BMI-DST-ABSA Risk Research Programme Funding Overview

Presented at

BMI-DST-ABSA Directed Risk Research Workshop
DST Auditorium, CSIR Campus

2 June 2016

Presenter: Neels Erasmus, Centre for BMI, NWU

NORTH-WEST UNIVERSITY
YUNIBESITI YA BOKONE-BOPHIRIMA
NOORDWES-UNIVERSITEIT
POTCHEFSTROOMKAMPUS

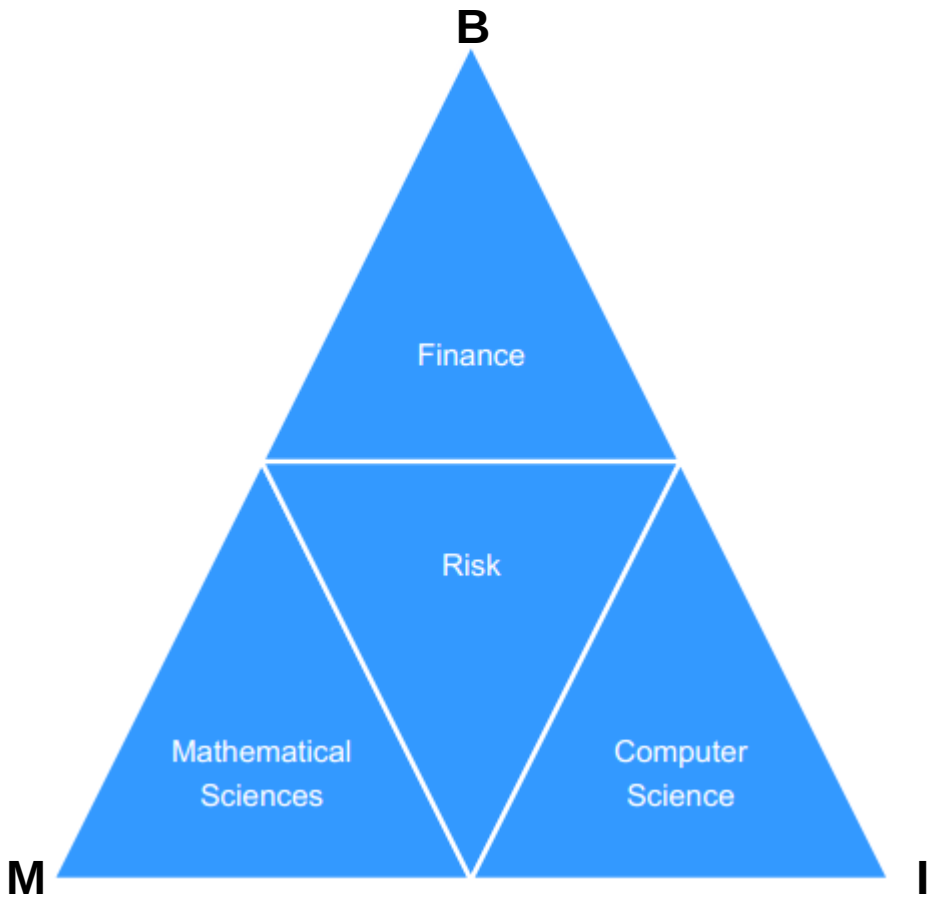
Attendance Profile

Row Labels	Academia	Industry	Parastatal	Prof Body	Public Sector	Grand Total
SUN	2					2
BANKSETA		1				1
Barclays Africa		2				2
BASA		2				2
CPDynamics		2				2
Dept of Water & Sanitation					2	2
DST					2	2
Fisglobal		3				3
FNB		2				2
IRMSA				1		1
National Treasury					3	3
NWU	14					14
SARB					1	1
Sasol		1				1
STD Bank		4				4
Transnet			2			2
UCT	1					1
UFS	1					1
UKZN	1					1
UNISA	8					8
UP	3					3
WITS	1					1
XDS		1				1
Grand Total	**31**	**18**	**2**	**1**	**8**	**60**

