The BI Task Force

BI Task Force @EUNIS
Elsa Cardoso

Paris, March 6, 2014

EUNIS BI TaskForce

- Activities 2013-2014
  - BI Maturity Survey
    - Closed Jan 31, 2014
    - Preliminary results
  - BI Conference
    - Networking
    - Identify relevant topics for European HEIs to focus hereafter
  - EUNIS Congress, Sweden
    - BI Track
    - Report on the BI Maturity Survey

BITF Web site:
- Contents?
- Share experiences

Join us at the LinkedIn Group

EUNIS BI TaskForce: next activities

- Presentation at the Terena 2014 conference on the current state of BI in European HEI (May 2014)

- Write at least 2 reports by the end of this year
  - Detailed survey results
  - Report on this conference ☺

- Feedback form

EUNIS BI TaskForce: possible future activities

- Another edition of the BI Maturity Survey
- Case studies
- Training sessions on specific topics
- Organizing events in specific countries; local networking
- Feedback form

Evaluation of the maturity level of BI initiatives in European Higher Education Institutions: Survey Results

BI Task Force @EUNIS
Elsa Cardoso

Paris, March 6, 2014

Agenda

- Business Intelligence and Maturity Models in HE
- Results of BI Maturity Survey 2013 for HEI in Europe
- Concluding remarks and next steps

Business Intelligence and Maturity Models in Higher Education

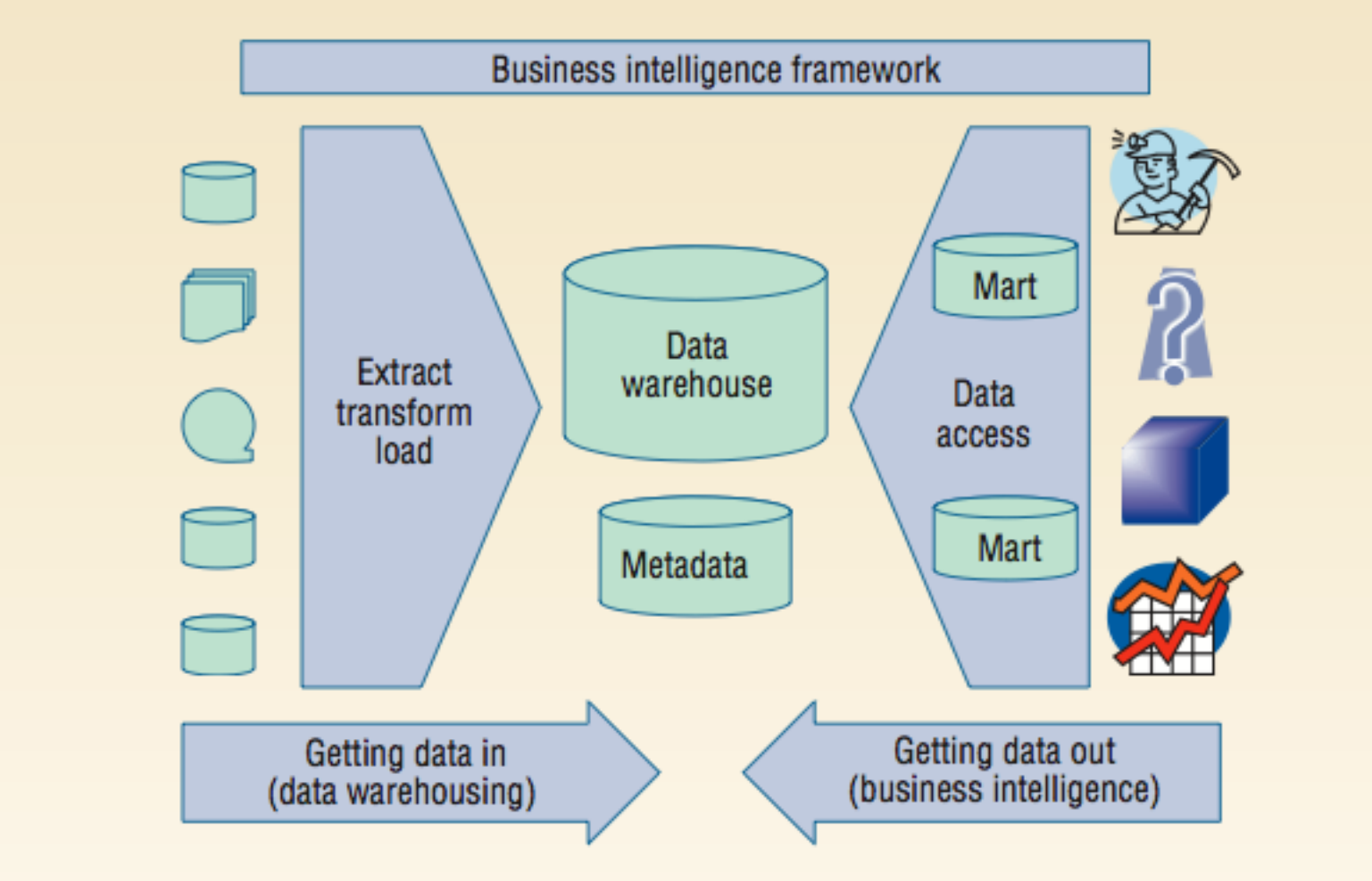
An overview

Business Intelligence

- BI encompasses a broad category of applications and technologies for gathering, storing, analyzing, sharing and providing access to data to help enterprise users make better business decisions

- Highly linked to achieving organizational goals

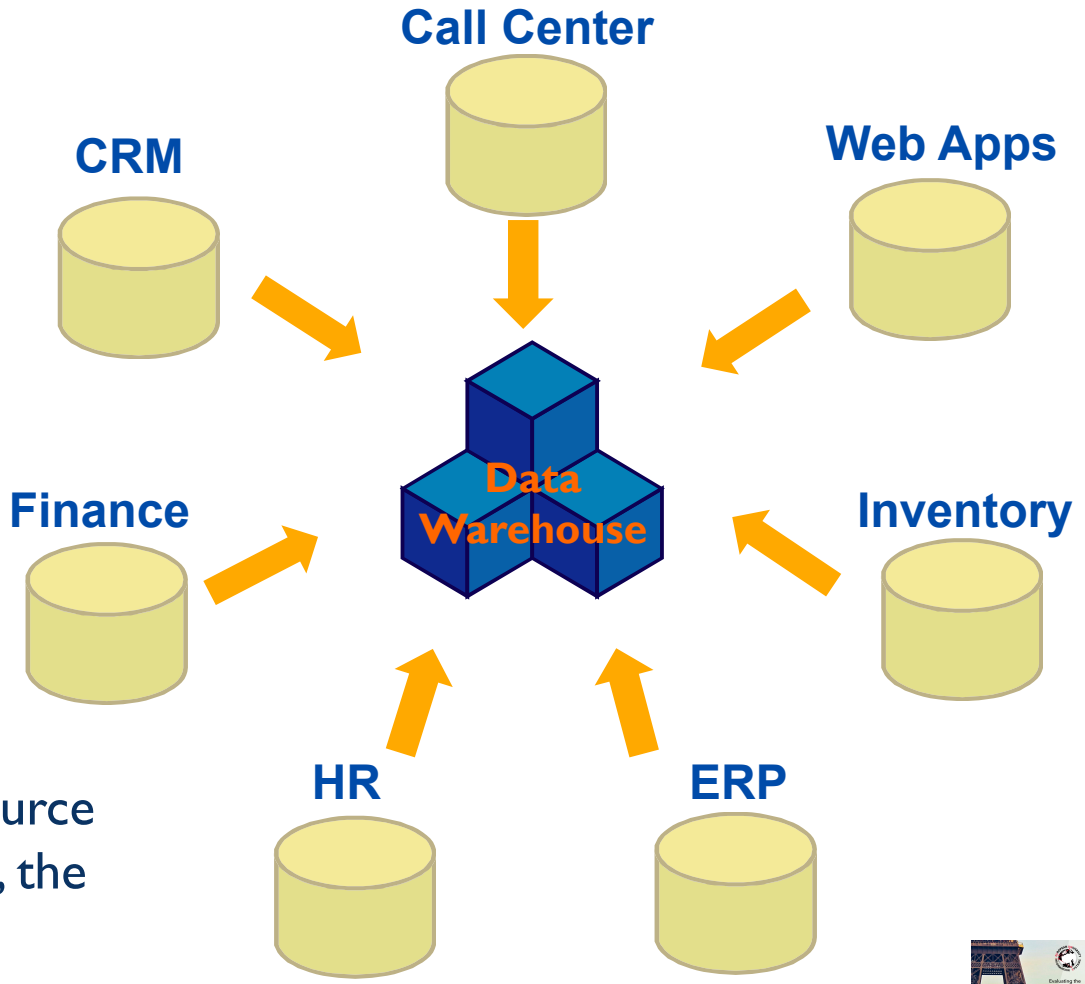
Business Intelligence



Source: (Watson & Wixom, 2007)

DW/BI Systems

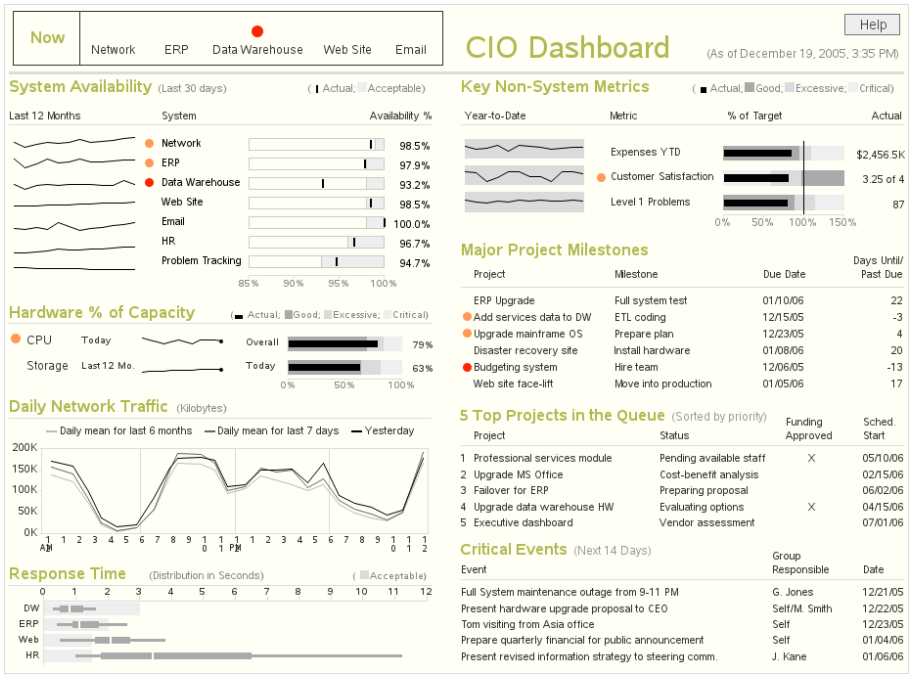
- **Data Warehousing: Getting data in**



Integrating data from different source systems into a central repository, the DW

DW/BI Systems

- **Business Intelligence: Getting data out**

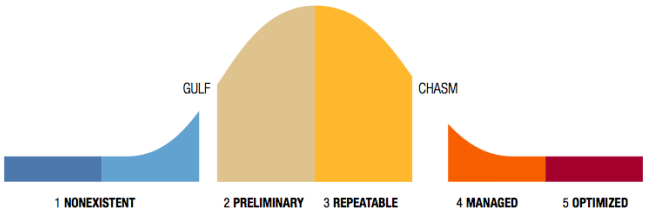


Business users and applications accessing data from the DW to perform enterprise reporting, OLAP, querying, and predictive analytics

Looking into the future: how analytics can help us?

	Past	Present	Future
Insight	How and why did it happen? (Modeling, experimental design)	What's the next best action? (Recommendation)	What's the best/ worst that can happen? (Prediction, optimization,simulation)
Information	What happened? (Reporting)	What is happening now? (Alerts)	What will happen? (Extrapolation)

Source: Adapted from (Davenport et al. 2010)



Maturity Models (MM)

- Are used to identify strengths and weaknesses of certain areas in an organization
- Include a sequence of levels (or stages) that "together form an anticipated, desired, or logical path from an initial state to maturity" (Pöppelbuß and Röglinger 2011)
- Maturity levels indicate an organization's current (or desirable) capabilities regarding a specific area.

Maturity Models (MM)

- MM are commonly applied to assess the AS-IS situation, to prioritize improvement measures, and to monitor progress

- MM are a valuable instrument for organizational assessment and development

Maturity Models for BI

- TDWI Maturity Model (The Data Warehouse Institute)
- HP Maturity Model
- Gartner Maturity Model
- AMR Maturity Model
- SAS Information Evolution Model

- Institutional Intelligence Maturity Model
- JISC InfoNet Maturity Model

HE specific

The BI Maturity Survey 2013

Assessing maturity level of BI initiatives

EUNIS BITF: milestones of the BI Maturity Survey 2013 work

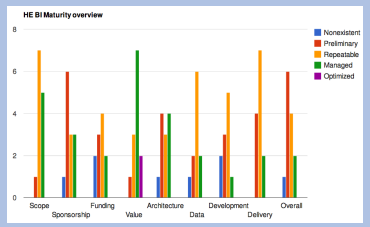
Kick-off @Vila Real

eunis'12

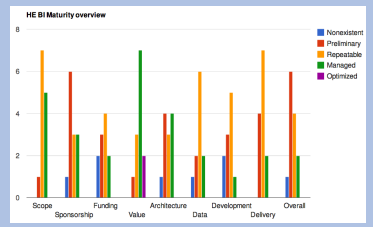
EUNIS RIGA 2013

EUROPEAN UNIVERSITY INFORMATION SYSTEMS

Initial Results @Riga



4 pilot countries



9 countries

“Unlocking BI”: the kick-off of this project

- EUNIS 2012 @Vila Real, Portugal

- Goal: Improve the collaboration and exchange of good practices among HE BI practitioners

