







Research Management Workshop

Advanced Research Management Tools

Venezia 07/10/2015 – Università Ca' Foscari

Information Systems in the Assessment of the University Research Products

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from OR to VRA

from 2004 to 2013: Research Observatory (OR)

- ✓ start of ANVUR (National Agency for the Evaluation of the University System and Research)
- ✓ VQR (first Research Evaluation Process: 2004-2010)
- ✓ start of ASN (Scientific National Qualification process)

from 2014 to date: Commission for the University Research Evaluation (VRA Commission)

> review process of the University research evaluation system, to make it more consistent with both national and international criteria



what is VRA for?

The results of the new assessment process will be used by the University Governance and Departments to define policies for allocating resources for scientific research on the basis of merit.



OR vs. VRA: main differences

OR

- evaluation of the <u>structures</u>
- comparability among <u>14</u>
 scientific CUN-areas at UniBO
 level, by a specific Indicator
- 14 scientific areas clustered in 2 macro-areas (Science and Human Sciences), 2 evaluation criteria
- <u>all</u> products present in UniBO research catalogue (CRIS)

VRA

- evaluation of the <u>researchers</u>
- comparability among the same scientific areas at the national/international level
- <u>17</u> scientific areas, <u>17</u> evaluation criteria
- a selected, <u>limited number of products</u>



OR vs. VRA: main differences

the 17 VRA scientific areas include 3 new entries:

- ✓ Informatics (01-09)
- ✓ Architecture (08B)
- √ Psychology (11B)

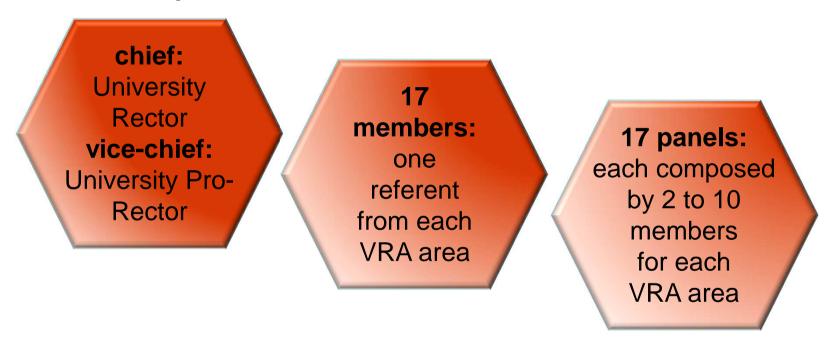
VRA

- evaluation of the researchers
- comparability among the same scientific areas at the national/international level
- 17 scientific areas, 17 evaluation criteria
- a selected, <u>limited number of products</u>



aims and features of the VRA Commission

> to ensure consistency between internal (Departments, Researchers) and external evaluation of the University

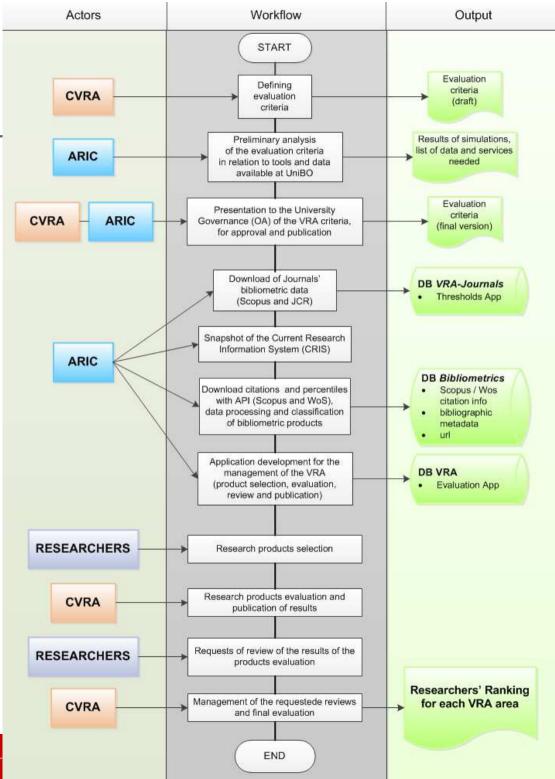


- ✓ panel members and referents are selected by the Rector based on indications from the Department Directors
- ✓ VRA criteria and final evaluations are subjected to the University Governance



work flow of the VRA:

