

Southern African Association for Institutional Research

#### **Foundations of Institutional Research 2015**

# Principles of Data Quality and Use of the Enterprise Data Warehouse at Wits



Presented by Kevin McLoughlin

# Purpose of this session

The purpose of this session is to give you a
 Whistle stop tour of Wits' information
 infrastructure, data quality processes and
 how we use information for strategy,
 integrated planning and performance
 monitoring;





### Content

- Overview of Wits
- Data Warehouse and HEMIS Infrastructure
- Data Quality Processes
- Usage of Information
  - Corporate Performance Management
  - Strategy Implementation through Integrated Planning



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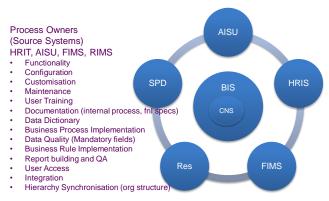
### **Overview of Wits**

- 32000 students and 4000 staff (±1200 perm academics)
- Federated structure 5 autonomous faculties and 34 schools;
   Each faculty has own HR Manager, Business Manager and
   Faculty Registrar reporting to the Dean
- Functional system specialists (central process owners) AISU, HRIS, FINIT
  - Responsible system, training, reporting, data quality
- BIS responsible for data integration (EDW), models, integrated stats, trends, predictive analytics and HEMIS
- Systems Oracle Financials and HR, Peoplesoft Campus Solutions (SIMS) with bespoke HEMIS functionality
- Data Warehouse Integrate data using Oracle Data Integrator, CDC technology. Reporting using OBIEE, Business Objects, QlikView and Discoverer



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# **BIS Partners**Responsibilities



There should be standardisation of these Functions across information areas – e.g. user access, use of OLM for training etc



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#### RIS

(Data Warehouse)

Custodian of DW

- Design
  - Populate
- QA (=source)
- Inform Institutional performance vs targets
- Enrolment Planning
- Predictive analytics
- Studies (HS Application Strategy)
- Integrated trends & stats
- Models
- Dashboards
- Complex report support
- Portal
- HEMIS
- CRM
- User training

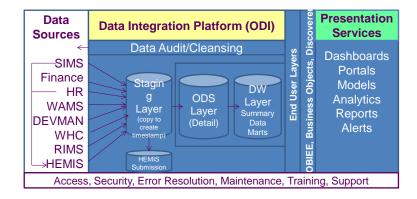
#### SPD

- Benchmarking
- Surveys
- Profiles (schools, faculty)
- Report writing & Interpretation
- Rankings
- External data sourcing
- (Scopus, Insights, Mouton)
- Fact Book
- Special Projects (Kresge)
- IR Studies



# **Data Integration**

Wits Enterprise Data Warehouse



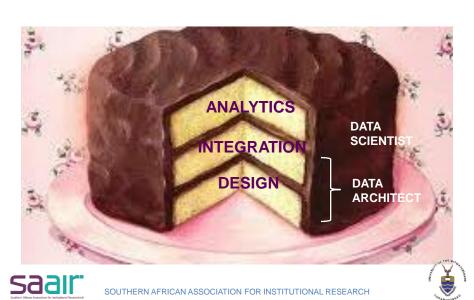


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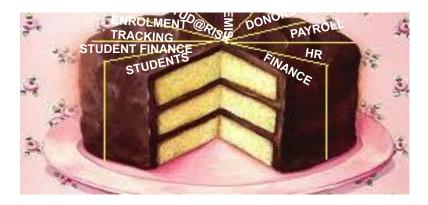




# **Data Warehouse Processes**



### **Data Warehouse Data Marts**

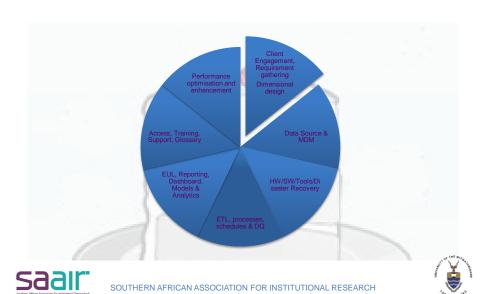




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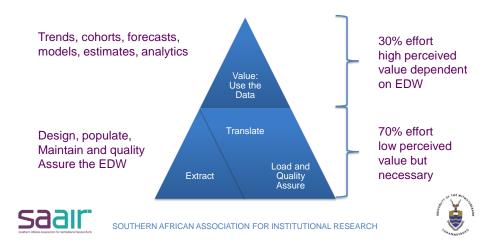