BI Maturity Survey 2013 Goals

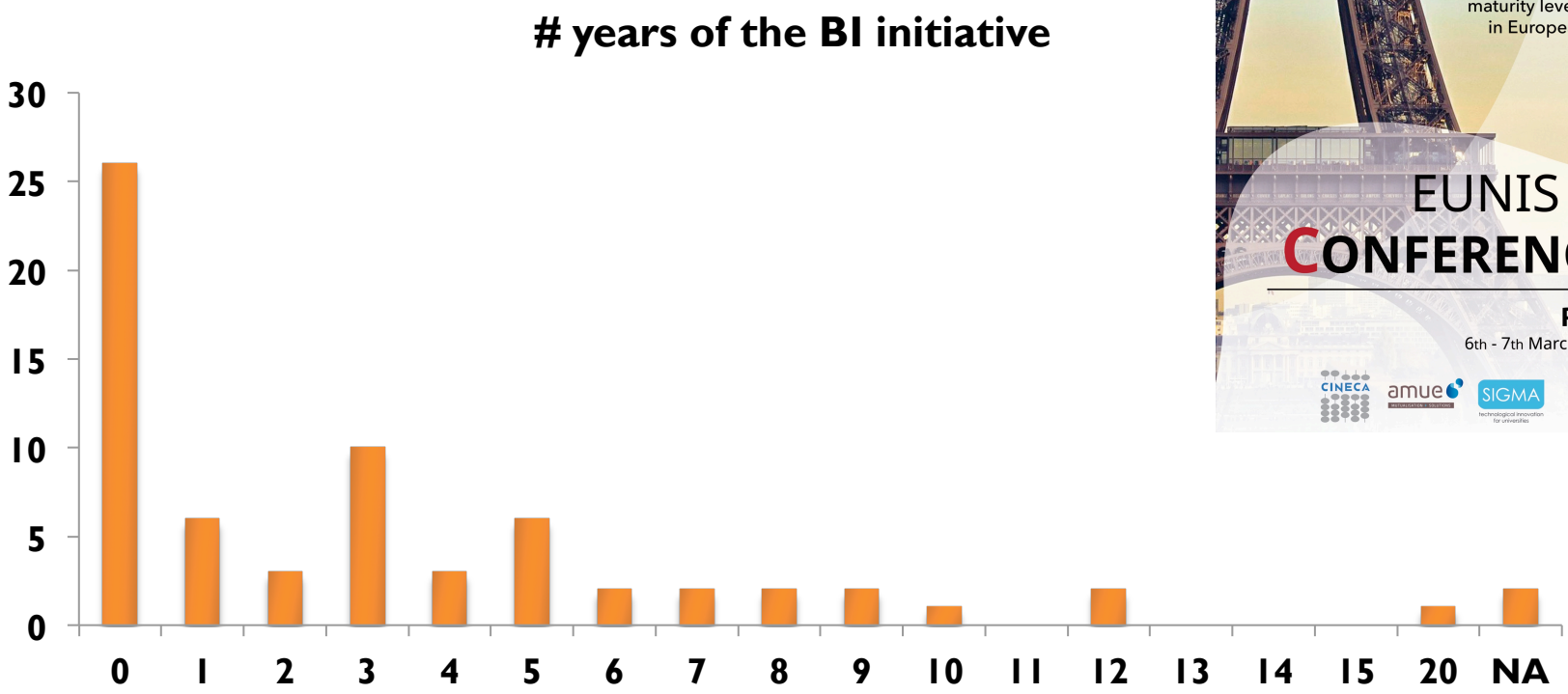
- **Starting point** for future endeavours

- Big picture of the use of BI in European HE
  - Different countries and realities
  - The AS IS situation of HEI
  - Identify gaps and the needs of the BI community

- How can we move forward?
  - Start a BI initiative?
  - Consolidate and increase the value of BI initiatives?

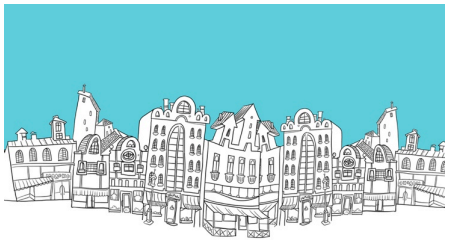
Profile of the participants in this conference

- N=68

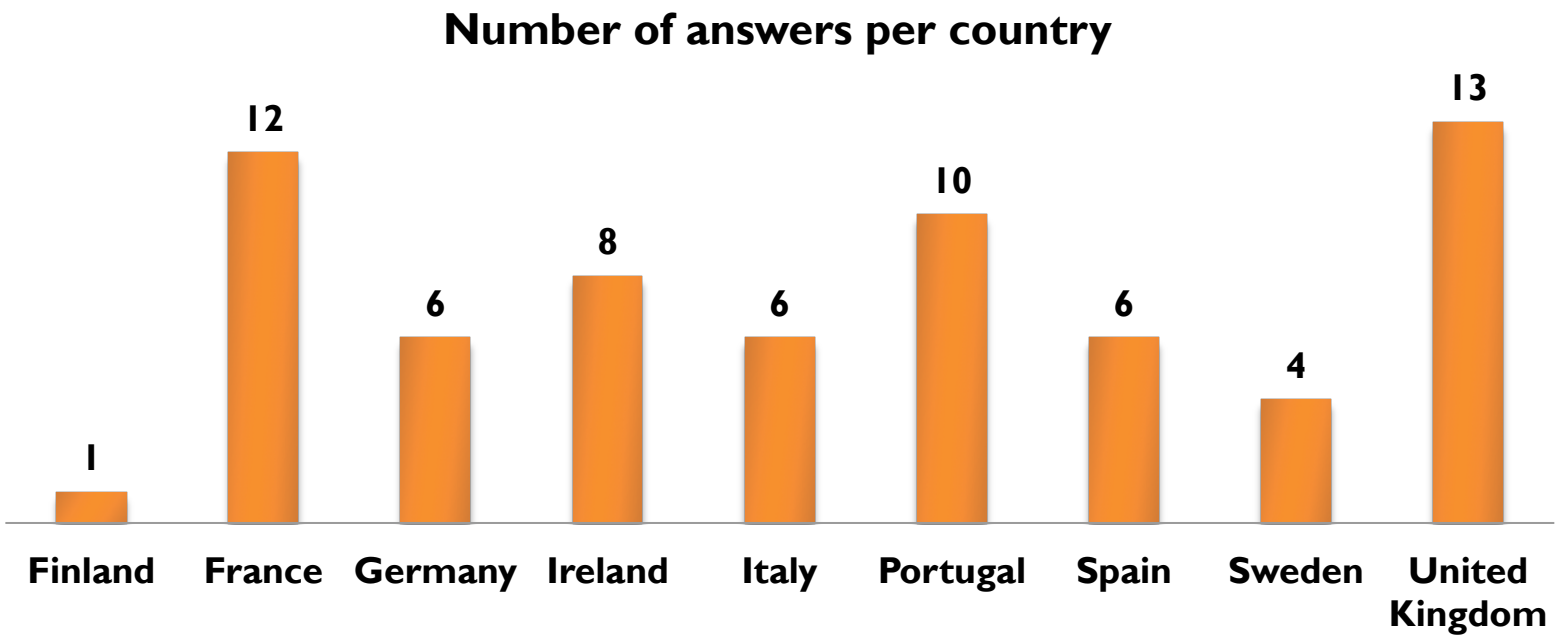


Not yet started 38%

Profile of respondents: HEI

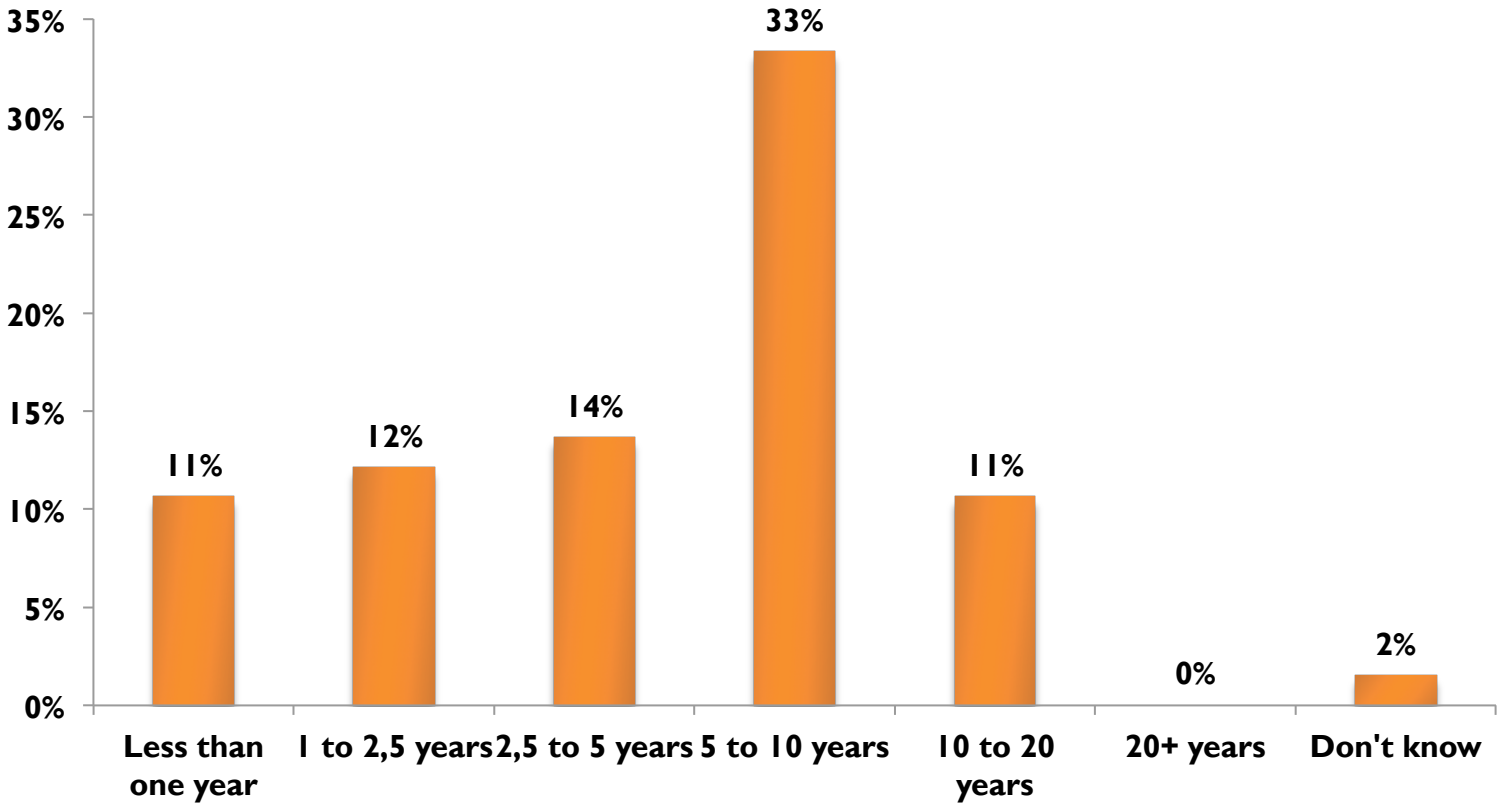


- Global response: 66
- 9 countries
- Sector: mostly Public HEI (92%)
- System for PT and IT: only Universities (not Polytechnics)



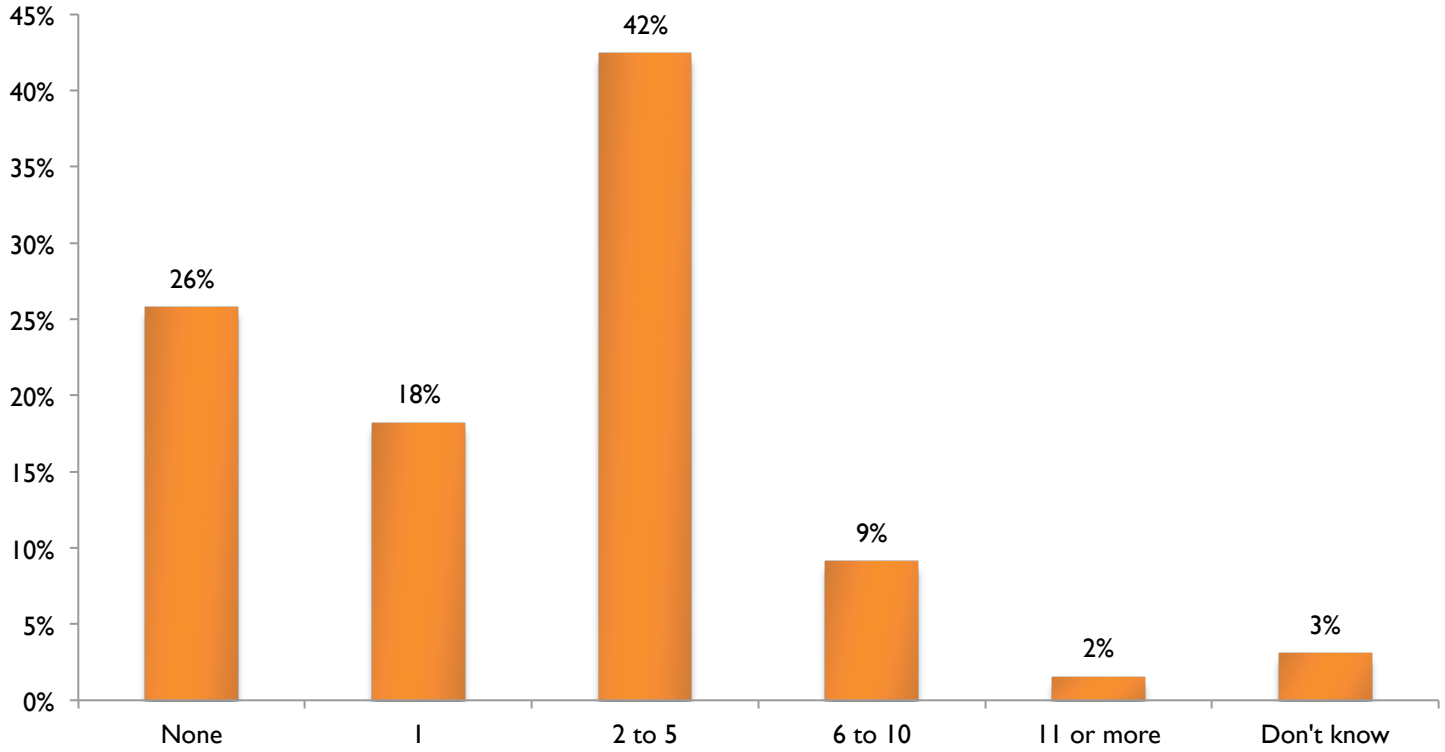
Profile of respondents: HEI

- When did your HEI start a BI/DW initiative?