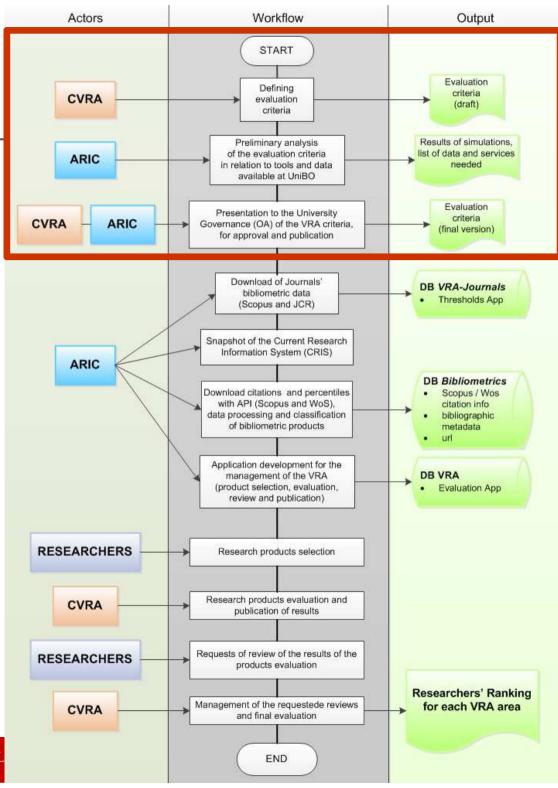
- > actors
- > actions
- > outputs





work flow of the VRA:

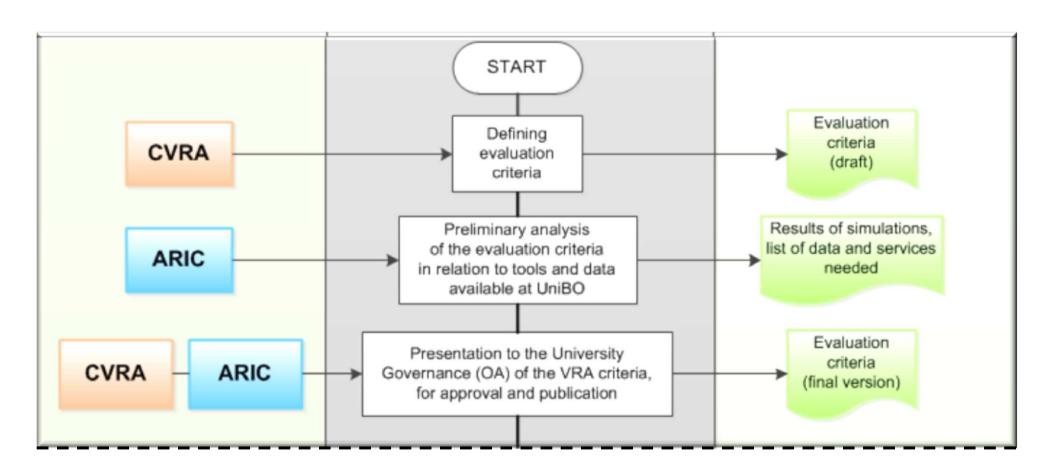
- > actors
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work flow of the VRA: part I

definition of the evaluation criteria





autonomy of the CVRA Panels

each of the 17 panels defines specific criteria for its own Scientific Area, inspired by ANVUR and matching the general CVRA criteria, e.g.:

- ✓ typologies of eligible scientific products
- ✓ requested number of publications (4 to 12)
- ✓ evaluation criteria
- ✓ criteria to manage cases of multiauthorship:
 - total authors
 - UniBO authors
 - VRA Scientific Area authors
 - Department authors.....