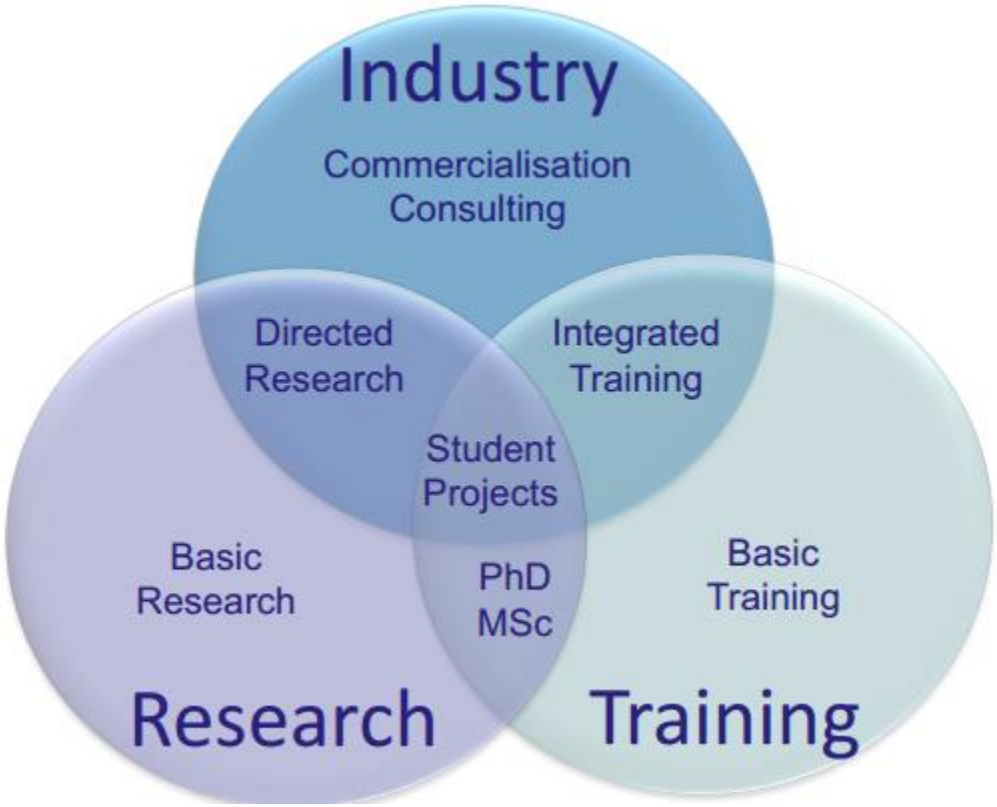
Agenda

1. BMI risk training and research – where it started
2. The Absa/BAG connection
3. The DST connection
4. Research projects funding process
5. Funding summary
6. Going forward

BMI Training Programme Design
The Business-Mathematics-Informatics Triangle



BMI Training Programme Design
The Industry Engagement Framework



RISK TALENT PIPLELINE DEVELOPMENT ROADMAP

v.7.2

Absa Graduate Development Program

- Managed by Group Talent (Elegance Gozo)
- Candidates already employed in business
- Consists of 1x2 week intervention in Jan/Feb followed by 3 quarterly interventions during the year
- Cost to business approximately R43k per graduate

Placement in Absa

Graduates sourced externally

Placement in Absa

Placement in Group Risk

Direct placement elsewhere in Absa

Group Risk Placements

HBCom / HBSc

Yr 4
Yr 3
Yr 2
Yr 1

BCom Hons / MSc

Yr 5: Student Research Projects

Yr 4 / Yr 3: Student Vacation Work

Yr 2
Yr 1

- Academic requirement
- 6 Months Jul -> Dec
- Cost to business 6xR8.5k/month
- Appointed as code UR
- Workspace & pc's organised by bus
- Apply for perm pos in October

- Group Risk 3rd + 4th year socialisation
- 2 Weeks in June holiday
- No cost to business
- Accommodation, meals and allowance paid by COO Risk
- Appointment, computers & workspace organised centrally
- Only business responsibility to define suitable vacation project and provide oversight

	Absa Bursary Program	Absa/BMI Bursary Program
Training focus:	**Generic B-degree** - Information Engineering - Economics - Law - Accounting - Marketing - Industrial Psychology - Industrial Sociology	**Specialised in Risk** - BCom Honours (Risk Management) - MSc in BMI (Business Mathematics and Informatics)
Exit level:	Baccalareus degree	Postgraduate (MSc or BCom Hons) degree
Entry level: University	Students who have completed first Ac Yr Various Universities	Matriculants NWU only

- Annual recruitment drive
- Advert in papers in Aug
- Student marketers at VTC (Employed on commission)
- Target Grade 11 learners
- Conditional bursaries