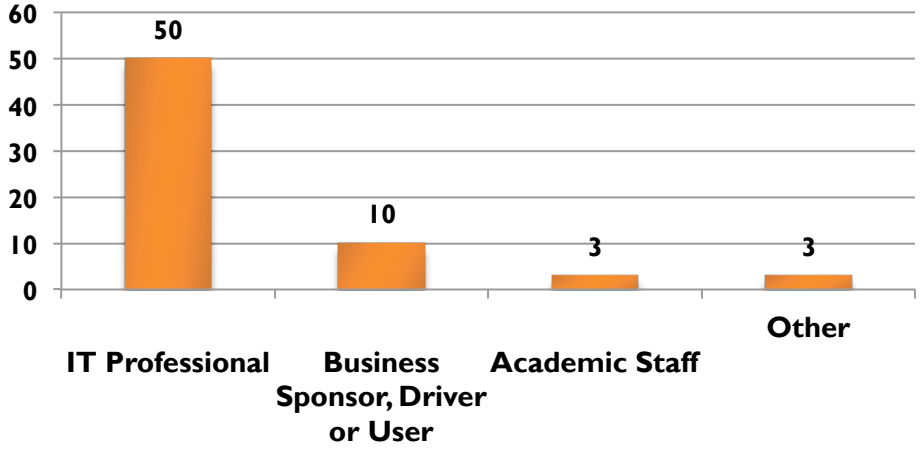
Profile of respondents: HEI

- Number of full-time equivalent BI/DW staff members (including contractors)



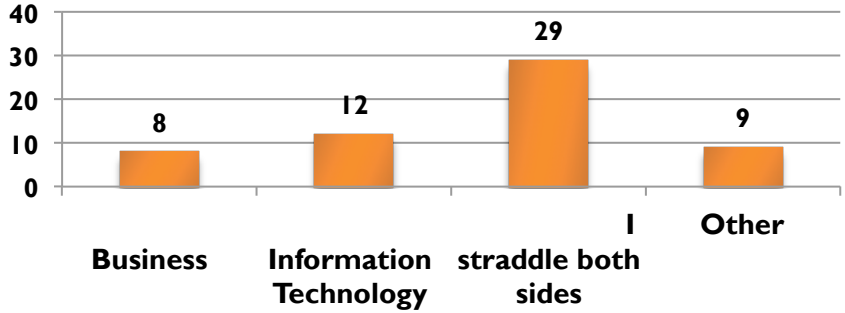
Profile of respondents

Position in the BI/DW initiative



[*Directeur de la Stratégie Numérique*,
Analyst,
Economist]

Side of the business



[IT Director (#3),
CIO (#2),
IT development manager,
Project Manager,
BI/DW Evangelist,
Porteur politique du numérique (plus large que BI/DW)]

The BI Maturity Survey

Assessing maturity level of BI initiatives

The MM Survey

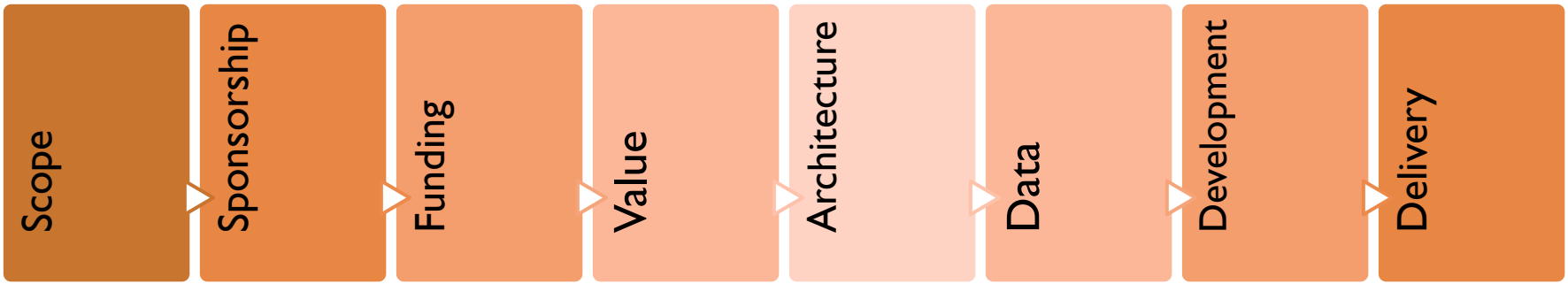
- Assessment questions required by two maturity models:
  - TDWI BI MM (TDWI Research, 2012)
  - Institutional Intelligence White Book MM (OCU 2013)

- Original TDWI survey was used with its 40 questions in 8 dimensions (5 questions each). Only minor changes were introduced in the questions to better reflect the HE terminology.

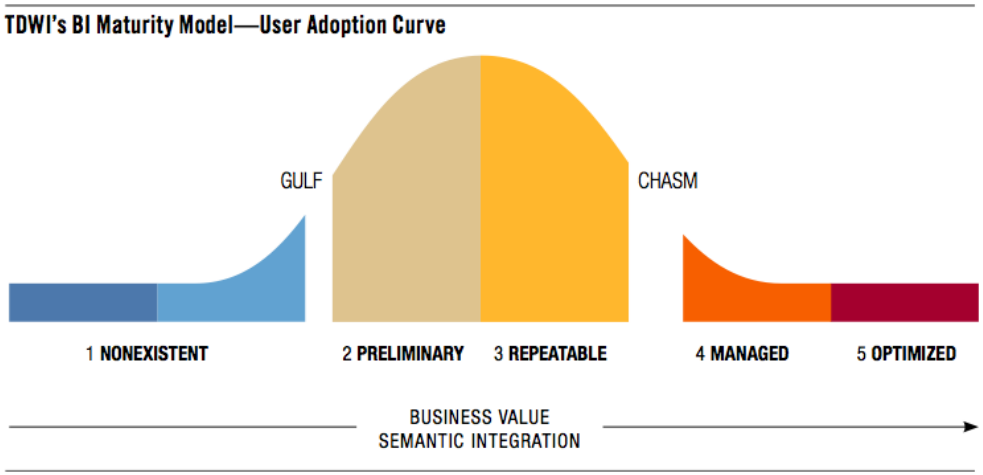
- One new HE-specific MM, representing a lean approach to maturity assessment with 9 questions + 9 dimensions

TDWI BI Maturity Model

- 8 dimensions



- 5 stages of maturity



Source: (TDWI Research 2012)

TDWI BI MM: dimensions

- **Scope.** To what extent does the BI/DW program support all parts of the organization and all potential users?
- **Sponsorship.** To what degree are BI/DW sponsors engaged and committed to the program?
- **Funding.** How successful is the BI/DW team in securing funding to meet business requirements?
- **Value.** How effectively does the BI/DW solution meet business needs and expectations?

Source: (TDWI Research 2012)

TDWI BI MM: dimensions

- **Architecture.** How advanced is the BI/DW architecture, and to what degree do groups adhere to architectural standards?
- **Data.** To what degree does the data provided by the BI/DW environment meet business requirements?
- **Development.** How effective is the BI/DW team's approach to managing projects and developing solutions?
- **Delivery.** How aligned are reporting/analysis capabilities with user requirements and what is the extent of usage?

Source: (TDWI Research 2012)

TDWI BI MM: questions

- **Scope.** To what extent does the BI/DW program support all parts of the organization and all potential users?

- The goals for BI/DW systems are defined before building a system
- BI/DW strategy is aligned with the strategic plan of the organization
- BI/DW objectives adapt to the changing objectives of the organization
- How many applications does your BI/DW environment support?
- Users are assigned full-time tasks/roles to BI/DW projects

Source: Adapted from (TDWI Research 2012)

TDWI BI MM: questions

- **Sponsorship.** To what degree are BI/DW sponsors engaged and committed to the program?

- Which best describes how executives perceive the purpose of your group's BI/DW environment?
- Which best describes the sponsor of your BI/DW group?"
- To what degree is your sponsor committed to the BI/DW program?
- To what degree is the BI sponsor held accountable for the outcome of the BI/DW solution?
- Senior management is involved in the BI/DW through steering committee/governance

Source: Adapted from (TDWI Research 2012)

TDWI BI MM: questions

- **Funding.** How successful is the BI/DW team in securing funding to meet business requirements?

- How easy is it to get funding for your annual BI/DW budget?
- Compared to other universities in your country your level of investment in BI/DW is…
- The annual BI/DW budget for your BI/DW group represents approximately what percent of the annual IT budget for your group? Consider the costs associated with BI platform and team (internal and/or external).
- Which best describes the current degree of capital investment in your BI/DW system?
- Which best describes the current maintenance budget for your group's BI/DW system?

Source: Adapted from (TDWI Research 2012)

TDWI BI MM: questions

- **Value.** How effectively does the BI/DW solution meet business needs and expectations?

- BI/DW reduces the cost for many business processes
- BI/DW enhances the value of our products (e.g., programmes, research) and/or services
- BI/DW assists in identifying the most appropriate clients (e.g., students) for our institution
- BI/DW assists in identifying the most important research areas for our institution
- BI/DW projects always contain an assessment of risk

Source: Adapted from (TDWI Research 2012)

TDWI BI MM: questions

- **Architecture.** How advanced is the BI/DW architecture, and to what degree do groups adhere to architectural standards?

- What is the predominant architecture of your DW environment?
- To what degree can users directly access the data they need to make decisions from a single user interface?
- To what degree have you established standards for technology and tools in your BI/DW environment?
- To what degree do individuals and groups adhere to the technology and tool standards established for your BI/DW environment?
- To what degree has your institution defined, documented and implemented definitions and rules for key terms and metrics?

Source: Adapted from (TDWI Research 2012)

TDWI BI MM: questions

- **Data.** To what degree does the data provided by the BI/DW environment meet business requirements?

- To what degree do end users trust the data in your BI/DW environment?
- How many unique data sources does your BI/DW environment draw from?
- On average, how often are the majority of data elements in your BI/DW environment refresh?
- Which best describes the degree of synchronization among the data models below that your group maintains?
  - ETL Source and Target Models
  - Data Warehouse and Data Marts Models
  - BI Semantic or Query Object Models
- To what degree has your institution integrated unstructured data (i.e., text or documents) in the BI/DW environment?

Source: Adapted from (TDWI Research 2012)

TDWI BI MM: questions

- **Development.** How effective is the BI/DW team's approach to managing projects and developing solutions?

- Which best describes your BI/DW group's approach to developing BI/DW solutions?
- To what degree has your institution defined, documented, and implemented standards for developing, testing, and deploying BI/DW functionality (i.e., ETL code and BI reports)?
- A standardized process for prioritizing BI/DW projects has been established
- On average, how many BI/DW projects that last three or more months does your institution run concurrently?
- How long does it take your team to add a new subject area to the BI/DW environment?

Source: Adapted from (TDWI Research 2012)

TDWI BI MM: questions

- **Development.** How effective is the BI/DW team's approach to managing projects and developing solutions?

- Creating a subject area usually involves the following:
  1) Define user requirements
  2) Analyze source systems
  3) Model/revise target model
  4) Develop extract, transform, load, and validation routines
  5) Create/revise reports
  6) Test
  7) Deploy and train us

Source: Adapted from (TDWI Research 2012)

TDWI BI MM: questions

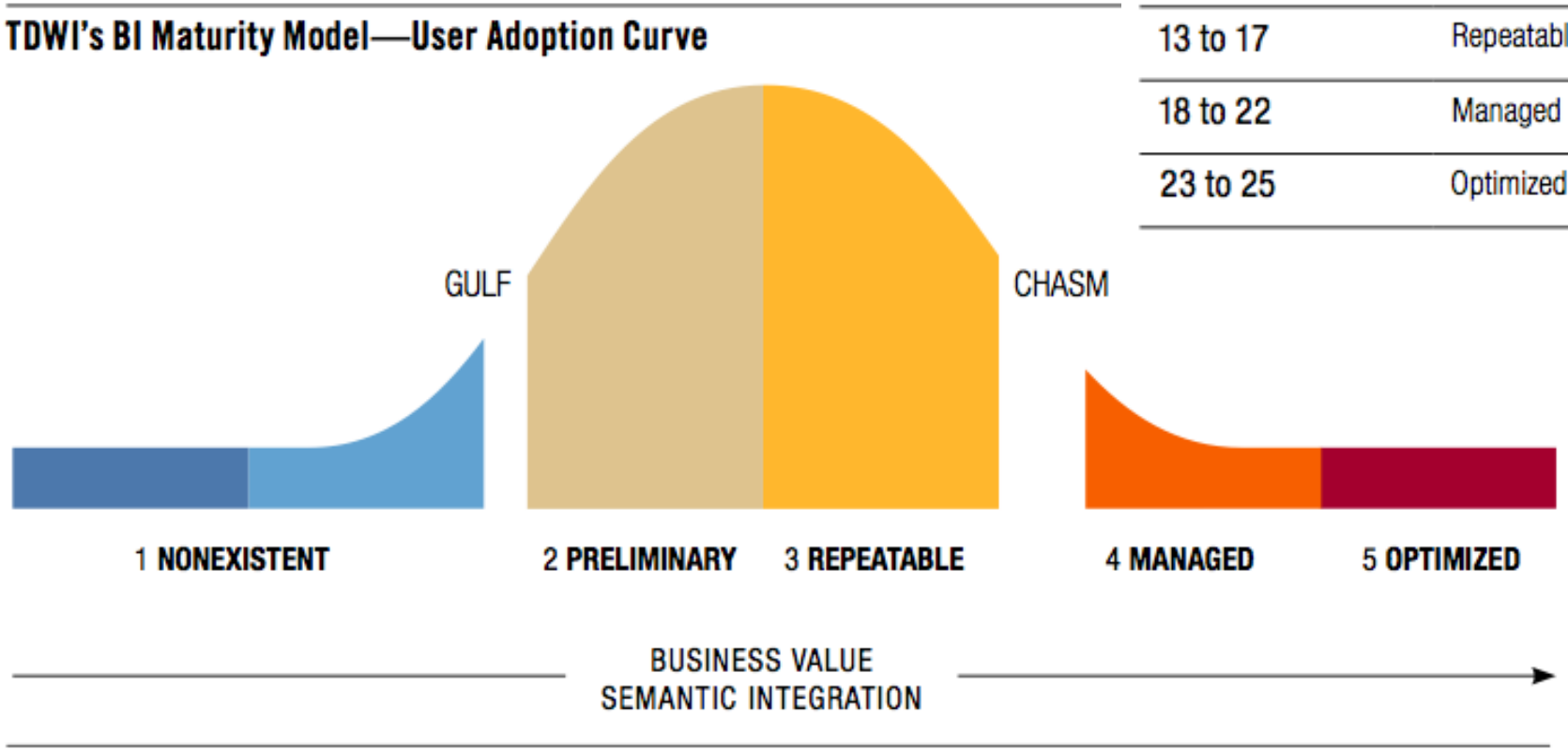
- **Delivery.** How aligned are reporting/analysis capabilities with user requirements and what is the extent of usage?