products evaluation classes

VRA Evaluation Classes and correspondences with the ANVUR/VQR classes

| Class | CVRA | ANVUR / VQR |
|---------------|------|-------------|
| Excellent | A | |
| Good | В | В |
| Acceptable | C | A |
| Limited | D | <u>L</u> |
| Not evaluable | NC | - |

main targets:

transparency and predictability of the evaluation's outcome



products evaluation classes

the **panels** attribute to each class a **score** that varies according to the document type

Example bibliometric

| Class | score |
|------------------|-------|
| Α | 1 |
| В | 0,8 |
| С | 0,5 |
| D (indexed) | 0,2 |
| D– (non-indexed) | 0,1 |
| NC | 0 |

Example non-bibliometric

| Class | score | | | | |
|-------|---------------------|-------------------------|--|--|--|
| | Monographic product | non-Monographic product | | | |
| A + | 3,5 | 1,2 | | | |
| Α | 3 | 1 | | | |
| В | 2,4 | 0,8 | | | |
| С | 1,5 | 0,5 | | | |
| D | 0,6 | 0,2 | | | |
| NC | 0 | 0 | | | |

the individual <u>researcher score</u> is the **sum** of the selected products scores and can be adapted according to the rules specific to each area.



non-bibliometric products

each area defines the classes for each eligible document type and the **criteria** are based on some fundamental hinges, including:

- relevance;
- originality / innovation;
- internationalization;
- scientific correspondence to the area;
- peer review and / or supervision of a scientific referee;
- journal placement in the ANVUR VQR-ASN / UniBO classes and / or in international ratings (for articles only);
- former classification according to OR (when present)

once defined, the class of non-bibliometric products does not change over time



bibliometric products

data sources and criteria adopted by the bibliometric panels

| VRA Scientific Area | W (WoS) / S (Scopus) | V (VQR1 percentile's classes) / Q (quartile's classes) | |
|---|------------------------------------|--|--|
| 01 Mathematics | W | Q | |
| 01-09 Informatics | S | Q | |
| 02 Physics | W/S | Q | |
| 03 Chemistry | W | V | |
| 04 Earth Sciences | W/S | Q | |
| 05 Biology | W | Q | |
| 06 Medicine | W | Q | |
| 07 Agricultural and Veterinary Sciences | W/S | V | |
| 08A Civil Engineering | W/S | V | |
| 09 Industrial and Information Engineering | W/S | V | |
| 11B Psychology | W/S | Q | |



bibliometric products

bibliometric indicators for the journals:

- Impact Factor (IF) based on JCR
- Scimago Journal Ranking (SJR) based on Scopus title list

bibliometric indicators for the publications:

number of citations, based on Scopus and/or WoS.

the class of bibliometric products can change over time



bibliometric products

the class of each product is calculated for the corresponding year, with reference to the scientific category (JCR Subject Category and/or ASJC Scopus).

years < **2012**:both the bibliometric indicators for the journals and the publications (citations) are used, integrated through the application of a matrix (specific for each VRA Area)

| | VRA 2012-2013 | | | | | | | | |
|--|------------------------|---|---|---------|---|---|-----|--|--|
| | bibliometric indicator | | | | | | | | |
| | | | 1 | 1 2 3 4 | | | | | |
| | ns | 1 | Α | Α | В | С | | | |
| | tatio | 2 | Α | В | С | D | I _ | | |
| | n° of citations | 3 | В | С | D | D | 11 | | |
| | 'n | 4 | С | D | D | D | 17, | | |