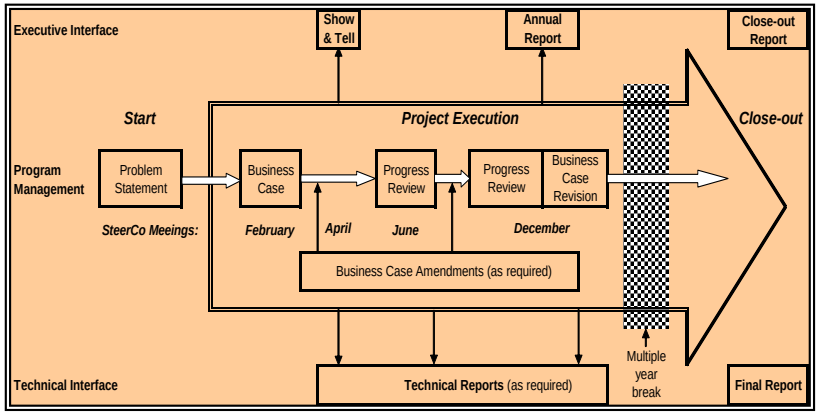
Project Types:

a) **Standard Research/Consulation projects**
Academic research team,

b) **Student Industry Projects**
Not an Univ req'ment, Stud project team with acad supervision

c) **Student Vacation Work Spillover Projects**
Absa requirement; Supervised by Absa; Project admin by Uinv

APPLIED RISK RESEARCH PROJECT MANAGEMENT PROCESS



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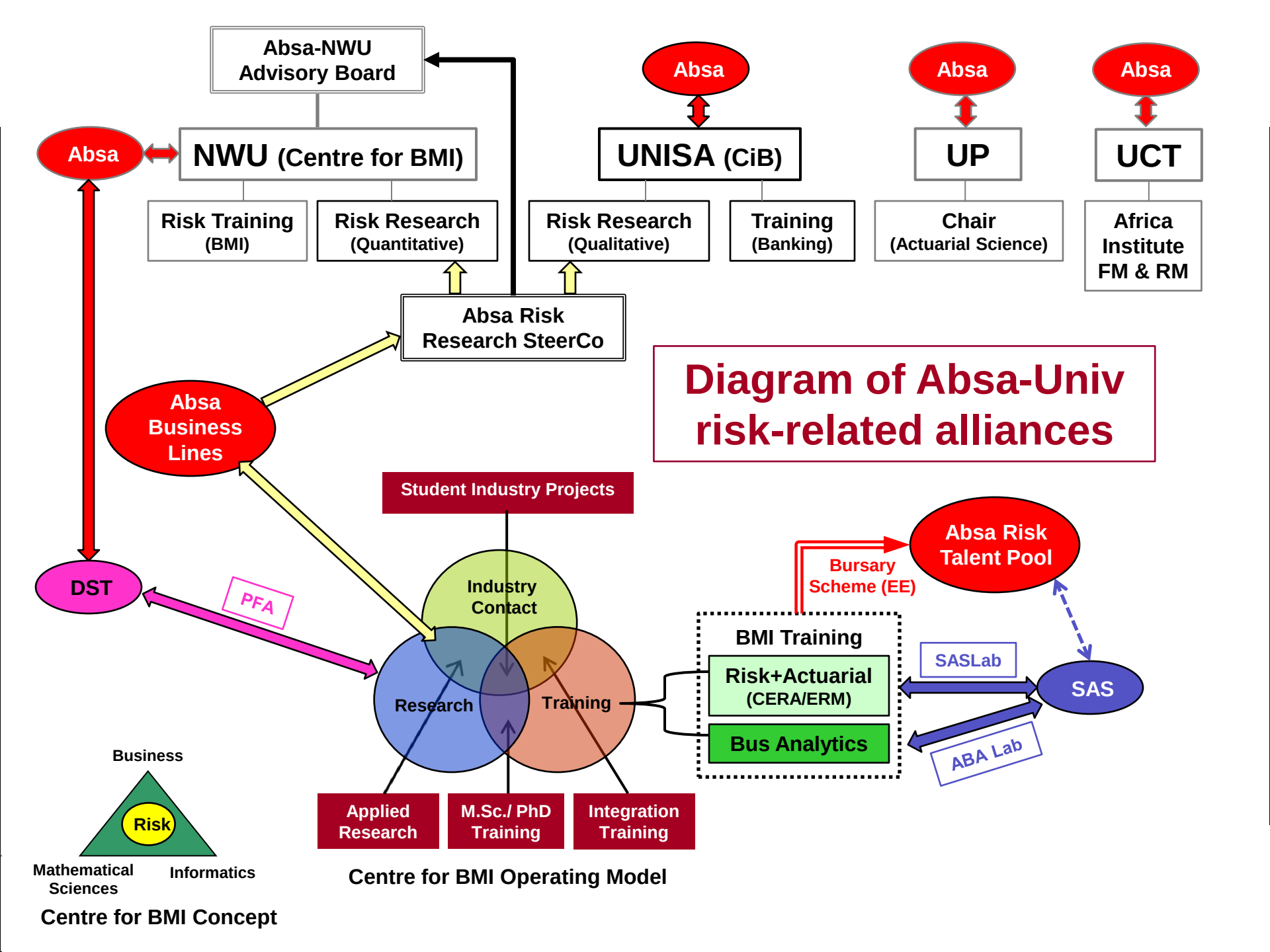