## **Data Mart Activities**



# **Value Proposition**

**BIS Core Values** ROI Responsiveness Quality



## Why is data quality important?

- Information is used for:
  - Planning and decision making
  - Resource allocation
  - Reward
  - Accountability
  - Censure and sanction
  - Accreditation
  - Subsidy





### **8 Dimensions of Quality**

#### **David Garvin**

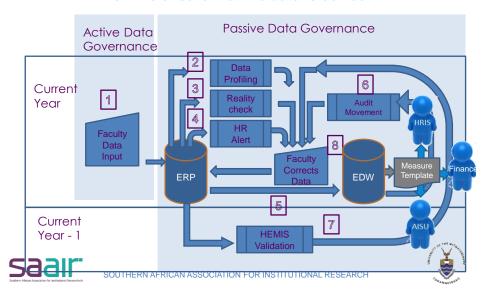
- Performance: can I access the information I need quickly and easily? Can you make new data available quickly to answer this important question?
- Features: can I manipulate and export the information?
- Reliability: is the information correct?
- Conformance: does the information meet my requirements?
- Durability: can I build trends and projections over time?
- · Serviceability: can problems be rectified quickly?
- Aesthetics: can the information be interpreted easily? Do the visualizations enhance my understanding of the data?
- Perceived Quality: I am told the data is audited and correct, but it differs from the reality in my school?



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# **Data Quality Processes**

How we ensure that the data is correct



# **Measures Template**









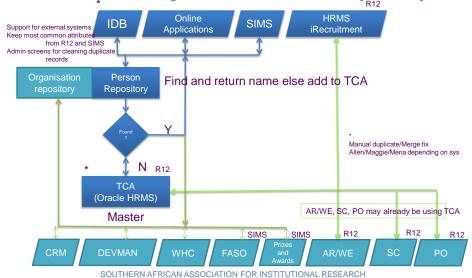
# **Stages of Data Maturity (Wits)**

- Disconnected islands of technology disputes over figures
- HEMIS validation done on prior years data
- Implementation of an integrated ERP
- Implementation of an Enterprise Data Warehouse single version of the truth
- Data profiling and data discrepancy reports daily data cleansing
- Process agreed with partners (AISU, HRIS, FINIS, Research Office) to fix data
- HEMIS validation includes current years data
- Near real time and in process BI enrolment planning
- Next round integrate disconnected systems to give a 360 view of external organisations (fundraising)





# Person Repository and Trading Community Architecture (TCA)



# **Data Management Challenges**

- · ERP hierarchies get out of sync
- Wits may regard a staff member as an academic (e.g. DVC) whereas they are not an academic ito HEMIS rules (internal view differs from HEMIS view)
- Staff member is allocated to an organisation and derives his/her CESM from the organisation. An academic may belong to a support organisation which does not have a CESM
- Technician roles are defined on HEMIS as academic support but some do teaching
- Not all fields are mandatory missing values
- Defaulted values that are not captured (e.g., PCS template)
- Joint staff update the province but not Wits





### How we use the data....

- Corporate Performance Management
  - Strategy
  - Target Setting
  - Monitoring
- Implementation
  - Integrated Planning
  - In process BI



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# Corporate Performance Management

- Wits 2022 Strategic Framework
- · School Portal
- · Dashboards and Targets
- Efficiency Ratios benchmarking
- Heads of School Executive Summary
- · Deans Executive Summary
- SET Executive Summary\*
- VCO Dashboard (Institutional Scorecard)
- Research Dashboard\*
- Financial Dashboard\*
- · Quinquennial Reviews
- Ranking statistics THES