- Of the people who use BI on a regular basis, most have a strong understanding of university products and services
- There is a well-organized availability of technical training for BI projects
- There exists a well-organized availability of business training (i.e., university-related functions) for BI projects
- Which best describes how users access business metadata?
- Formal measurement of training is done to improve BI training courses

Source: Adapted from (TDWI Research 2012)

TDWI BI Maturity Model: stages

SCORE	STAGE
5 to 7	Nonexistent
8 to 12	Preliminary
13 to 17	Repeatable
18 to 22	Managed
23 to 25	Optimized

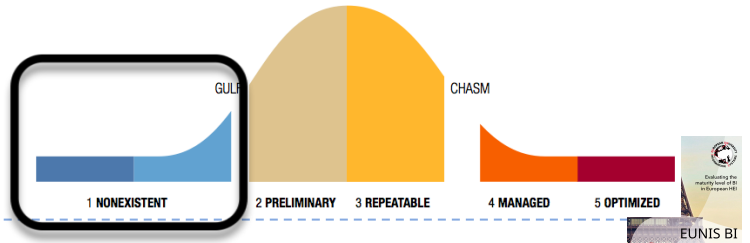


Source: (TDWI Research 2012)

Stage 1: The Nonexistent Stage

- Is the conglomeration of two phases: operational reporting and spreadmarts

- **Operational reporting:** represents a pre-data warehousing environment where an organization relies entirely on operational reports for information
  - An operational report runs directly against an operational system and shows data for that system only
  - New user requests usually requires the IT department to code a new custom report, a process that may take days, weeks, or months, depending on the complexity of the report and the current backlog of requests

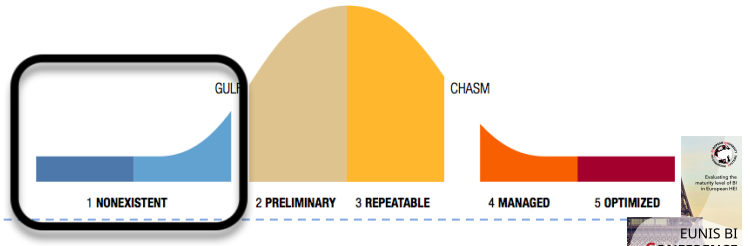


Source: (TDWI Research 2012)

Stage 1: The Nonexistent Stage

- **Spreadmarts:** represents an environment where users create their own reports using whatever tools are handy - usually a spreadsheet or desktop database (e.g., Microsoft Access)
  - They collect, clean, transform, aggregate, and format data for individual or group consumption, essentially performing all the functions of a data mart or data warehouse.
  - A spreadmart is a spreadsheet or desktop database acting as a data mart or data warehouse. Also called analytical silos.

- Cons: Users waste an incredible amount of time collecting and preparing data, and there is no single version of the truth

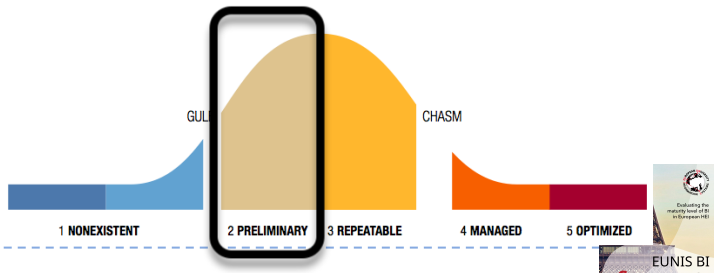


Source: (TDWI Research 2012)

Stage 2: The Preliminary Stage

- Represents an organization's first attempt into DW/BI
- The initiative is departmental in scope and usually a one-off project without precedent or established processes for project planning, change control, and software development tailored to BI.
  - Non-integrated data marts

- The organization purchases its first BI tools and users start to analyze trends in historical data
- Emphasis is on gaining insights by increasing awareness and understanding of how the business has run in the past.

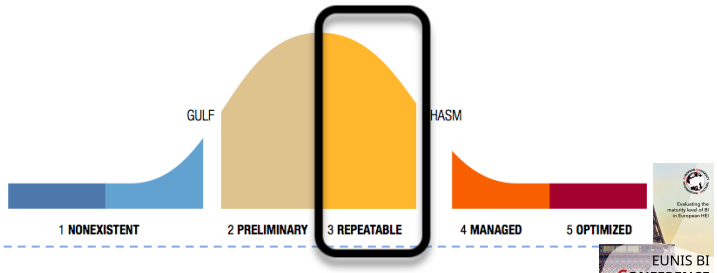


Source: (TDWI Research 2012)

Stage 3: The Repeatable Stage

- The organization recognizes the value of consolidating the data marts into a single data warehouse to save money and gain greater consistency in the information

- Starts a BI program rather than ad hoc projects, to develop multiple applications from a common data model and platform
- Growth in BI usage among casual users
  - knowledge workers who need information to make decisions and develop plans but who, unlike power users, don't have the need, inclination, or skills to analyze data on a daily basis



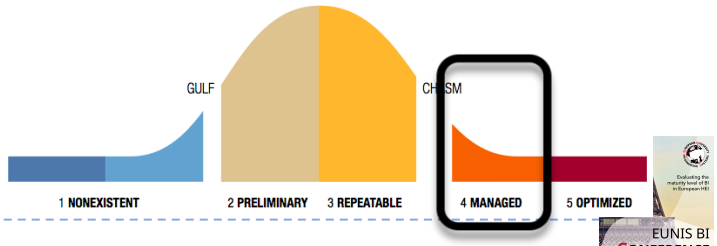
Source: (TDWI Research 2012)

Stage 4: The Managed Stage

- The organization now has a strategic, enterprise resource aligned with key objectives

- Unified DW architecture
  - defining a common set of semantics and rules for terms and metrics shared across business units and departments

- Fully loaded DW
  - DW is populated with all the data that all users might need to do their jobs. To meet any new request, DW designers simply repurpose existing DW data rather than extract and model new source data

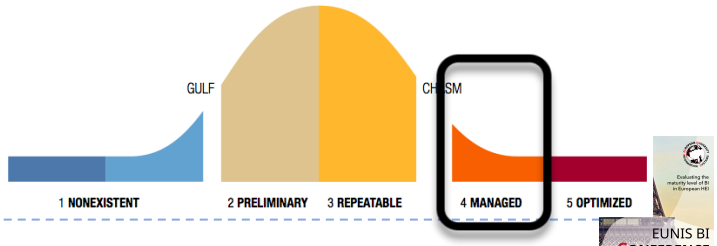


Source: (TDWI Research 2012)

Stage 4: The Managed Stage

- Predictive analytics
  - Organizations also begin to use more sophisticated forecasting and modeling tools to anticipate, rather than react to, business activity
  - E.g.: detect fraud, predict customer churn, or optimize delivery schedules

- Centralized Management
  - An Information Management (IM) group is created to consolidate all information-centric disciplines, such as BI, DW, content management, predictive analytics, and geographic information systems. This central IM group reports to the CIO, or CEO, not a department head

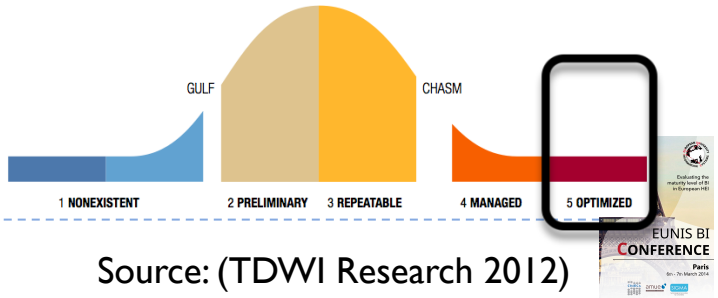


Source: (TDWI Research 2012)

Stage 5: The Optimized Stage

- Organizations use BI/DW to provide customers and suppliers with tailored, interactive reports, dashboards, and other information services

- Business and IT work harmoniously to win new customers and increase revenues
- BI becomes a key revenue generator



Source: (TDWI Research 2012)

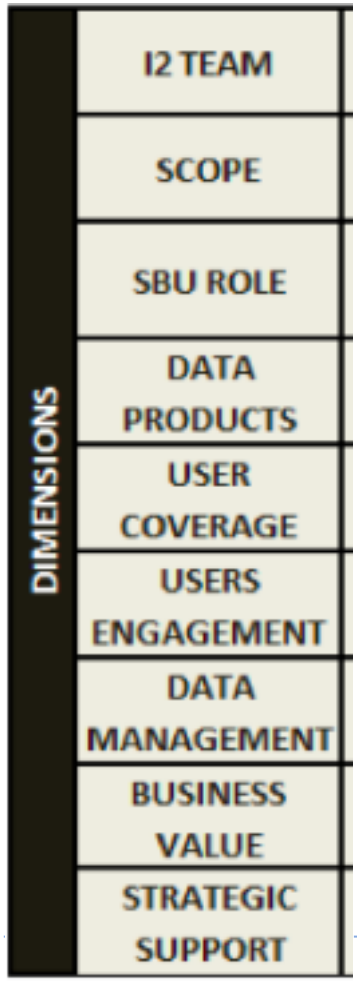
TDWI MM: levels of maturity for each dimension

Category/Stage	Nonexistent	Preliminary	Repeatable	Managed	Optimi ed
Scope	Individual	Department	Division	Enterprise	Inter-enterprise
Sponsorship	Non-existent or uncommitted	↔	Somewhat committed & accountable	↔	Very committed & accountable
Funding	None	Departmental budget	Divisional budget	Corporate IT budget	Self-funding
Value	Cost Center	Tactical	Mission critical	Strategic	Competitive differentiator
Architecture	Spreadmarts	Non-integrated data marts	Non-integrated data warehouses	Central DW with or without data marts	BI or data service via service-oriented architecture
Data	Not trustworthy, not timely, not comprehensive	↔	Somewhat trustworthy, timely, and comprehensive	↔	Fully trustworthy, timely, and comprehensive
Development	Non-standardized processes	↔	Somewhat standardized processes	↔	Fully standardized processes
Delivery	View static reports	Analyze trends and issues	Monitor processes	Predict outcomes	Automate processes

Source: (TDWI Research 2012)

Institutional Intelligence White Book MM

- WBMM model uses only 9 questions to build a qualitative profile of the maturity of a BI initiative
- 9 dimensions
- 5 levels of maturity



Institutional Intelligence White Book MM

OVERALL MATURITY LEVELS

LEVEL	NAME	GENERAL DESCRIPTION
1	ABSENT	
2	INITIAL	
3	EXPANDING	
4	CONSOLIDATE	
5	INSTITUTIONALI	

RESULT: OVERALL MATURITY LEVEL		
2	INITIAL	UNBALANCED

The notion of data as a valuable asset that must be provided to certain addressees in an efficient, trustworthy way is perceived in some functional areas, and some local initiatives arise. Small scale, local success stories regarding data analysis services may happen.

The achieved maturity level shows an unbalanced general situation where efforts must be made to improve the weak dimensions (probably by taking advantage of the strong ones).

			LEVELS								
			1		ABSENT	2	INITIAL	3	EXPANDED	4	CONSOLIDATED	5	INSTITUTIONALIZED
DIMENSIONS	I2 TEAM	2			ABSENT		LOCAL		GLOBAL VIRTUAL		GLOBAL FULL TIME		COMPETENCY CENTER
	SCOPE	4			NONE / UNKNOWN		SPECIALIZED		MULTIPLE		GENERALIZED		FULL
	SBU ROLE	1			UNAWARE		AWARE		PARTICIPANTS		SUPPORTING		DATA STEWARDS
	DATA PRODUCTS	2			NONE / UNKNOWN		LIMITED		EXPANDED		MAJORITY		COMPLETE
	USER COVERAGE	2			NONE / UNKNOWN		LIMITED		EXPANDED		MAJORITY		UNIVERSAL
	USERS ENGAGEMENT	2			UNAWARE		AWARE		CUSTOMERS		DRIVERS		CO-OWNERS
	DATA MANAGEMENT	1			UNAWARE		AWARE		MANAGED		SUPPORTED		ENFORCED
	BUSINESS VALUE	2			SCARCE		OPTIONAL		INTERESTING		NECESSARY		CRITICAL
	STRATEGIC SUPPORT	2			FREE FLOATING		LOCALLY EMBEDDED		PROJECT FOOTING		SUSTAINABLE SERVICE		INTERDEPENDENT WITH STRATEGY

Source: (OCU 2013)

BI Maturity Survey 2013 Analysis

Assessing maturity level of BI initiatives

Operationalization of the survey

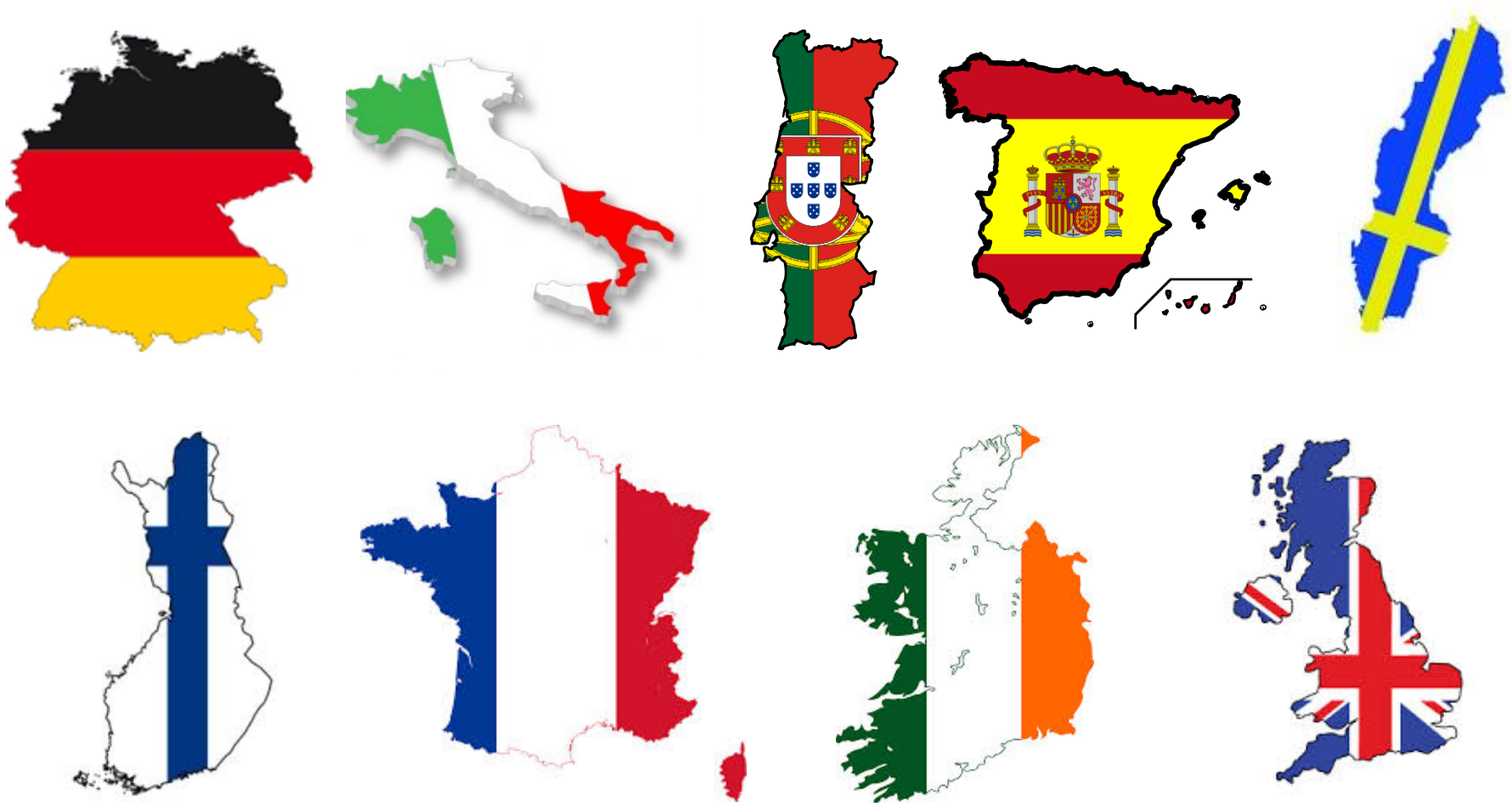
- Translation to Italian, Spanish and French of the original English version of the survey
- Coding of the survey into an online platform: the AlmaLaurea survey platform was used
- Controlled test of the survey in each country with a small number of HEI, to detect and correct possible flaws in the survey
- Running of the survey
- Data analysis of collected results