Absa-NWU Advisory Board
Absa
NWU (Centre for BMI)
Risk Training (BMI)
Risk Research (Quantitative)
Absa
UNISA (CiB)
Risk Research (Qualitative)
Training (Banking)
Absa
UP
Chair (Actuarial Science)
Absa
UCT
Africa Institute FM & RM
Absa Risk Research SteerCo
Absa Business Lines
Diagram of Absa-Univ risk-related alliances
Student Industry Projects
DST
PFA
Industry Contact
Research
Training
Absa Risk Talent Pool
Bursary Scheme (EE)
BMI Training
Risk+Actuarial (CERA/ERM)
Bus Analytics
SASLab
SAS
ABA Lab
Applied Research
M.Sc./ PhD Training
Integration Training
Centre for BMI Operating Model
Business
Risk
Mathematical Sciences
Informatics
Centre for BMI Concept

Summary of Absa-University Risk Alliances

NWU BMI training programme for masters level specialist risk skills.

- Absa seeding partner to first 5-year MoA in 1998. Current MoA for the period 2016 - 2018
- MoA covers bursaries, operational support & funding for contracted applied risk research
- To date 136 Absa bursary holders (40 black) graduates delivered by programme.
- BMI programme has had strong industry impact - total MSc delivered = 357 (31 black)

NWU BMI applied risk research programme

- Programme launched in 2006. Current MoA for the period 2016 – 2018.
- On average 10 projects per year (112 in total). Focus on quantitative risk problems in financial services
- Governance in place to source problems in Absa and manage execution interface with University
- Absa Project Owners rated completed projects highly in terms of business value-add
  (Overall 78% of budget has been spent on projects that were rated higher than 3 on a scale of 1 to 5)
- MCom in Risk (UARM) established at the NWU VTC from one of these research projects (2013)

UNISA Chair in Banking

- Chair sponsored by ABB in 1998 for 5 years - MoA for training/research activities as well as branding
- From mid-2010 realigned to the same governance as BMI, in doing applied risk research for Absa
  (Focus on qualitative, Operational Risk issues of an interdisciplinary nature)

University of Pretoria Chair in Actuarial Science

- MoA signed in 2012 for 5 years – focus on actuarial training in Africa

UCT Africa Institute for Financial Markets and Risk Management

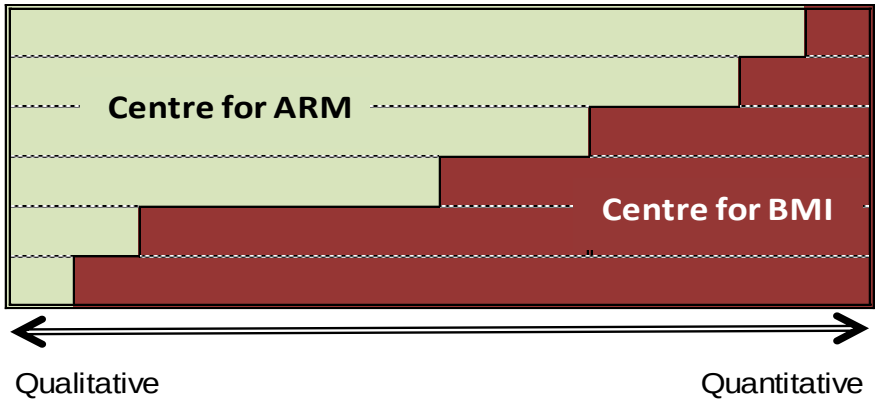
- Seeding support for UCT AIFMRM in 2014 for 5 years (Focus on quantitative risk, similar to BMI)

NWU Centres for BMI and ARM Research & Training Interface

Research

Risk Type

- People
- Strategic
- Compliance
- Operational
- Credit
- Market



Training

Centre for ARM

Focus: Qualitative Risk Management Training
(not industry-specific and across risk types)

Qualification: MCom in Applied Risk Management

Subjects:
- Applied analysis and research in risk management;
- Fundamentals of risk management;
- Behavioural risk management;
- Risk data and reporting;
- Risk assesment tools;
- Mini-dissertation.

Centre for BMI

Focus: Quantitative Risk Management Training
(for Financial Services Industry)

Qualification: Hons BSc and MSc
- Business Analytics
- Risk Analysis

Subjects: Quantitative Risk Analysis; Financial Engineering; Investment Theory; Statistical Data Analysis - Models & Time Series; Multivariate Statistics; Financial Modelling; Pricing of Derivatives; Practical Data Mining; Modern Porfolio Theory; Retail Credit Risk; Enterprise-wide Risk Management.

