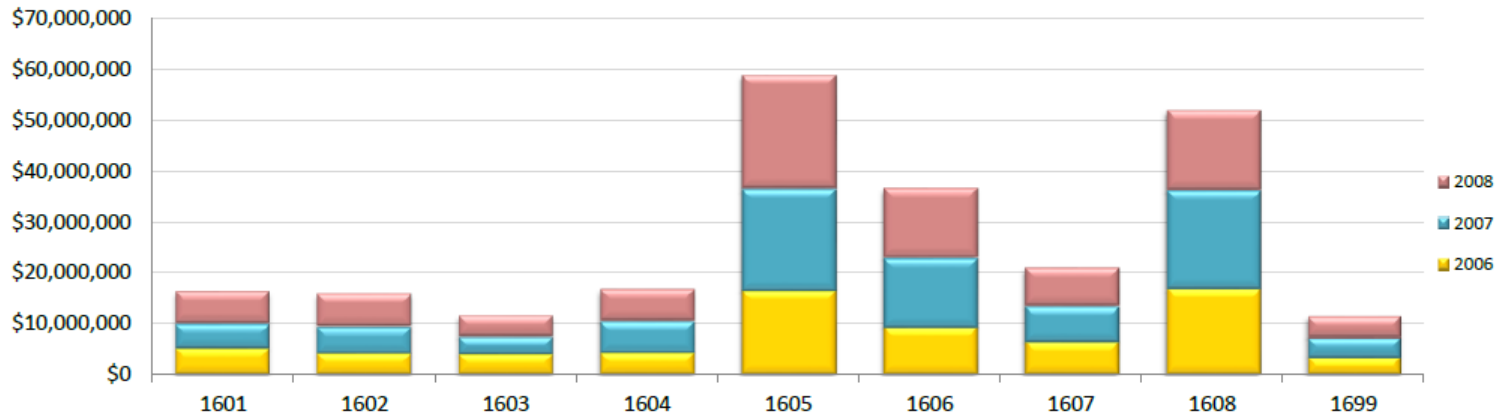


	Level E	Level D	Level C	Level B	Level A	Other	Total
1601	25	24	36	54	19	2	160
1602	26	15	27	51	6	7	132
1603	10	8	10	12	6	4	50
1604	22	23	31	59	10	8	154
1605	53	40	75	87	29	24	308
1606	84	71	114	135	37	15	456
1607	23	25	59	91	19	7	223
1608	58	53	118	167	45	25	466
1699	17	22	55	105	45	7	251
<b>Total</b>	<b>318</b>	<b>280</b>	<b>526</b>	<b>761</b>	<b>215</b>	<b>99</b>	<b>2,200</b>

Social, Behavioural and Economic Sciences

16 Studies in Human Society

Research income – all categories (\$)



	2006	2007	2008	Total
1601	\$5,164,986	\$4,807,566	\$6,274,922	\$16,247,474
1602	\$4,173,259	\$5,215,846	\$6,342,241	\$15,731,346
1603	\$4,010,190	\$3,429,972	\$4,038,476	\$11,478,638
1604	\$4,261,710	\$6,195,842	\$6,142,294	\$16,599,845
1605	\$16,417,616	\$19,998,056	\$22,305,991	\$58,721,663
1606	\$9,257,553	\$13,607,240	\$13,658,718	\$36,523,512
1607	\$6,399,503	\$7,000,209	\$7,436,910	\$20,836,622
1608	\$16,821,305	\$19,309,098	\$15,713,030	\$51,843,433
1699	\$3,343,093	\$3,916,245	\$4,002,436	\$11,261,774
<b>Total</b>	<b>\$69,849,216</b>	<b>\$83,480,074</b>	<b>\$85,915,018</b>	<b>\$239,244,308</b>

## Summary

- Intelligence gathering and evaluation elements of good management
- More detailed mapping is required to trace the quality of defence-related research in Australia.
- Many areas of interest to end-users have performed strongly in ERA.