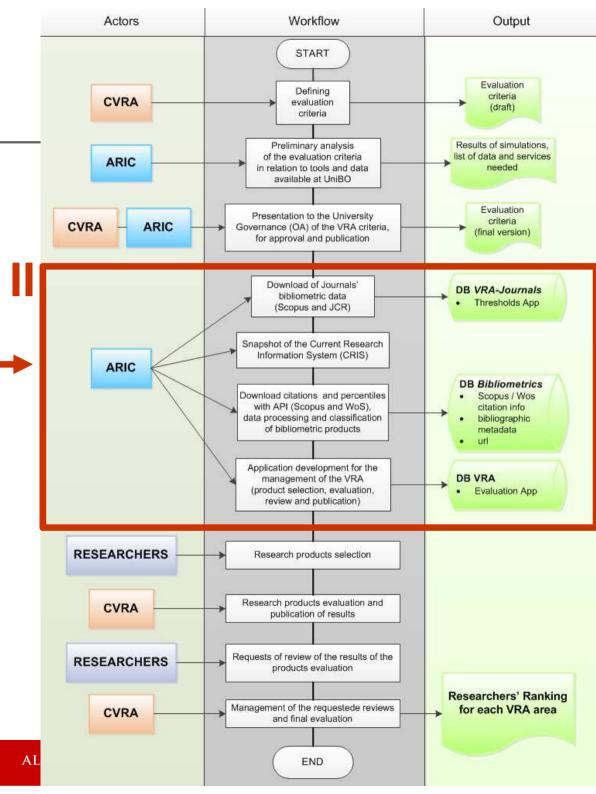
years **2012 and 2013**: only the bibliometric indicators for the journals are used

| • | VRA 2012-2013 | | | | | | | |
|---------|------------------------|--|--|--|--|--|--|--|
| | bibliometric indicator | | | | | | | |
| 1 2 3 4 | | | | | | | | |
| | A B C D | | | | | | | |



work flow of the VRA:

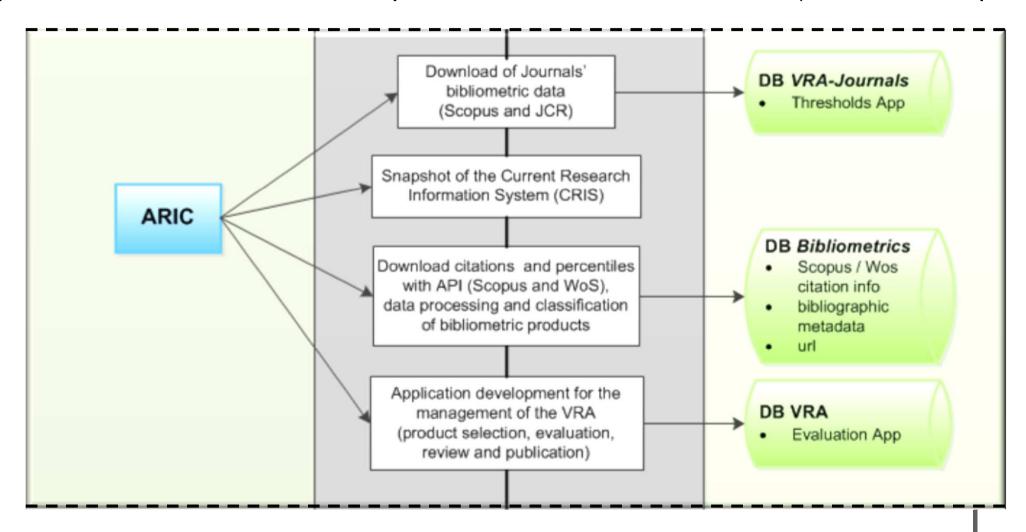
- > actors
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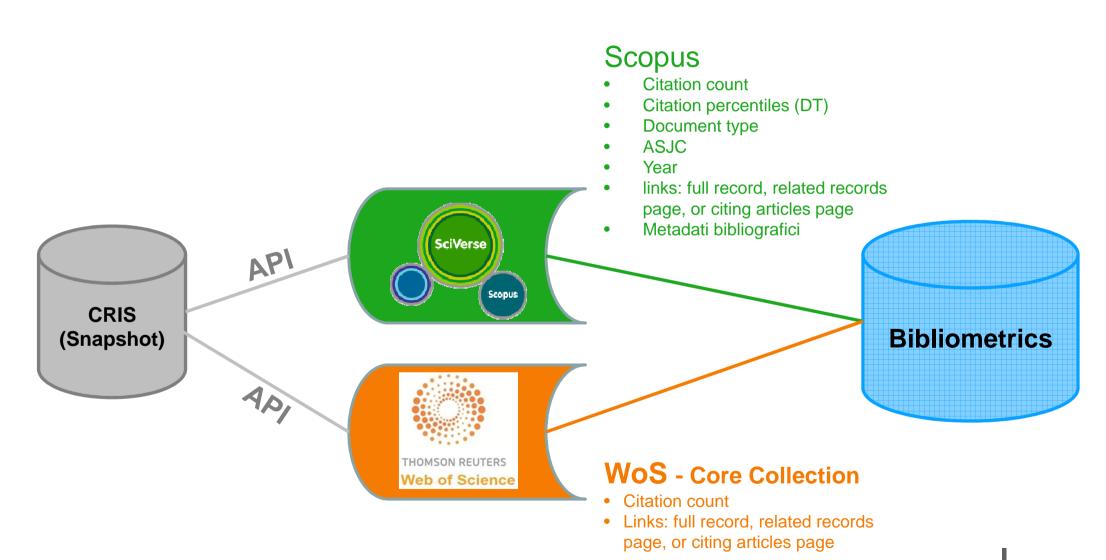
work flow of the VRA: part II