BMI = Business Mathematics and Informatics;
ARM = Applied Risk Management

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DST Funding for Risk Research

- MoA between DST and Absa signed in 2012 to cooperate in various fields, *inter alia* HCD (Human Capital Development)
- The DST identified the BMI risk research programme as deserving of additional funding for basic risk research
- 2014: 5-year PFA for R8.9m with BMI to "stimulate directed and basic risk research across primarily tertiary institutions and in the process delivering skilled students (MSc's and PhD's) in the area of risk analytics"
- 2016: Project Funding Agreement extended by 2 years, up to FY 2017/18

DST Funding for Risk Research - Application

2012/13

- Hosted a 2-day risk research workshop at NWU Potch Campus in March 2013
- Co-hosted the Mathematics in Finance Conference in Kruger Park in August 2014
- Balance of funds allocated as a grant to universities to foster research in risk

2013/14

- Conducted a national survey amongst universities to quantify the landscape on risk research and to set up a database of research initiatives, PhD students and academic papers in the field
- A three-tiered ranking system based on **Academic Impact**, **Industry Relevance** and **level of industry collaboration** was developed and used to allocate funds to the universities based on the articles published up to 2014 in an *ex-post* manner

2014/15

- Expanded process by requesting industry to submit problem statements and inviting **technology-pull** research proposals from universities in response (Funded)
- In addition to these, universities were also invited to submit **technology-push** proposals, based on their current areas of research. (Also qualified for funding)
- An agreement was also reached with BASA (the Banking Council of South Africa) to use their website as a common repository for these documents
- Expanded funding base to include Masters and PhD dissertations in risk

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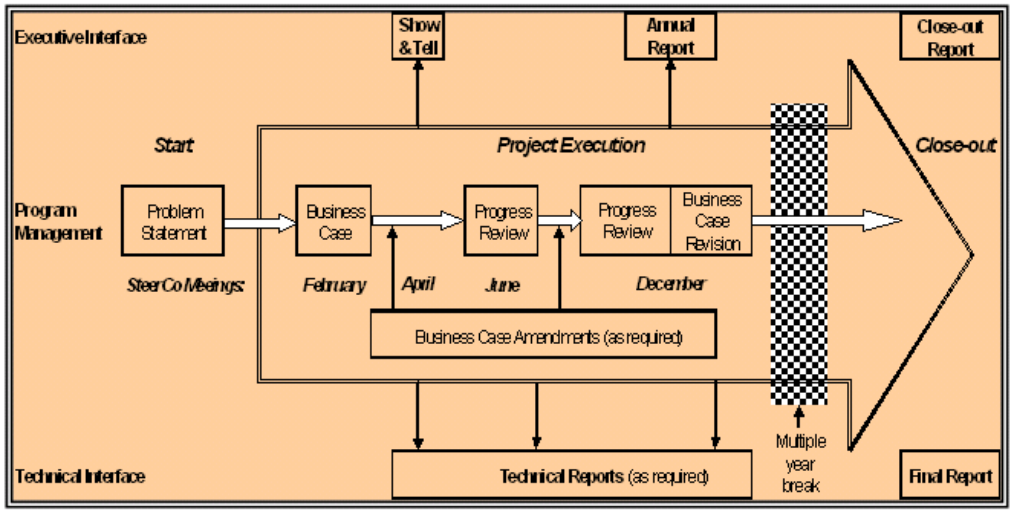
BMI-DST-Absa Directed Risk Research Programme