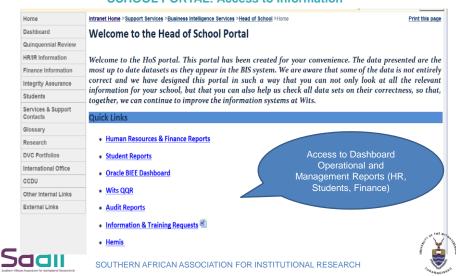
## **Corporate Performance Management**

Strategic Framework - Objectives for 2022



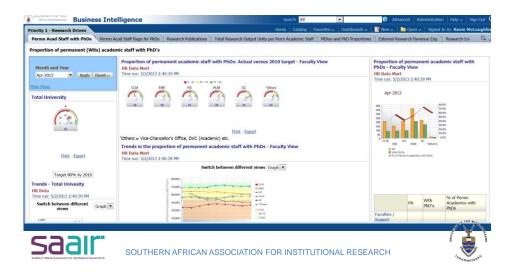
# Corporate Performance Management

SCHOOL PORTAL: Access to Information



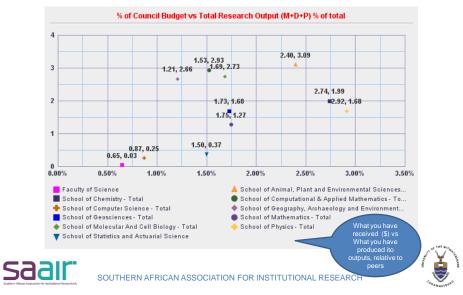
# Corporate Performance Management

**DASHBOARD: Monitoring Performance against Target** 



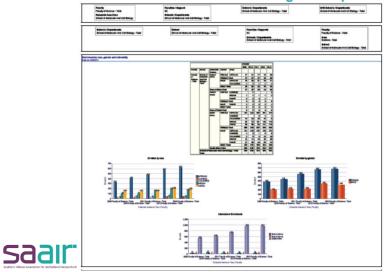
# **Efficiency Ratios**

Benchmarking against other schools in faculty



# Heads of School – Executive Summary

**Tailored Information for Target Group** 





# **Quinquennial Reviews**

**Monitoring School Performance - 5 Years** 

	TAB	Details					
1	Permanent Academic Staff with PHDs	Report shows the headcount of the permanent academic staff the the % of these staff that have a PHD. Please note that if the qualification records has not been captured on the system then the staff member will not be counted as having a PHD					
2	Total Staff FTE - summary	This report provides a total of the staff FTEs for the school. Please note there are 2 columns for the FTEs 1. Staff Fte Univ (excl Hosp & Registrars) - used for internal reporting 2. Staff Fte Univ (excl Hosp Only) - used for reporting to DOE					
3 ,	Academic Staff FTE	This report provides a total ACADEMIC of the staff FTEs for the school. There is a summary as well as the details of all staff members that contributed to the total academic staff FTE					
4	Support Staff FTE	This report provides a total SUPPORT of the staff FTEs for the school. There is a summary as well as the details of all staff members that contributed to the total support staff FTE This reports list the staff that have been promoted in the school by academic session. For support staff if					
5	Number of Promotions	there has been a grade change to a higher grade then this is classified as an promotion. Staff Headcount data used.  This report provides the staff age profile. There are 2 reports that shows totals by academic and support					
6		and totals for each age group. If you require the other totals that are not presented in the report please contact the BIS team					
7	Staff Gender / race profile	This report provides the staff gender/race profile. There are 2 reports that shows totals by academic and support and totals for each gender/race group. If you require the other totals that are not presented in the report please contact the BIS team					
8,	Academic Staff with Hidhest Qualification	This report has a summary of the no. of qualifications of staff within a qualification type. Only the records with completed - higest status are considered for the totals.					





# **Strategy - Implementation**

- Formulate the Strategy
- Agree the Targets
- Align resources with objectives through integrated planning
- Monitor performance within the process



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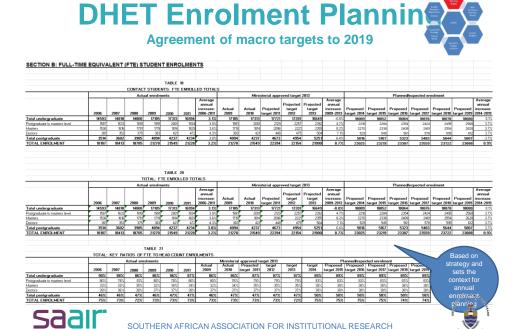
# Integrated Planning and Performance Management

How we use the data









# **Enrolment Planning Mode**

- · Estimate enrolments at program level
- · With Deans, plan expected New UG/PG inputs
- Estimate UG flow rates
- Estimate PG qualifications and dropouts per qualification type
- · Derive total enrolment picture
- Rollup to UNIV level
- Enrol>HC>FTE>TIU
- Compare Rollup to DHET TIU target (DVC: Academic)
- Iterate until bottom up and top down satisfy targets
- Faculty targets feed into registration process





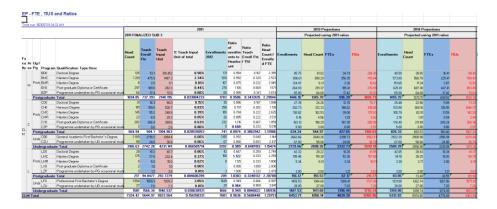
# Enrolment Planning Mode Estimate 1st time entering