Two phase-approach

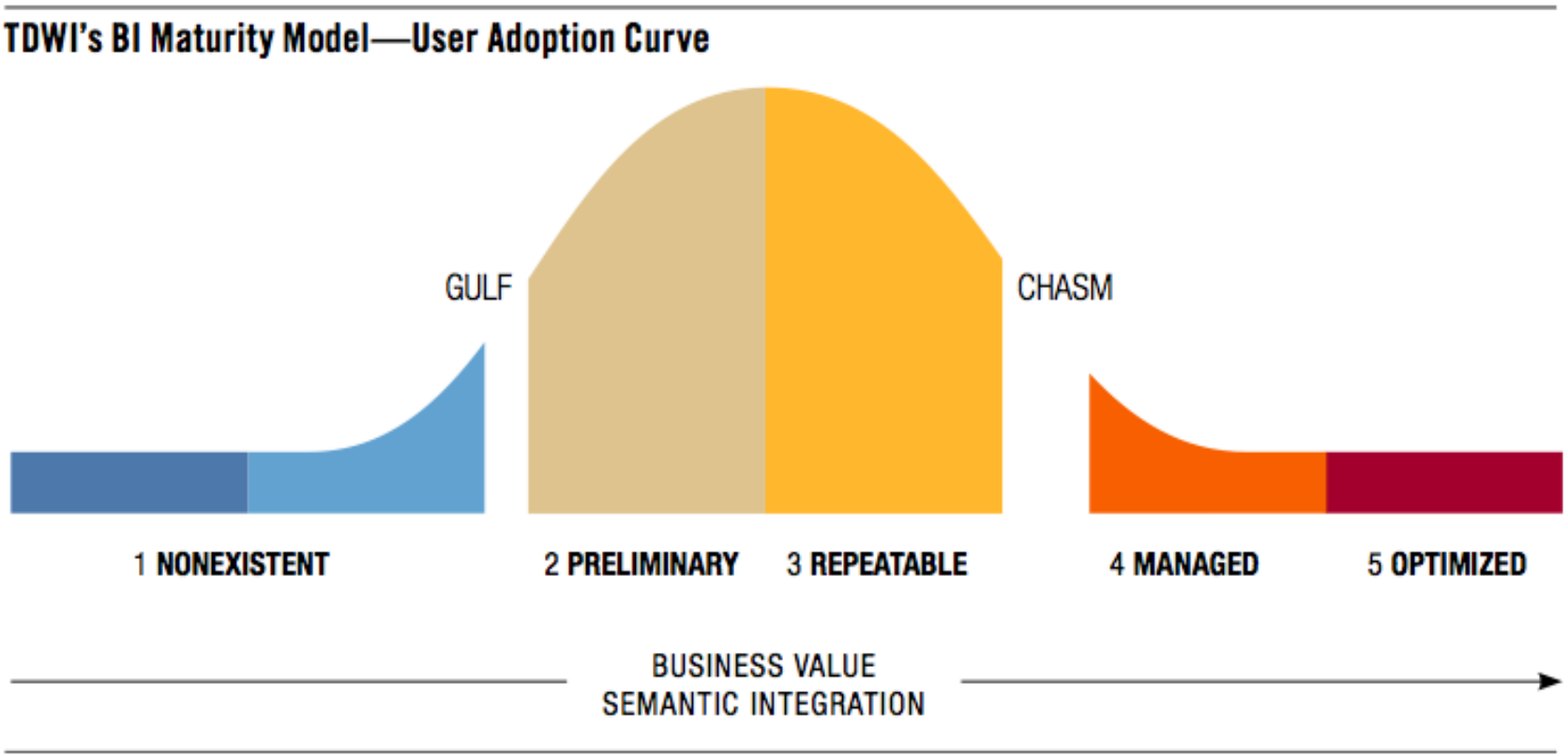
- Pilot phase:
  - Started by the end of May 2013
  - Spain: all HEI
  - Italy: all HEI
  - Germany: started June 15, 2013
  - Portugal: all Public HEI

- Second phase:
  - France
  - Ireland and UK
  - Sweden
  - Finland

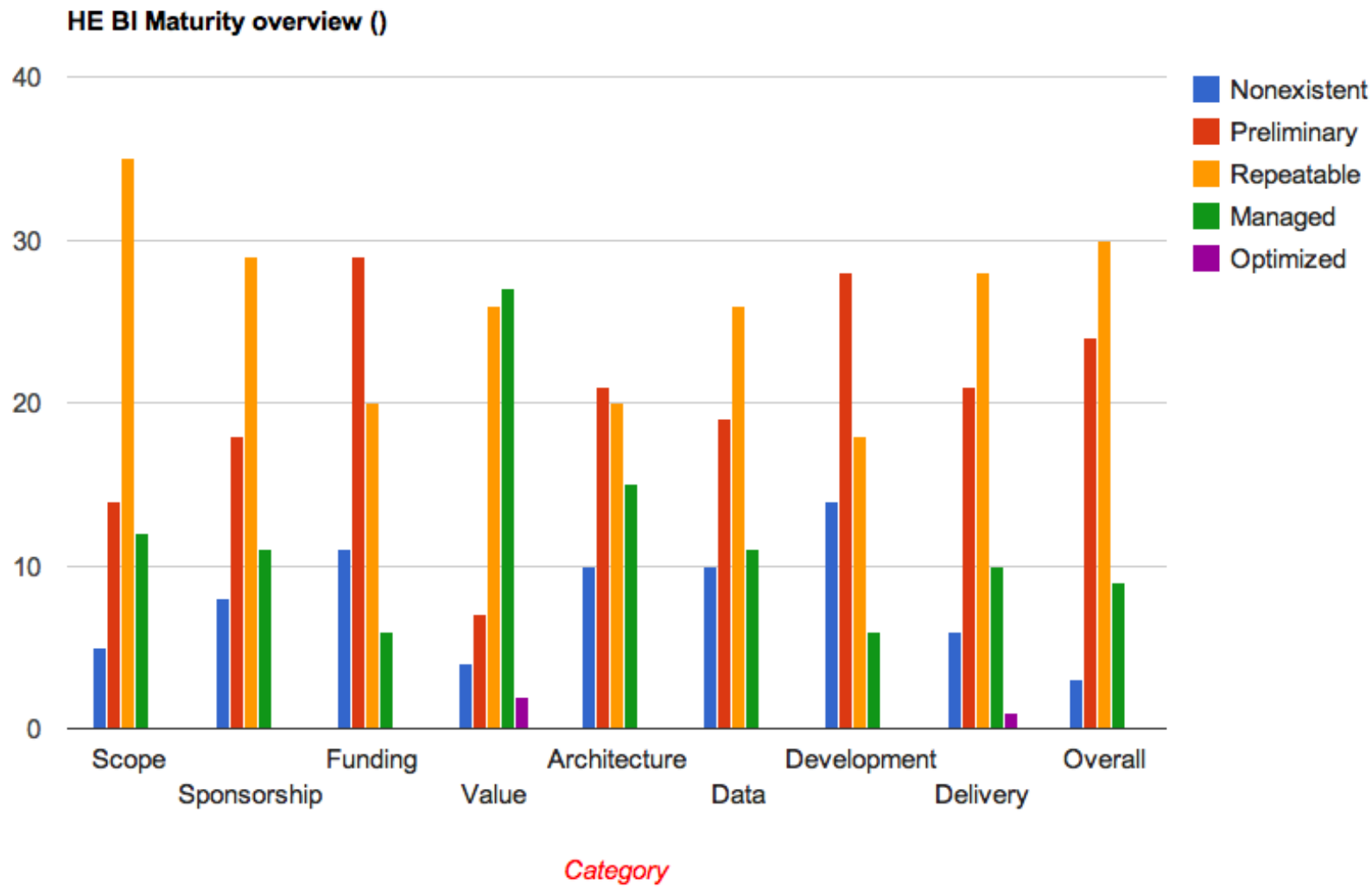
Survey analysis



Survey analysis: aggregated view



Survey analysis: aggregated view



Higher Education in Germany

- Germany has 392 HEI
- All 193 **public HEI** were included in the first phase, representing 92% of German students.

Higher Education in Germany

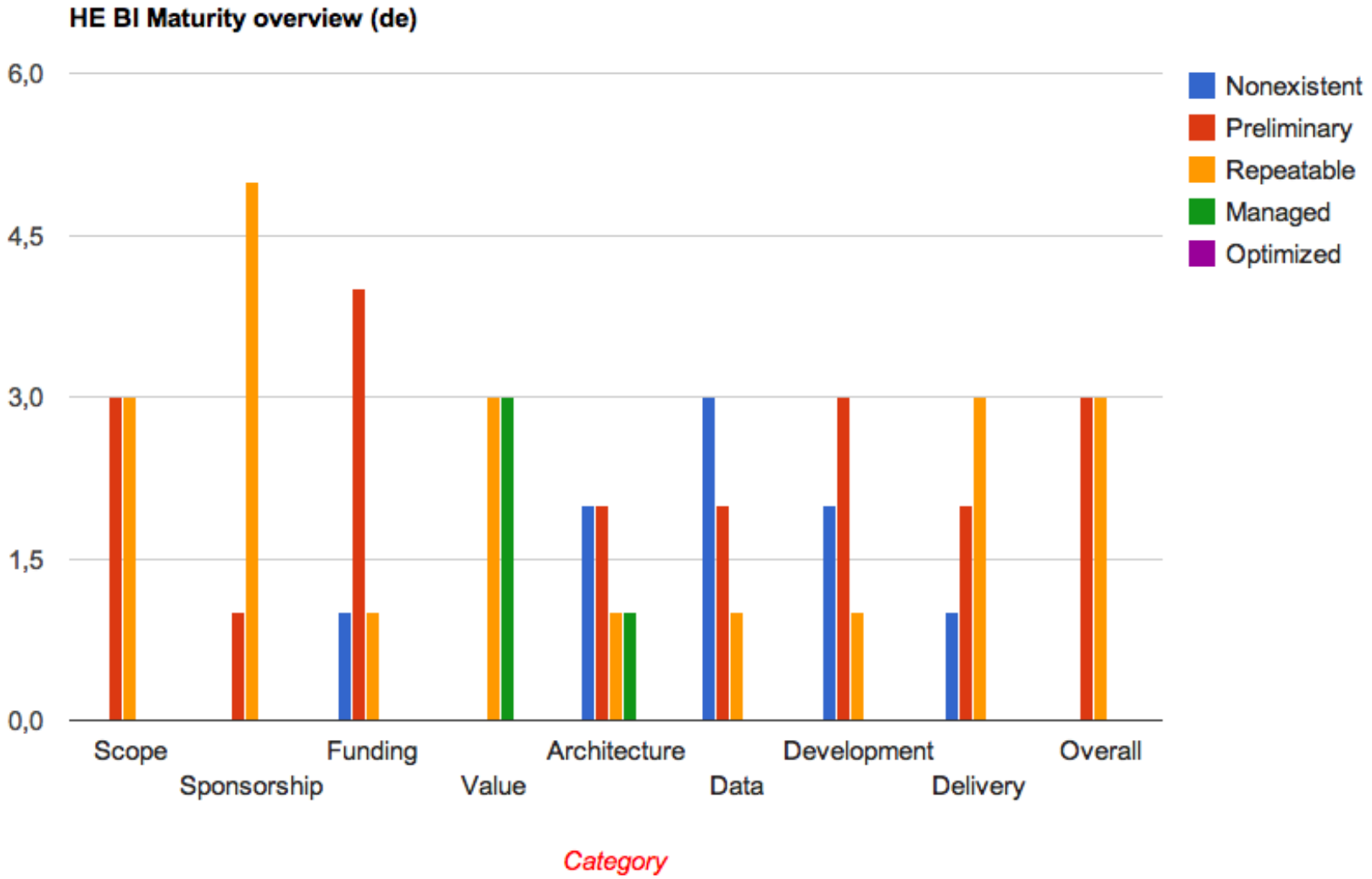
Addressable German Universities: number of institutions and students								
Based on List of HRK per Feb, 19th 2013								
(http://www.hs-kompass2.de/kompass/xml/download/hs_liste.txt)								
(HRK=Hochschulrektorenkonferenz=community of all German university "heads")								
	public		private, state-approved		ecclesiastic, state-approved		Total	
	count	number of students	count	number of students	count	number of students	count	number of students
Universities of Applied Sciences without right to promotion	105	618.386	99	105.162	21	20.021	225	743.569
Universities with right to promotion	88	1.540.670	12	14.086	11	6.641	111	1.561.397
Universities for Arts and Music	46	32.506	2	884	8	296	56	33.686
Type of University	**239**	**2.191.562**	**113**	**120.132**	**40**	**26.958**	**392**	**2.338.652**
	193	**92%**	**304**	**97%**				

Source: HRK, 2013

Survey analysis: Germany

- Contacted HEI: all public HEI
- Questionnaire addressed to: the President or Rector level asking to forward to CIO/BI department if available
- Promoters: German members of EUNIS BITF (Bodo Rieger, Sonja Schulze)
- Contact procedure: mailing list www.hochschulkompass.de (Higher Education Compass, offered by German Rectors' Conference (HRK)