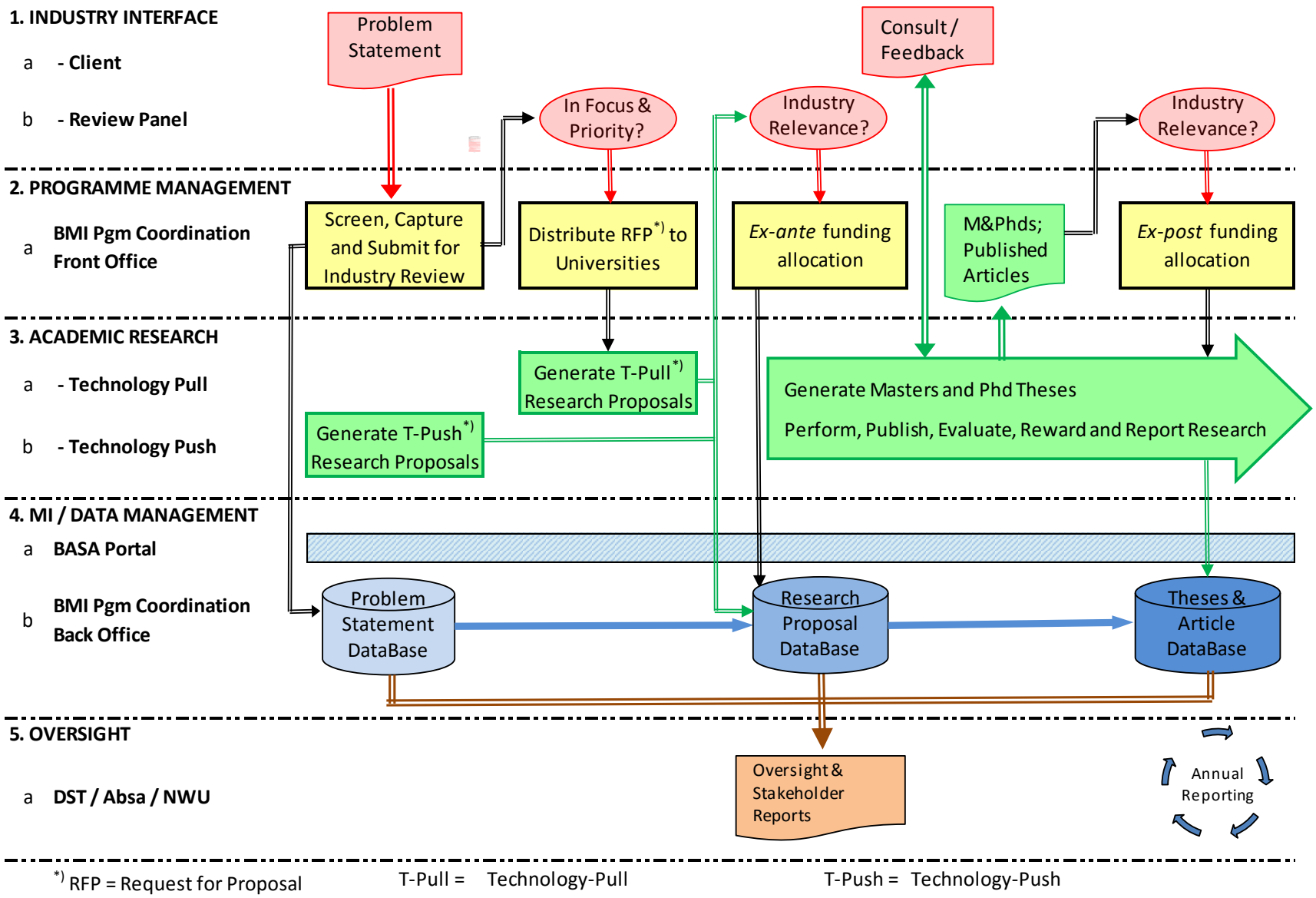
Problem Statement (One-Pager)

- Client details
- Project Title
- Project Goal
- Problem Description
- Objectives
- Outputs Required
- Strategic Value

Research Proposal

- University details
- Project Title
- Project Goal
- Scope
- Objectives
- Research outputs/deliverables
- Approach to be followed
- Strategic Value

The BMI-DST-Absa Risk Research Process Diagram



*) RFP = Request for Proposal T-Pull = Technology-Pull T-Push = Technology-Push

Industry Problem Statements Received - 2015

ProbNr	Org	Title/ Description	Authors/Collaborators
PS15001	StdBank	Combining internal and scenario loss data in OpRisk quantification	Haasbroek, LJ (Leendert)
PS15002	StdBank	Macro-Economic Stress Testing for OpRisk	Haasbroek, LJ (Leendert)
PS15003	SARB	Basel III Minimum Capital Requirements	Jansen van Rensburg, Y (Yolindi)
PS15004	AbCap	Credit Curve Model	van der Merwe, P (Pieter); de Jager, T (Tiaan)
PS15005	StdBank	Alternatives to splice distributions in OpRisk quantification	Haasbroek, LJ (Leendert)
PS15006	PWC	Embedded Derivatives	Ngugi, A (Alvin)
PS15007	StdBank	Quantile Approximation	Haasbroek, LJ (Leendert)
PS15008	BAG	Estimation techniques for deriving the Basel LGD estimates	van der Walt, F (Freek)
PS15009	BAG	The use of PECDC data in LGD modelling in South Africa	van der Walt, F (Freek)
PS15010	XDS	Research in predictive modelling: Binning, Variable selection, Income modelling	de Wet, D (Dries)
PS15011	BAG	Semi-supervised segmentation within a predictive modelling context in retail credit	Robbertse, W (Wickes) TBC
PS15012	BAG	Low default portfolios – estimation of the probability of default	van der Walt, F (Freek)
PS15013	FNB	Multi-Period Credit Portfolio Optimisation	Visagie, L (Loutjie); Nolan, D (Derrick)
PS15014	Peregrine	Pricing and risk management of derivatives in dynamic markets	Flint, E (Emlyn)

Article Prioritisation – Evaluation Criteria

Academic Impact (Categories High/Medium/Low)

The accreditation level of the journal where the article was published determines the category:

- Low = only DHET (Department of Higher Education and Training)
- Medium = either ISI (Thomas Reuters Web of Science List) or IBSS (Proquest International Bibliography of Social Science)
- High = both ISI and IBSS.