Faculty	Progam	, videa by	the Deans of each Faculty  Program Description	Proposed Projections for 2012 1st Time Entering Enrolment	Actual New to Wits 2011	Variance 2012 (2012 Projection versus 2012 Actual) %		Proposed Projections for 2013 1st Time Entering Enrolment	Proposed Projections for 2013 Yos 1 Returning Enrolment	Proposed Projections for 2013 Yos 1 Total Enrolment
			General Academic 1st Bachelors							
Arts	AB0000	AB000	Degree	850	659	16.34%	1016	850	545	1395
	AF0000	AF000	Bachelor of Arts in Dramatic Art	71		-3.48%	69	71	59	130
	AF0001	AF001	Bachelor of Arts in Fine Arts	44	45	-3.35%	43	44	25	69
	AF0003	AF003	BA in Speech & Hearing Therapy	39	24	-2.70%	38	39	5	44
	AF0004	AF004	Bachelor of Music	24	22	-2.70%	23	24	18	42
	AF0007	AF007	Bachelor of Social Work	60	38	35.00%	92	60	15	7:
	AF0008	AF008	BA in Performing & Visual Arts	44	22	-34.00%	33	45	13	51
Arts - Total				1133	873	13.81%	1314	1133	680	1813
Education	HF0021	HF021	Bachelor of Education (Foundation Phase Teaching) Bachelor of Education (Senior Primary	111	82	-10.54%	100	111	3	11
	HF0022	HF022	Teaching)	105	78	-16.83%	90	105	3	10
	HF0023	HF023	Bachelor of Education (Secondary Teaching) HU0046-Advanced Certificate in	334			301	334	11	34
	HU0046	HU046	Education in School Leadership and Management	169		0.00%	169	180		18
Education - To				719		-8.94%	660	730	17	
Humanities Total				1852		6,20%	1974	1863	697	



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- Faculty budgets
  - Based on enrolment plan
  - Generated at course level
  - Estimate income to be generated
- MTEF Scenarios
  - Given sector allocations for input, output, research
  - Based on current statistics
  - What is Wits' likely share of subsidy



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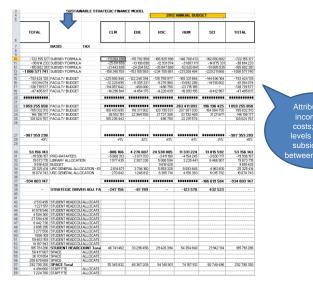
# Sustainable Finance Mode

- Guides budget allocations to faculties and support services
- Agreed Support/Academic split
- Agreed levels of cross subsidization
- Agreed levels of strategic funding
- Attribution of costs
  - Staff related
  - Student related
  - Space related
- Guide for one line budget given to faculties
- · Faculties split to schools













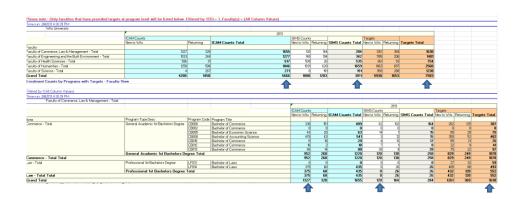
## **Enrolment Targeting Process**

- During Registration process:
  - Can faculty make an additional offer from waitlist?
  - Requires near real time stats
  - Online Registrations (flex curriculum from 2015)
  - All registrations forms (non online) captured same day





# **Enrolment Targeting**





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# **Enrolment Analysis**

**Debriefing Statistics** 

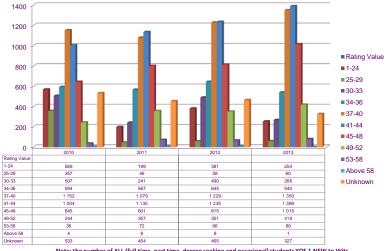


- Accept rate applications versus firm offers
- UG applications by APS\* band
- · UG firm offers by APS band
- Applications, Offers and Registrations by Faculty
- New to Wits versus Returning
- · New to Wits by APS band etc
- Admission Points Score composite measure of matric performance





# New to Wits Undergraduate Student Enrolment by Admissions Points Score(APS) 2010-2013





Note: the number of ALL (full time, part time, degree seeking and occasional) students YOS 1 NEW to Wi Undergraduates enrolled SOUTHERN AFRICAN ASSOCIATION FOR INSTITUTIONAL RESEARCH



### **Early Warning System**

BI in the teaching and learning process

Details will be presented by Innocent Mamvura

- Proactively identify students (1st years) at Risk
- Set up course structure in WAMS and capture marks
- Do snapshot from WAMS into Early Warning Data Mart
- Dedicated staff in faculties review students at risk
- · Formulate and capture interventions
- At end of year BIS needs to correlate interventions with movements out of 'at risk' to determine which interventions lead to student success





# The End...

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