Survey analysis: Germany



Higher Education in Italy

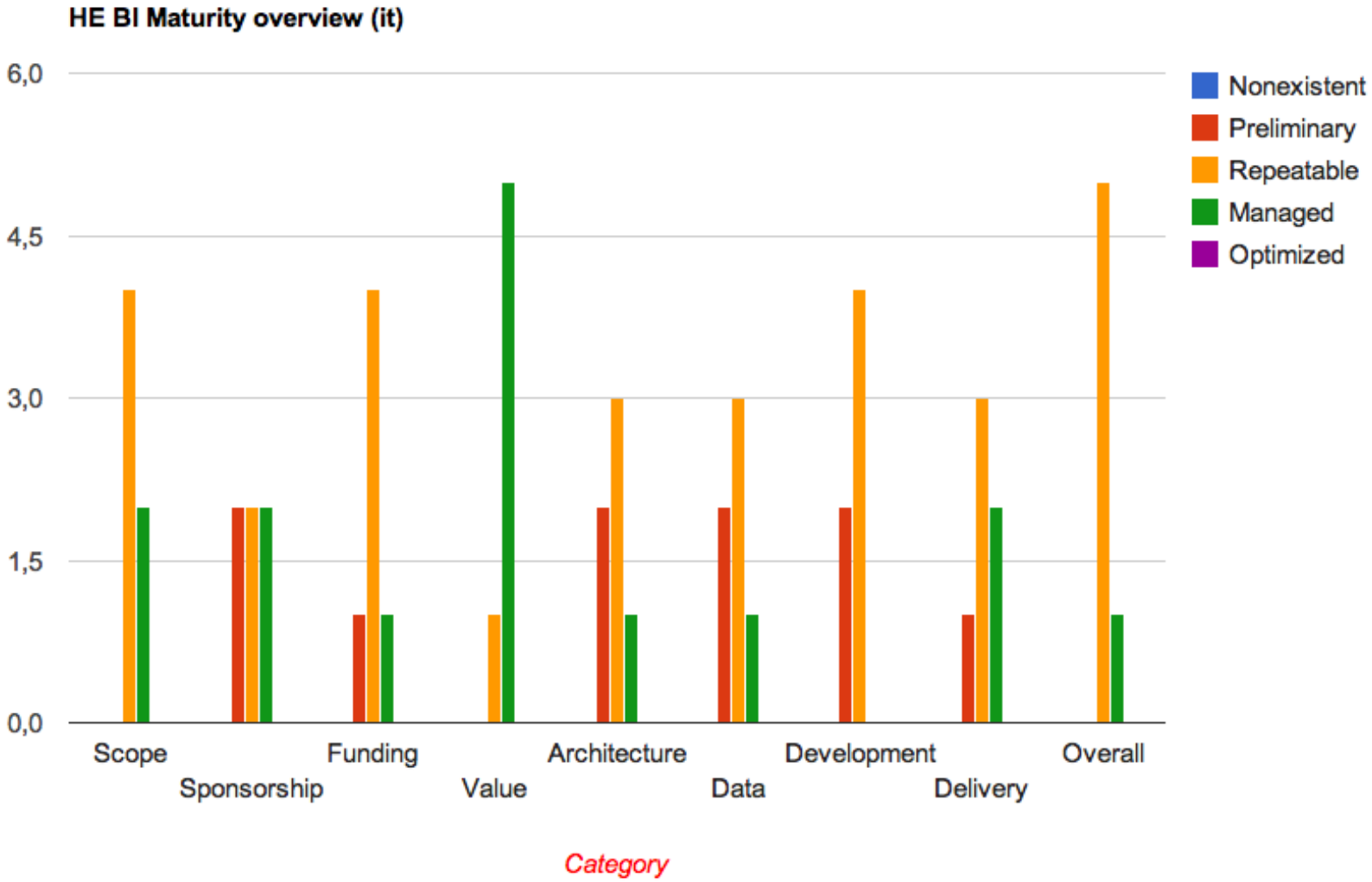
- Italy has 96 Universities:
  - 67 Public + 29 Private

- Some numbers:
  - 3 HEI with more than 80.000 students
  - 18 HEI between 30.000 and 80.000 students
  - 18 HEI between 15.000 and 30.000 students
  - 57 HEI with less than 15.000

Survey analysis: Italy

- Contacted HEI: 95 institutions (out of 96)
- Questionnaire addressed to: Directors, or Managers or CIOs (Responsible of Information Systems)
- Promoters: Italian members of EUNIS BITF (Alberto Leone - AlmaLaurea, Michele Mennielli & Enrico Brighi - CINECA)
- Contact procedure: CINECA internal CRM system was used to contact each IT manager of the Institution by a direct mailing approach, with monthly recalls (by phone call or by another email)

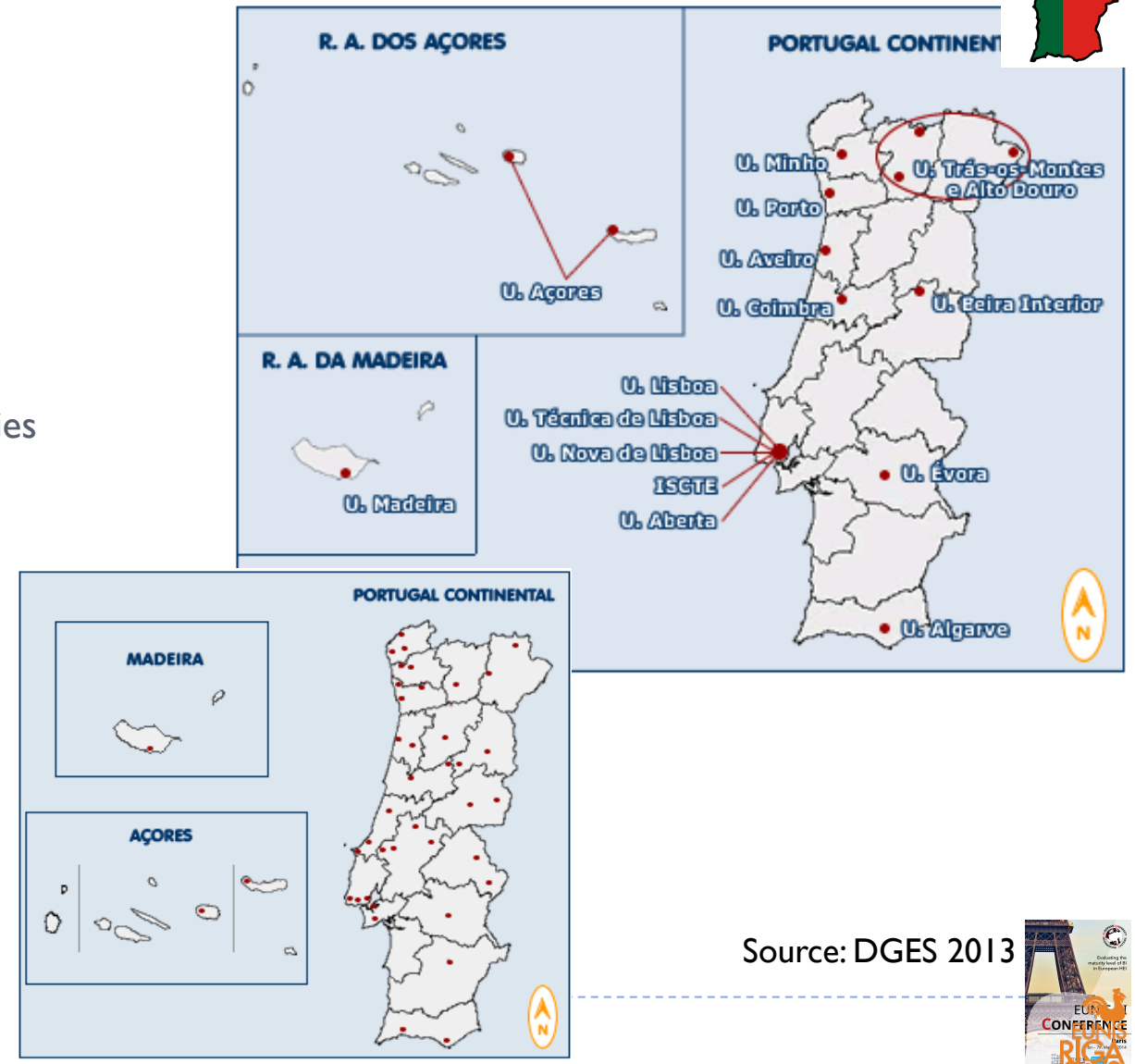
Survey analysis: Italy



Higher Education in Portugal

- Portugal has 134 HEI

- Some numbers:
  - **Public HEI:** 14 Universities + 20 Polytechnic + Univ. Aberta
  - **Private HEI:** 37 Universities + 56 Polytechnic
  - 5 Military and Police HEI
  - Universidade Católica

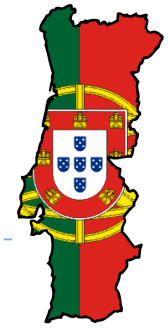


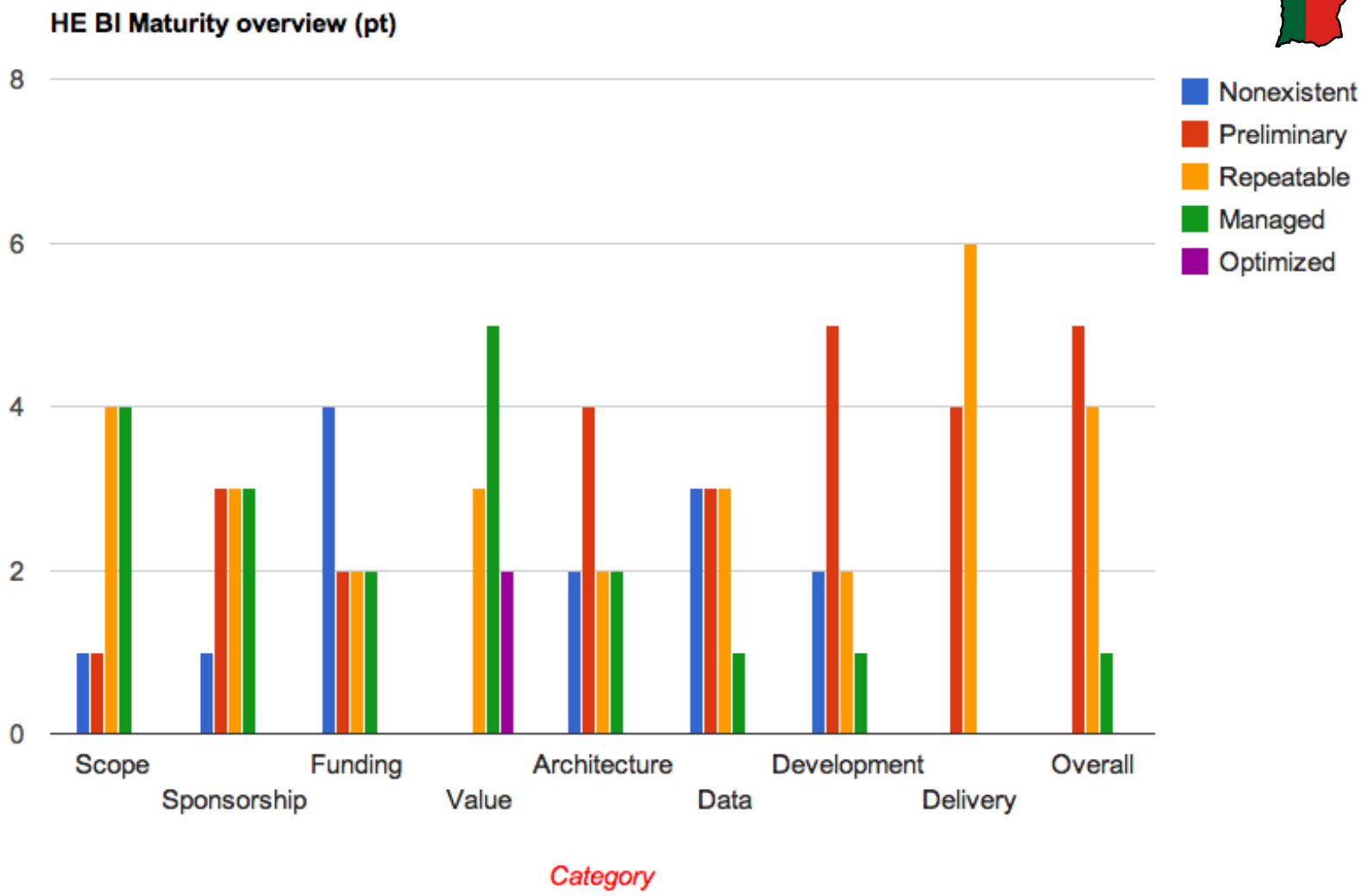
Source: DGES 2013

Survey analysis: Portugal

- Contacted HEI: 14 public HEI
- Questionnaire addressed to: IT or BI Managers, or Rectory level
- Promoters: Portuguese members of EUNIS BITF (Elsa Cardoso – ISCTE- University Institute of Lisbon)
- Contact procedure: direct phone call and email

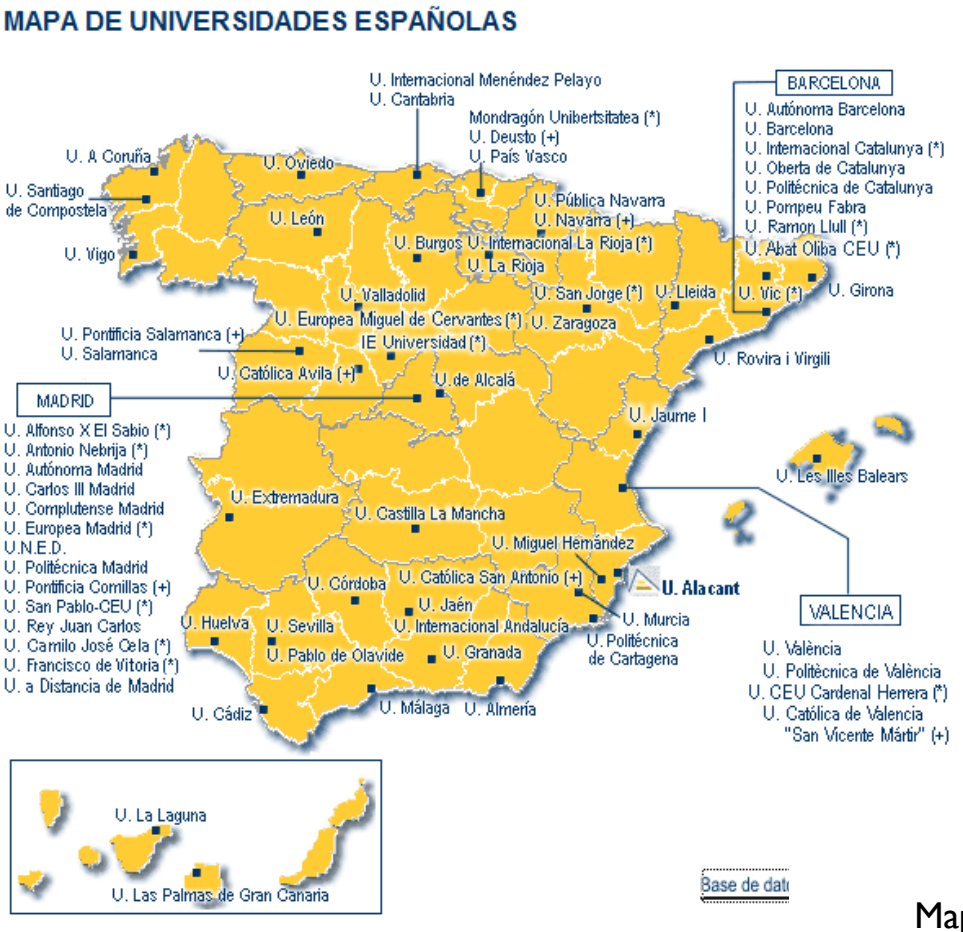
Survey analysis: Portugal





Higher Education in Spain

Spain has 81 institutions dispersed throughout its territory.