Industry Relevance (Categories Yes/Maybe/No)

- The Industry Relevance was taken as the consensus view of a number of industry representatives considered to be experts in the application field
- They received a list of the articles containing only the article names and abstracts of the articles, with the request to rate them on a 3-category scale Yes/Maybe/No.
- The Industry Relevance assessment is further broken down into one of 5 risk themes (Market Risk, Credit Risk, Operational Risk, Regulatory Risk and Systemic Risk), which are then allocated different weightings relative to its importance during the fund allocation process

Industry Collaboration (Categories Yes/No)

The Industry Collaboration was Yes/No, depending on whether one of the authors of the article was a member of industry.

Article Prioritisation – Combining the Criteria

Used a pair-wise comparison method to compare each of the possible 3x3x2=18 combinations of the three criteria with each other possible combination, and decide which one is more deserving of funding

Allocation Key Pairwise Comparison

Total	AllocKey:	HiYesYes	HiYesNo	HiMayYes	HiMayNo	HiNoYes	HiNoNo	MedYesYes	MedYesNo	MedMayYes	MedMayNo	MedNoYes	MedNoNo	LoYesYes	LoYesNo	LoMayYes	LoMayNo	LoNoYes	LoNoNo
17	HiYesYes	X	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
16	HiYesNo	0	X	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
11	HiMayYes	0	0	X	1	1	1	0	0	1	1	1	1	0	0	1	1	1	1
10	HiMayNo	0	0	0	X	1	1	0	0	1	1	1	1	0	0	1	1	1	1
7	HiNoYes	0	0	0	0	X	1	0	0	0	0	1	1	0	0	1	1	1	1
3	HiNoNo	0	0	0	0	0	X	0	0	0	0	0	1	0	0	0	0	1	1
15	MedYesYes	0	0	1	1	1	1	X	1	1	1	1	1	1	1	1	1	1	1
14	MedYesNo	0	0	1	1	1	1	0	X	1	1	1	1	1	1	1	1	1	1
10	MedMayYes	0	0	0	0	1	1	0	0	X	1	1	1	0	1	1	1	1	1
8	MedMayNo	0	0	0	0	1	1	0	0	0	X	1	1	0	0	1	1	1	1
5	MedNoYes	0	0	0	0	0	1	0	0	0	0	X	1	0	0	0	1	1	1
1	MedNoNo	0	0	0	0	0	0	0	0	0	0	0	X	0	0	0	0	0	1
13	LoYesYes	0	0	1	1	1	1	0	0	1	1	1	1	X	1	1	1	1	1
11	LoYesNo	0	0	1	1	1	1	0	0	0	1	1	1	0	X	1	1	1	1
6	LoMayYes	0	0	0	0	0	1	0	0	0	0	1	1	0	0	X	1	1	1
4	LoMayNo	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	X	1	1
2	LoNoYes	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	X	1
0	LoNoNo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	X

Article Funding (used for 2015 allocation)

Developed a fund allocation model based on scores from comparison table:

- Define a cut-off score below which we do not fund
- Define a minimum and a maximum funding per article
- Total allocation required to fit inside available budget

	Academic Quality	Industry Relevance	Acad-Indust Coll	Score	Rands/Article
1	High	Yes	Yes	17	90,000
2	High	Yes	No	16	81,100
3	Medium	Yes	Yes	15	72,200
4	Medium	Yes	No	14	63,350
5	Low	Yes	Yes	13	54,450
6	Low	Yes	No	11	36,650
7	High	Maybe	Yes	11	36,650
8	Medium	Maybe	Yes	10	27,800
9	High	Maybe	No	10	27,800
10	Medium	Maybe	No	8	10,000
11	High	No	Yes	7	0
12	Low	Maybe	Yes	6	0
13	Medium	No	Yes	5	0
14	Low	Maybe	No	4	0
15	High	No	No	3	0
16	Low	No	Yes	2	0
17	Medium	No	No	1	0
18	Low	No	No	0	0

Proposals, Masters & Phd Dissertation Funding (2015)

Proposals

- Only the “Industry Relevance” criterion is used with the same risk themes
- Use categories High/Medium/Low/None
- The funding allocation further differentiates depending on whether it is a “Technology-Pull” or a “Technology-Push” proposal.