procedures to match the CRIS publications to the citation DBs (WoS and Scopus)



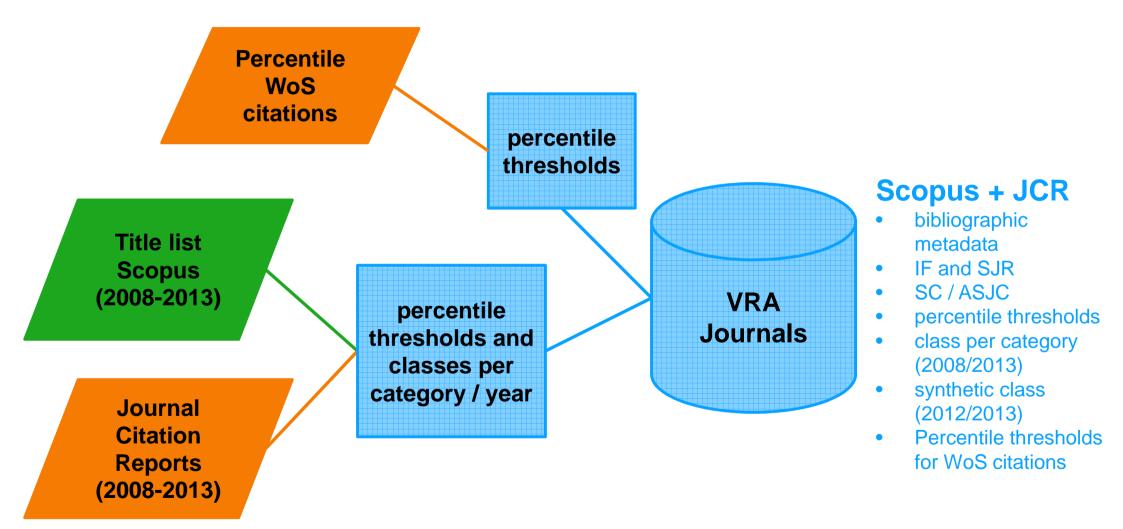


Data Base "Bibliometrics"