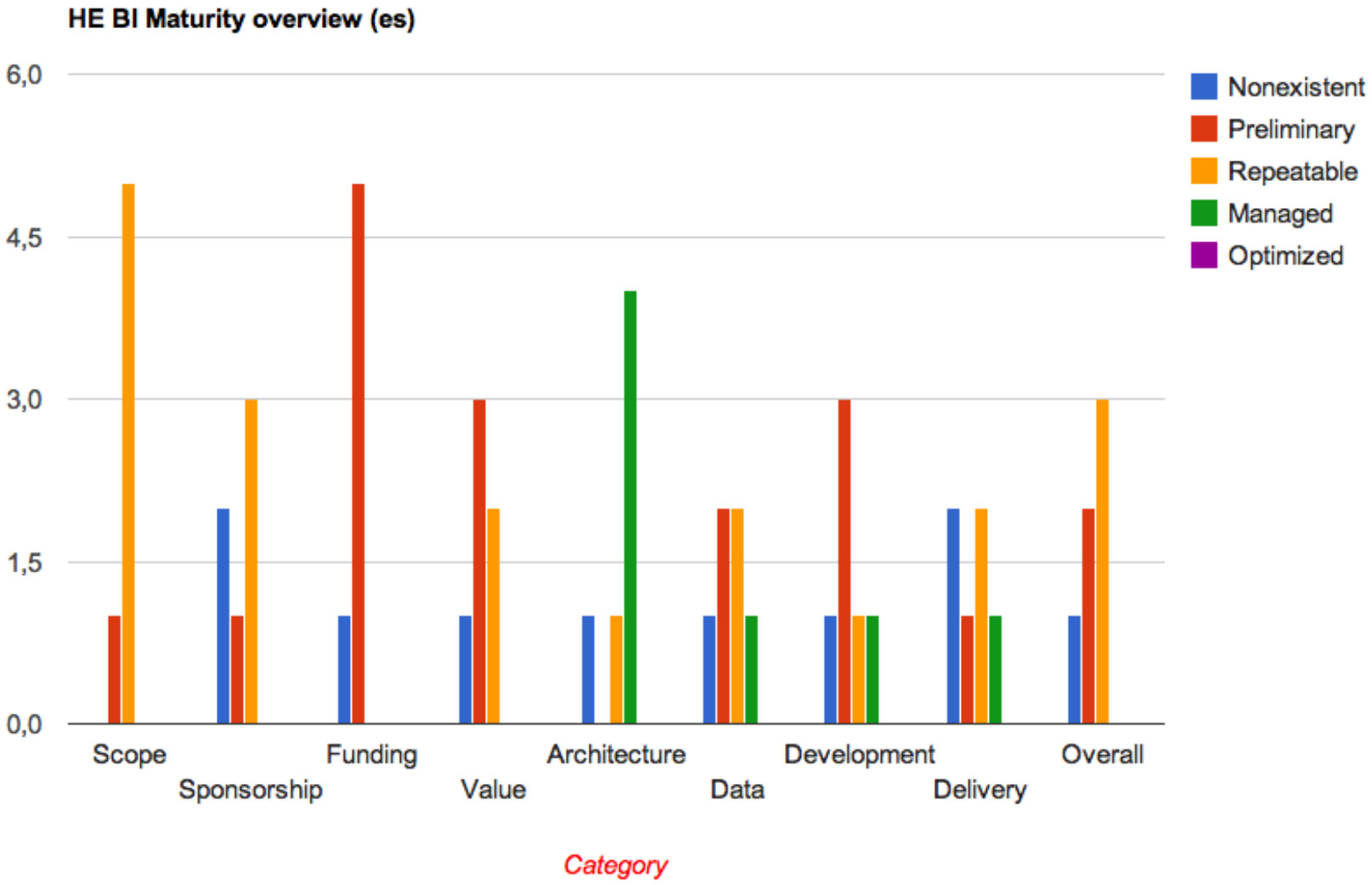


Map source: Universidad de Alicante

Survey analysis: Spain

- Contacted HEI: 78 universities (out of 81)
- Questionnaire addressed to: IT or BI Managers
- Promoters: Spanish members of EUNIS BITF (Juan
- Jesús Picazo, Manuel Rivera – OCU)
- Contact procedure: mailing list

Survey analysis: Spain



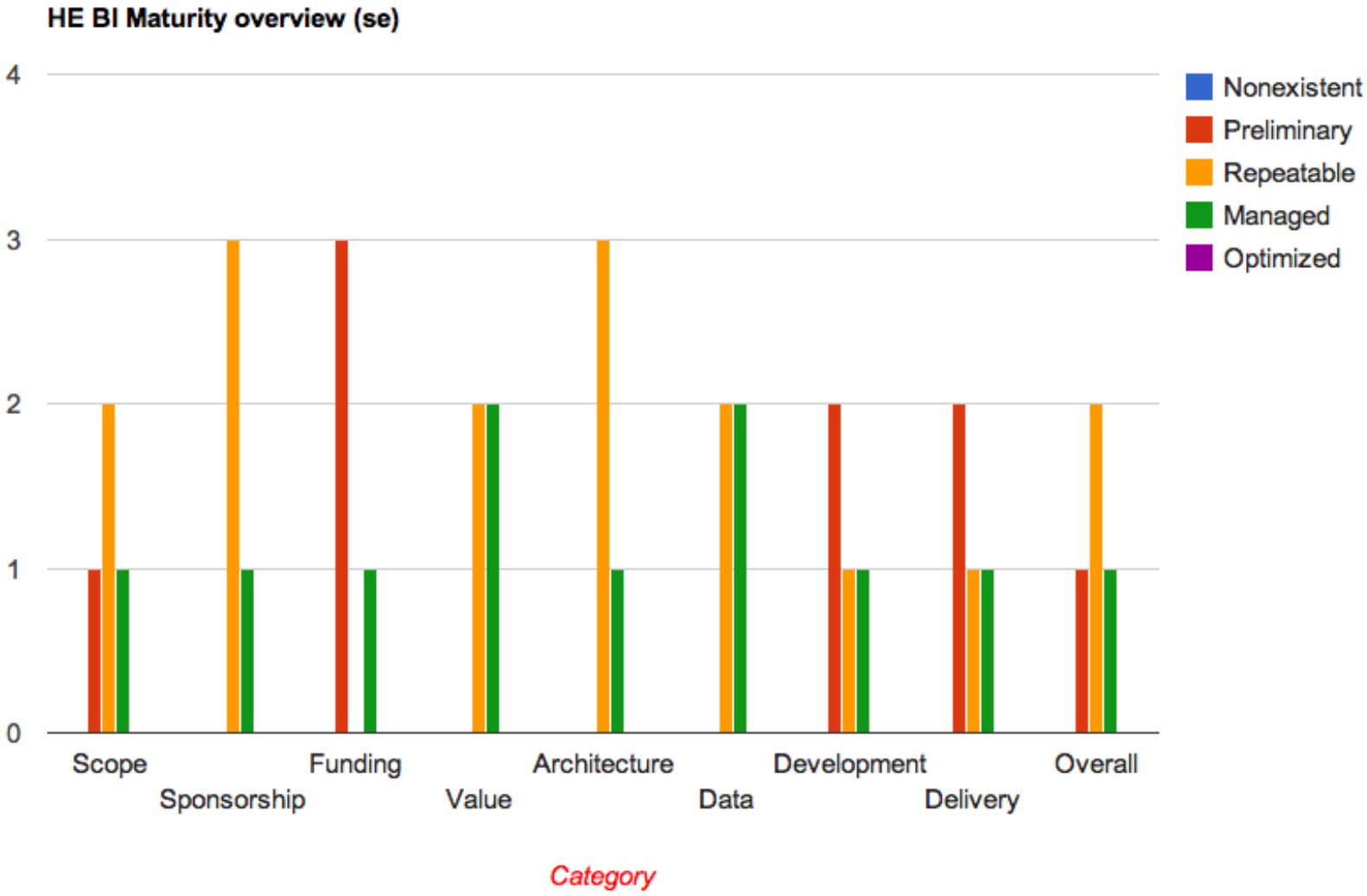
Higher Education in Sweden

- 54 institutions in total
  - Of which approx. 30 Universities or University colleges
- ~ 450.000 students

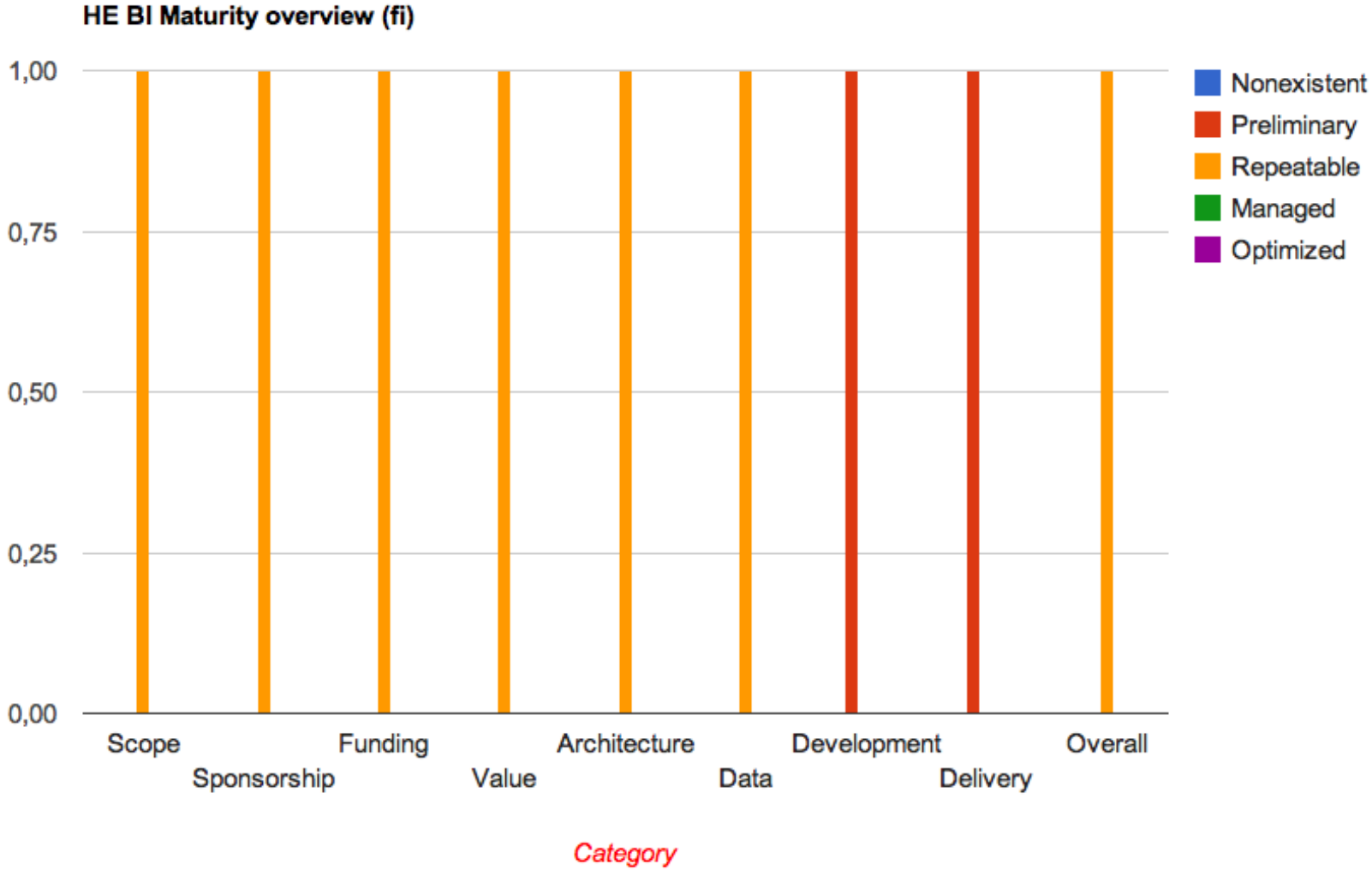
Survey analysis: Sweden

- Contacted HEI: The 15 largest institutions, all public
  - Accounts for more than 90% of the student population
- Questionnaire addressed to: IT or BI Managers
- Promoters: Umeå University – through ITS
- Contact procedure: mailing list

Survey analysis: Sweden



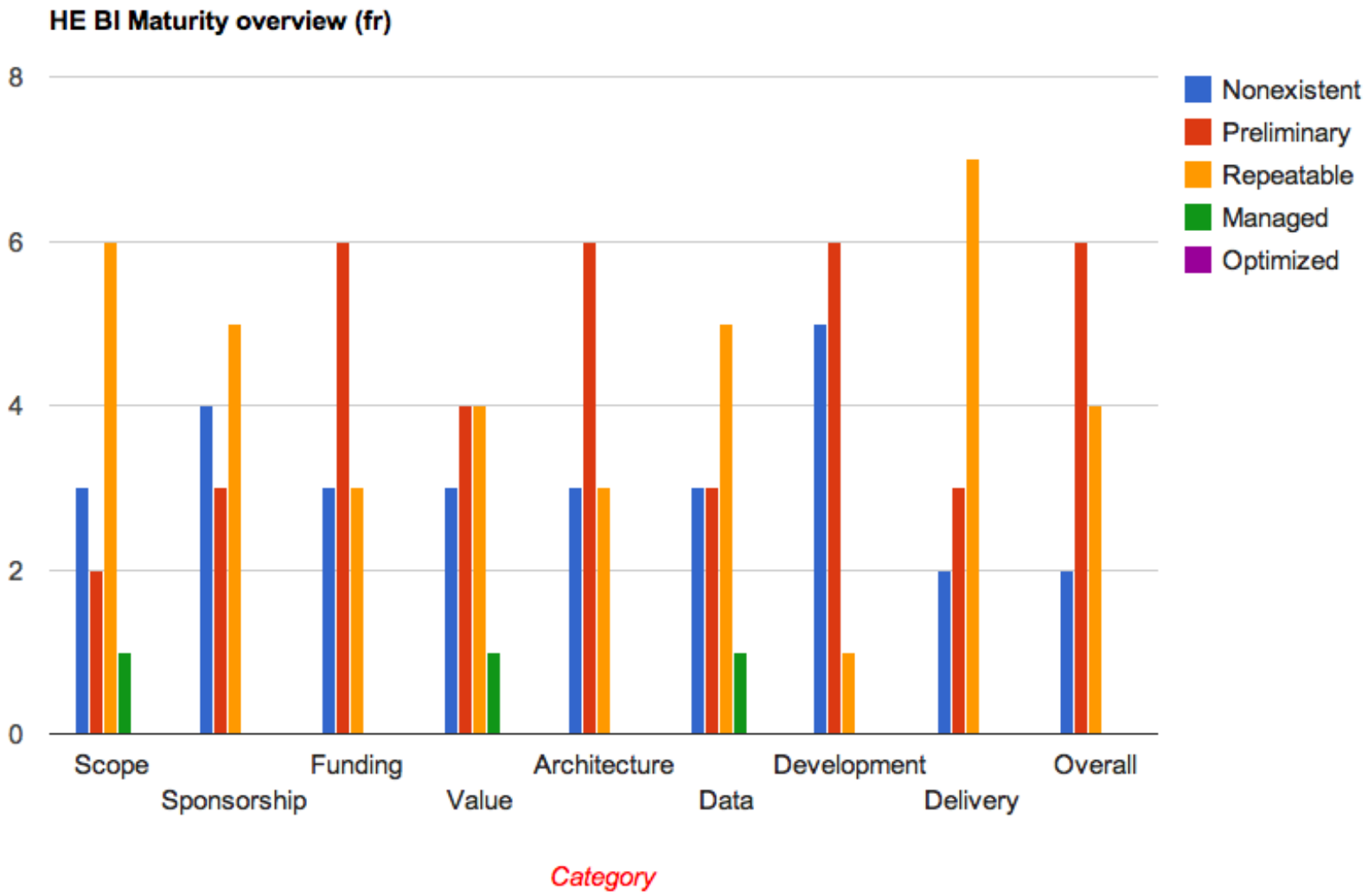
Survey analysis: Finland



Survey analysis: France

- Contacted HEI: 100 public universities (out of the 170 network of AMUE members)
- Questionnaire addressed to: Mainly to the IT VP, CIOs, general managers, and managers responsible of universities dashboarding
- Promoters: French members of EUNIS BITF (Jean François Desnos, and Marc Bouchara – AMUE)
- Contact procedure: mailing list and phone calls