Proposal Type	Proposal Rating	Fund Allocation
Tech-Push:	TPush-0	0
	TPush-L	5000
	TPush-M	10000
	TPush-H	15000
Tech-Pull:	TPull-0	0
	TPull-L	10000
	TPull-M	15000
	TPull-H	20000

Masters and PhD Dissertations

- Only the “Industry Relevance” criterion is used
- Use categories Yes/Maybe/No
- The funding allocation further differentiates depending on whether it is a masters or a doctors dissertation.

Dissertation Type	Dissertation Rating	Fund Allocation
Masters	M-No	0
	M-Maybe	10000
	M-Yes	15000
Doctoral	PhD-No	0
	PhD-Maybe	15000
	PhD-Yes	20000

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Summary of funding allocation for 2015

	NWU	SUN	UCT	UFS	UJ	UKZN	UNISA	UP	WITS	Total	%-Alloc
Grant allocated	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	**225,000**	**10%**
# Articles submitted	10	1	21	0	0	1	1	2	0	**36**	
# Articles funded	8	1	12	0	0	0	1	0	0	**22**	
Article funding	R 284,450	R 5,000	R 338,126	R 0	R 0	R 0	R 63,350	R 0	R 9,174	**R 700,100**	**32%**
# Proposals submitted	8	0	21	0	0	1	0	7	0	**37**	
# Proposals funded	8	0	20	0	0	0	0	7	0	**35**	
Proposal funding	R 130,000	R 0	R 115,000	R 0	R 0	R 0	R 0	R 100,000	R 0	**R 345,000**	**16%**
# M-Diss submitted	53	0	0	0	0	1	3	10	0	**67**	
# M-Diss funded	49	0	0	0	0	1	3	7	0	**60**	
M-Diss funding	R 730,000	R 0	R 0	R 0	R 0	R 15,000	R 40,000	R 95,000	R 0	**R 880,000**	**40%**
# PhD-Diss submitted	2	0	0	0	0	0	2	0	0	**4**	
# PhD-Diss funded	2	0	0	0	0	0	1	0	0	**3**	
PhD-Diss funding	R 35,000	R 0	R 0	R 0	R 0	R 0	R 20,000	R 0	R 0	**R 55,000**	**2%**
Total funding	**R 1,204,450**	**R 30,000**	**R 478,126**	**R 25,000**	**R 25,000**	**R 40,000**	**R 148,350**	**R 220,000**	**R 34,174**	**R 2,205,100**	**100%**
%-Allocation:	**55%**	**1%**	**22%**	**1%**	**1%**	**2%**	**7%**	**10%**	**2%**	**100%**	

Article Submission & Funding Trends

Year:	NWU			SUN			UCT			UKZN		
	2014	2015	%-Δ	2014	2015	%-Δ	2014	2015	%-Δ	2014	2015	%-Δ
Articles submitted:	19	10	-47%	3	1	-67%	3	21	600%	4	1	-75%
Articles funded:	13	8	-38%	2	1	-50%	2	12	500%	2	0	-100%
%-Funded:	68%	80%		67%	100%		67%	57%		50%	0%	

Year:	UNISA			UP			UWC			TOTAL		
	2014	2015	%-Δ	2014	2015	%-Δ	2014	2015	%-Δ	2014	2015	%-Δ
Articles submitted:	15	1	-93%	4	2	-50%	5	0	-100%	53	36	-32%
Articles funded:	10	1	-90%	0	0	-	0	0	-	29	22	-24%
%-Funded:	67%	100%		0%	0%		0%	-		55%	61%	

Technology Pull/Push Risk Research Profile

A = Projects in direct response to an industry problem statement

B = Projects without an industry problem statement, but with an obvious and immediate practical application (in the University's opinion! ☺)

C = The rest ("Technology Push" research projects)

	NWU	UCT	UNISA	UP
A	9	0	0	4
B	6	0	0	3
C	18	20	14	5

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Quo Vadis?

Strategic: Where do we want to be in 10 years?

- Growing this into a Centre of Excellence within the NRF framework?
- Current focus quantitative risk in financial services – expand to qualitative risk and/or other sectors? (other sectors already covered by Operational Risk?)
- Need for an Industry/Academia “Council” to facilitate and guide alignment?

Areas for improvement

- Breaking down industry-university “barrier” (Student projects, sabbaticals and converse?)
- Increasing the number of universities actively participating (incentives?)
- Industry structures and processes to feed the A row (technology-pull problems)
- Intra-University: Balancing number of projects in response to industry problems with the number of technology-push (basic research) projects (entries in A row vs C row)
- Intra-University: Aligning research activities to create pipeline from basic research => directed research => responses to industry problems (C => B => A)
- Inter-University: Cross-university research projects and cooperation
- Industry-University Communication (regular conferences?)
- ???

Thank you for your attention