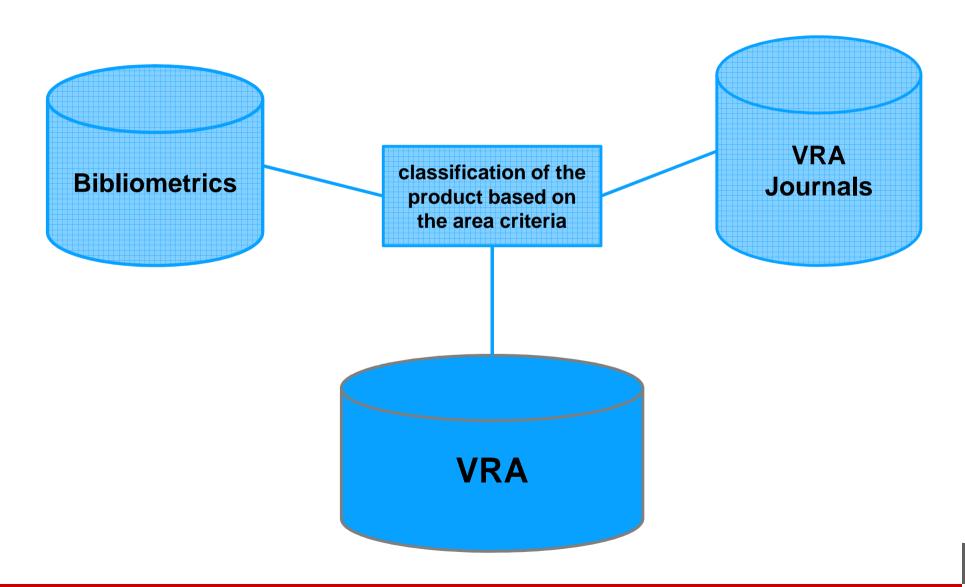


Data Base "VRA Journals"





Data Base "VRA"





some examples: practical cases

case I - years 2012-2013

the journal "Paddy and water environment" belongs to 3 scientific categories

| Journal | Year SJR | 46.10 | Percentile threshold | | | Class | |
|---|------------|------------------------------|---------------------------------|-------|-------|-------|-------|
| | | SJR | ASJC | 25th | 50th | 75th | Class |
| PADDY AND WATER ENVIRONMENT - ISSN: 1611-2490 | 2012 0,717 | | Agronomy and Crop Science | 0,713 | 0,36 | 0,213 | Α |
| | | Environmental Engineering | 0,859 | 0,455 | 0,17 | В | |
| | | | Water Science and Technology | 0,651 | 0,288 | 0,135 | Α |

| VRA 2012-2013 | | | | | | |
|------------------------|---|---|---|--|--|--|
| bibliometric indicator | | | | | | |
| 1 | 2 | 3 | 4 | | | |
| A B C D | | | | | | |



some examples: practical cases

case II - years < 2012

journal bibliometric indicator: SJR

| DB | Year | Citation count | ASJC | Percentile threshold | | | Class |
|--------|------|----------------|---|----------------------|------|------|-------|
| | Teal | | ASJC | 20th | 40th | 50th | Class |
| | | | Atomic and Molecular Physics, and Optics | 11 | 5 | 4 | 4 |
| | 2011 | 3 | Bioengineering | 21 | 11 | 8 | 4 |
| SCOPUS | | | Chemistry(all) | 16 | 7 | 5 | 4 |
| SCOPUS | | | Condensed Matter Physics | 11 | 5 | 4 | 4 |
| | | | Materials Science(all) | 13 | 6 | 4 | 4 |
| | | | Modelling and Simulation | 9 | 4 | 3 | 3 |

product indicator: n° of citations

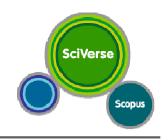
| Journal | Year SJR | | ASJC | Percentile threshold | | | Class |
|-----------------------------|----------|-------|---|----------------------|--------|--------|-------|
| Journal | Teal | 30K | ASJC | 20th | 40th | 50th | Class |
| | | 1,087 | Atomic and Molecular Physics, and Optics | 1,0634 | 0,6098 | 0,478 | 1 |
| | 2011 | | Bioengineering | 1,405 | 0,734 | 0,556 | 2 |
| JOURNAL OF NANOPARTICLE | | | Chemistry (all) | 0,928 | 0,4706 | 0,354 | 1 |
| RESEARCH ISSN: 1388-0764 | | | Condensed Matter Physics | 1,13 | 0,67 | 0,489 | 2 |
| | | | Materials Science (all) | 1,048 | 0,4484 | 0,307 | 1 |
| | | | Modelling and Simulation | 1,0842 | 0,5972 | 0,4795 | 1 |

the "Journal of Nanoparticle Research" belongs to 6 scientific categories

| VRA 2010-2011 | | | | | | |
|------------------------|---|---|---|---|---|--|
| bibliometric indicator | | | | | | |
| | | 1 | 2 | 3 | 4 | |
| ns | 1 | Α | Α | В | С | |
| tatio | 2 | Α | В | В | D | |
| າ° of citations | 3 | A | В | С | D | |
| n° | 4 | В | С | С | D | |