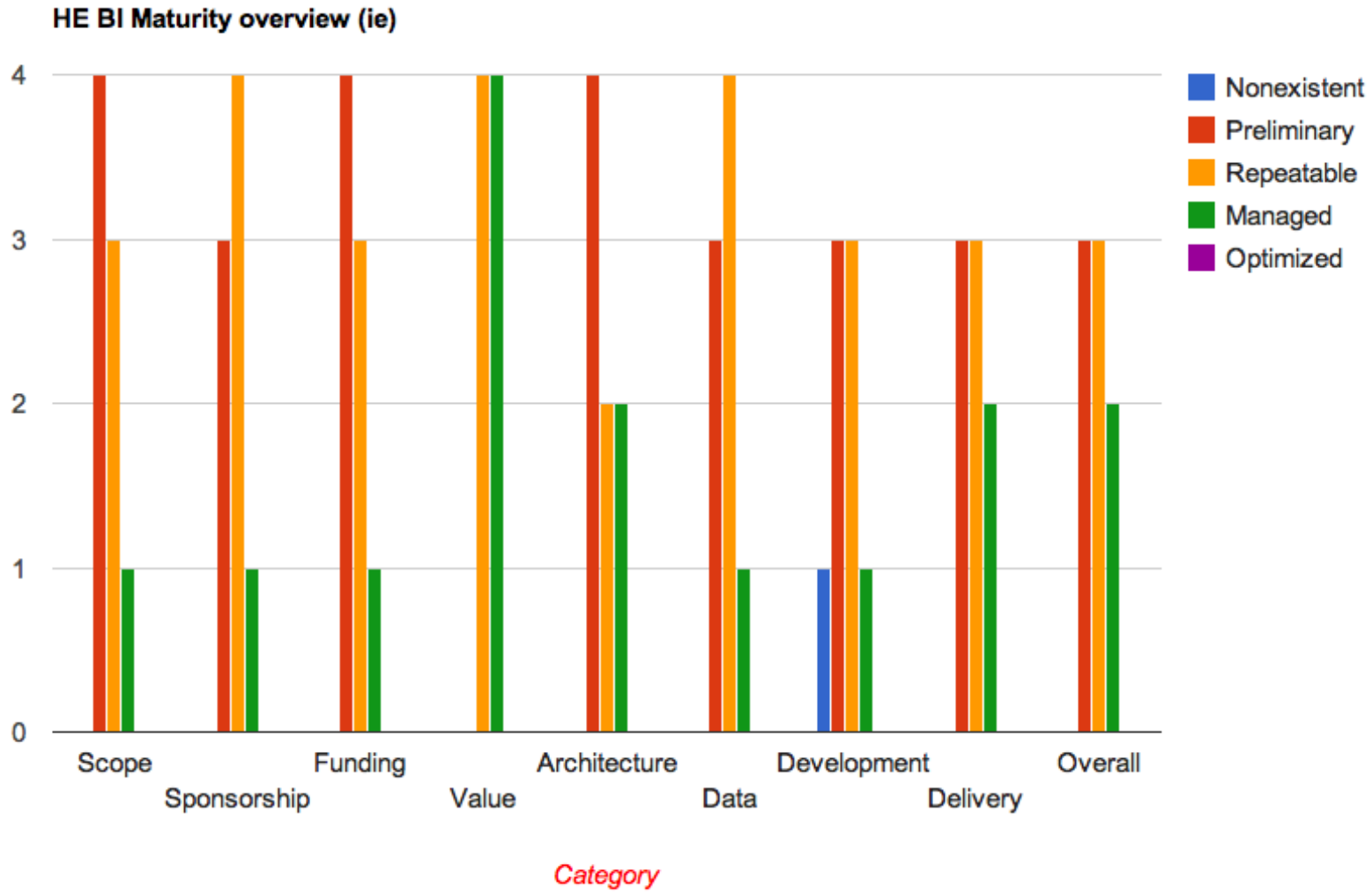
Survey analysis: France



Survey analysis: Ireland

- Contacted HEI: 7 public universities
- Questionnaire addressed to: IT Directors
- Promoters: Irish members of EUNIS BITF (John Murphy - Secretary to the Board of EUNIS and Trinity College Dublin)
- Contact procedure: mailing list and face to face meeting of Computing Centre Directors (Irish Universities Association)

Survey analysis: Ireland

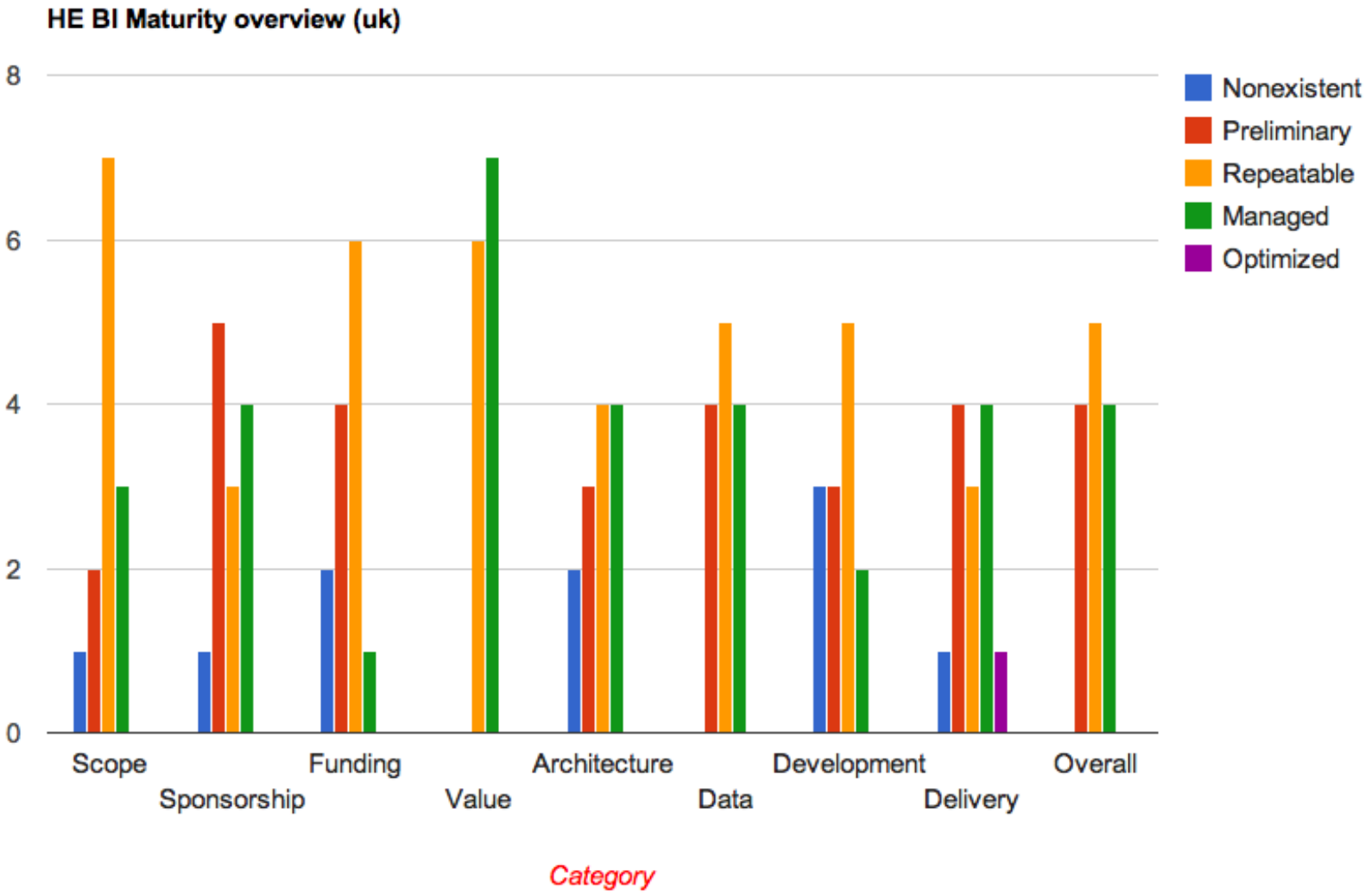


Survey analysis: United Kingdom

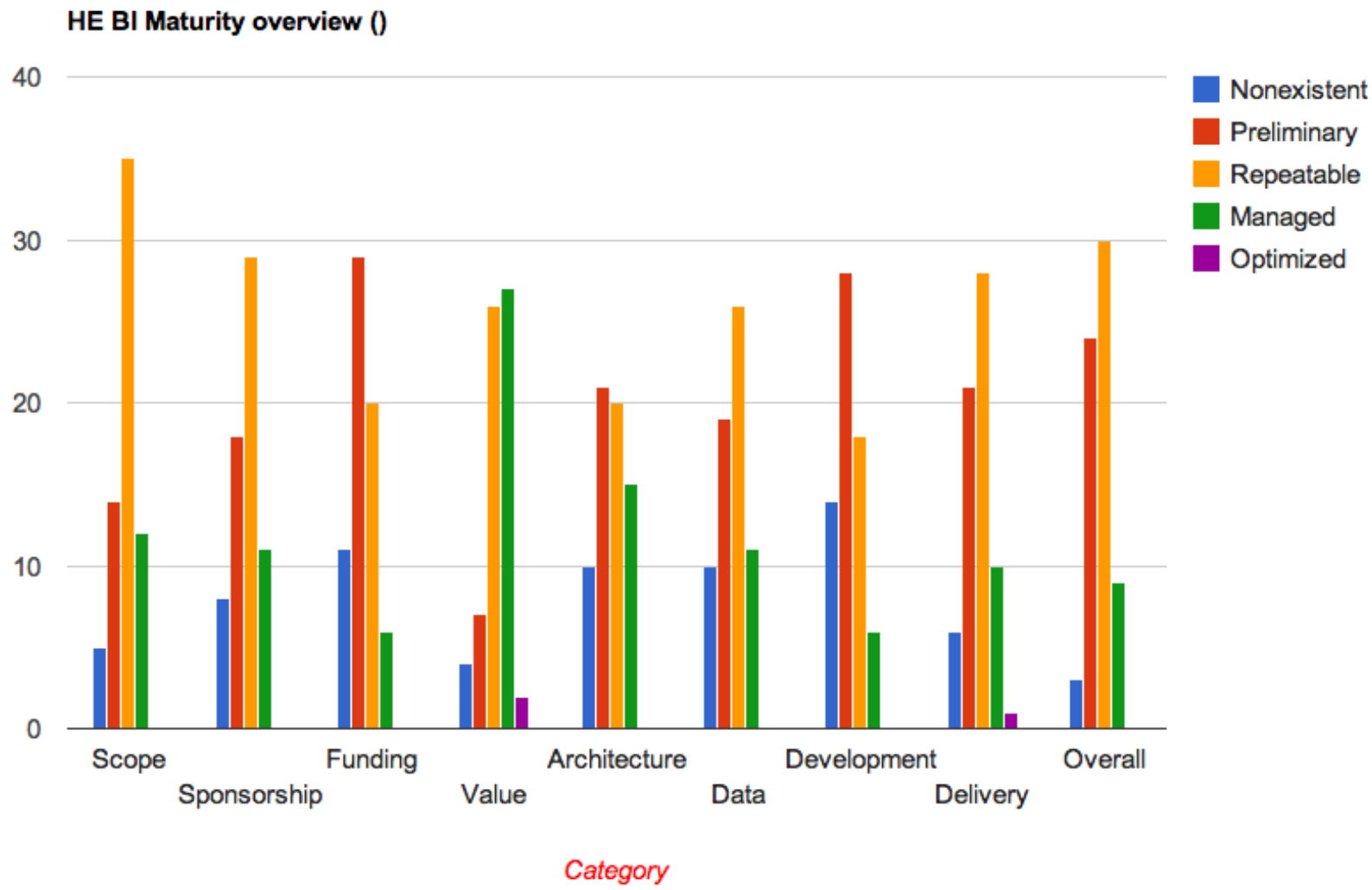
- Promoters: UCISA (Universities and Colleges Information Systems Association) via direct contact of John Murphy - Secretary to the Board of EUNIS and Trinity College Dublin

- Contact procedure: UCISA mailing list

Survey analysis: United Kingdom



Survey analysis: aggregated view



Concluding Remarks

- Data gathered from this project constitutes the first European assessment of the maturity level of BI programs in HEI

- The survey enables each participating HEI to perform a benchmark of its BI maturity level against the total average score
- The survey is anonymous; however, individual HEI can use the TDWI score calculations to perform a self-assessment evaluation

Concluding Remarks

- The survey also enables the validation of the HE-specific MM (more on this in June EUNIS 2014 Congress)

- We a network of peers to increase the response rate for the next edition of the survey

Next Steps

- Run a second phase of the BI Maturity Survey
- Publish results of the first phase of the survey: BITF website, international journals
- …

- Feedback form

Bibliographic References

OCU (2013) Alcolea, J. J. (eds) White book of Institutional Intelligence. Office for University Cooperation, Madrid, Spain.

TDWI Research (2012)) TDWI Benchmark Guide: Interpreting Benchmark Scores using TDWI's Maturity Model. www.tdwi.org

Davenport T. (2010) Davenport, T., Harris, J., Morison, R. (2010) Analytics at Work – Smarter Decisions, Better Results. Harvard Business Press

Pöppelbuß and Röglinger (2011) What Makes a Useful Maturity Model? A Framework of General Design Principles for Maturity Models and its Demonstration in Business Process Management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