Data critical points: Scopus



| Year | More papers for 1 Scopus record | 1 paper for more Scopus records | Paper year # Scopus year | Records retrieved by bibliographic metada (ISSN, volume, year, start page) | Total Scopus records |
|-------|---------------------------------------|---------------------------------------|---------------------------|---|----------------------------|
| 2008 | 18 | 57 | 55 | 598 | 2,698 |
| 2009 | 49 | 54 | 60 | 68 | 2,556 |
| 2010 | 36 | 76 | 46 | 54 | 2,795 |
| 2011 | 30 | 348 | 93 | 40 | 3,514 |
| 2012 | 29 | 559 | 129 | 50 | 4,033 |
| 2013 | 49 | 716 | 134 | 59 | 4,333 |
| Total | 211 | 1,810 | 517 | 869 | 19,929 |
| % | 1.06% | 9.08% | 2.59% | 4.36% | 100.00% |



Data critical points: WoS

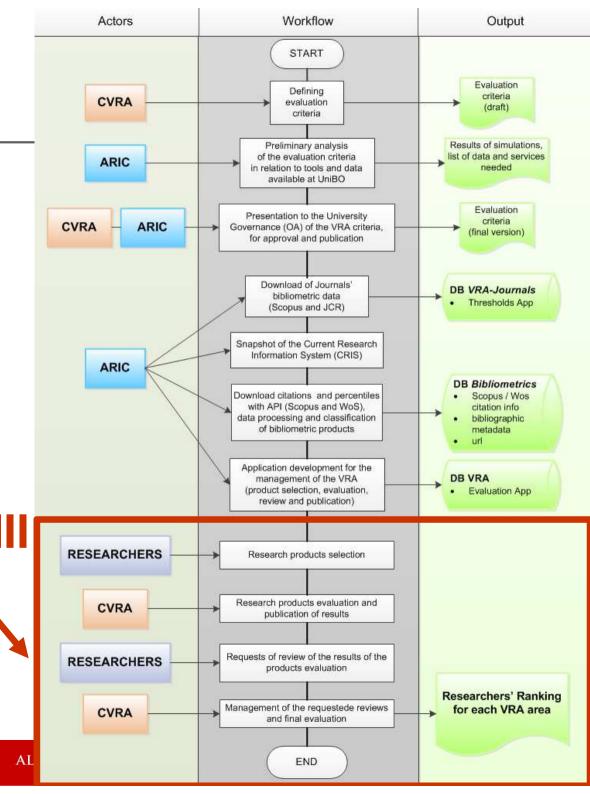


| Year | Papers with no WoS record <u>associated</u> with a JCR journal | Papers with WoS record not associated with a JCR journal | Records retrieved by bibliographic metada (ISSN, volume, year, start page) | Total WoS records |
|-------|--|--|---|-------------------------|
| 2008 | 244 | 152 | 258 | 2,823 |
| 2009 | 673 | 158 | 110 | 2,612 |
| 2010 | 713 | 124 | 101 | 2,722 |
| 2011 | 542 | 213 | 70 | 3,008 |
| 2012 | 364 | 242 | 71 | 3,447 |
| 2013 | 349 | 284 | 56 | 3,660 |
| Total | 2,885 | 1,173 | 666 | 18,272 |
| % | 15.79% | 6.42% | 3.64% | 100.00% |



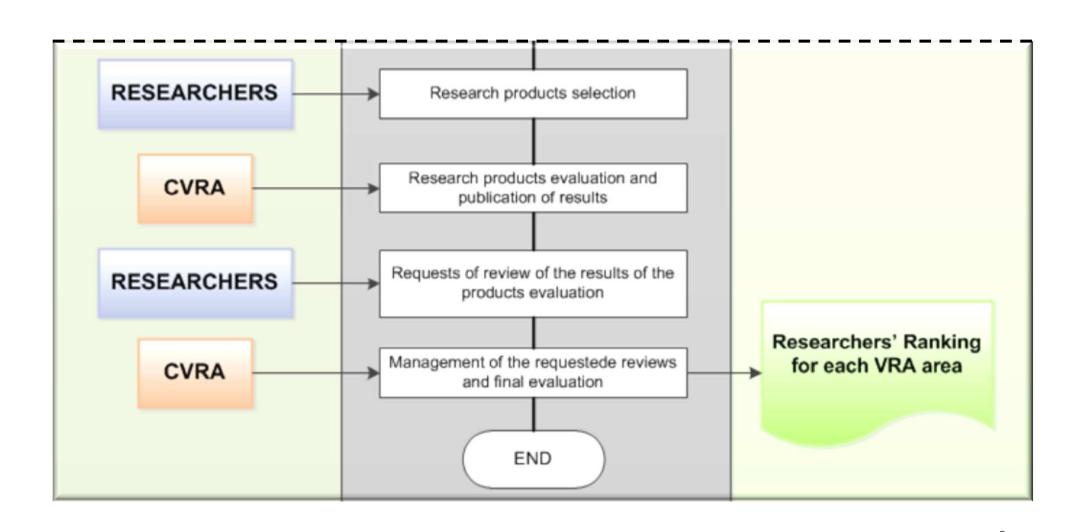
work flow of the VRA:

- > actors
- > actions
- > outputs





work flow of the VRA: part III





the VRA web application

4 phases and 3 rules:

Products selection:

- done by researchers
- same deadline for all VRA areas (from 10/06/2015 to 09/07/2015)

Products assessment:

- done by the panels and area referents
- autonomous timing for publication of results

Assessment review request:

- done by researchers
- 15 days from the assessment publication

Researchers assessment:

- done by the area referents
- publication of the final results



the VRA web application

Platform: Microsoft

Web application: ASP.NET technology

Responsive UI

Database Management System: Microsoft SQL SERVER

Customed functions for the 17 scientific areas:

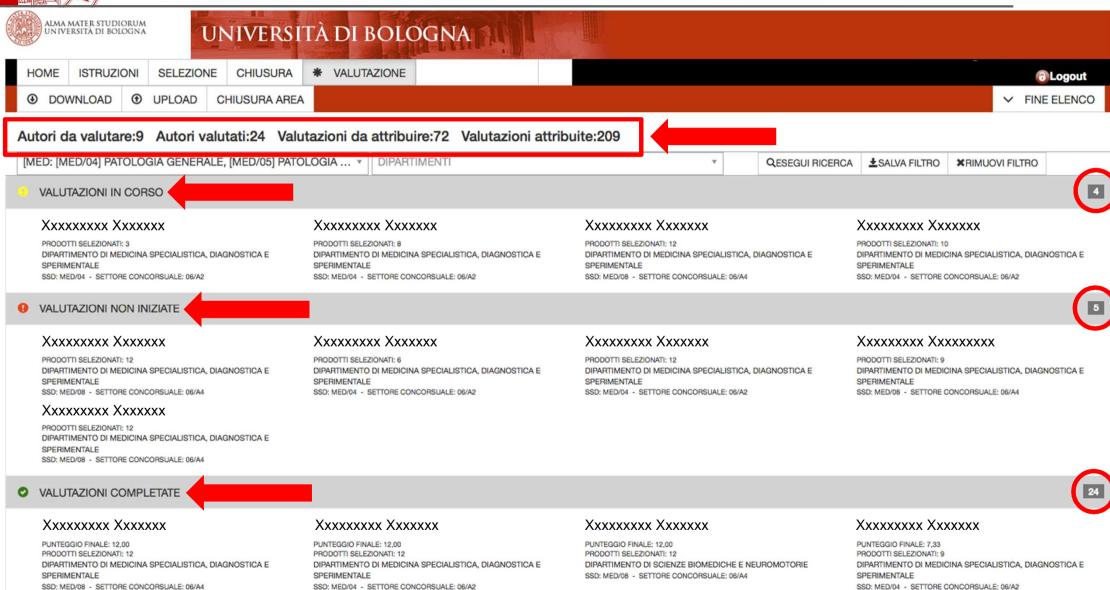
- eligible document types
- requested number of products
- publications metadata:
 - ✓ number of authors (total UniBO, VRA area, Department...)
 - ✓ bibliometric indicators
 - √ classification



VRA web application: selected products







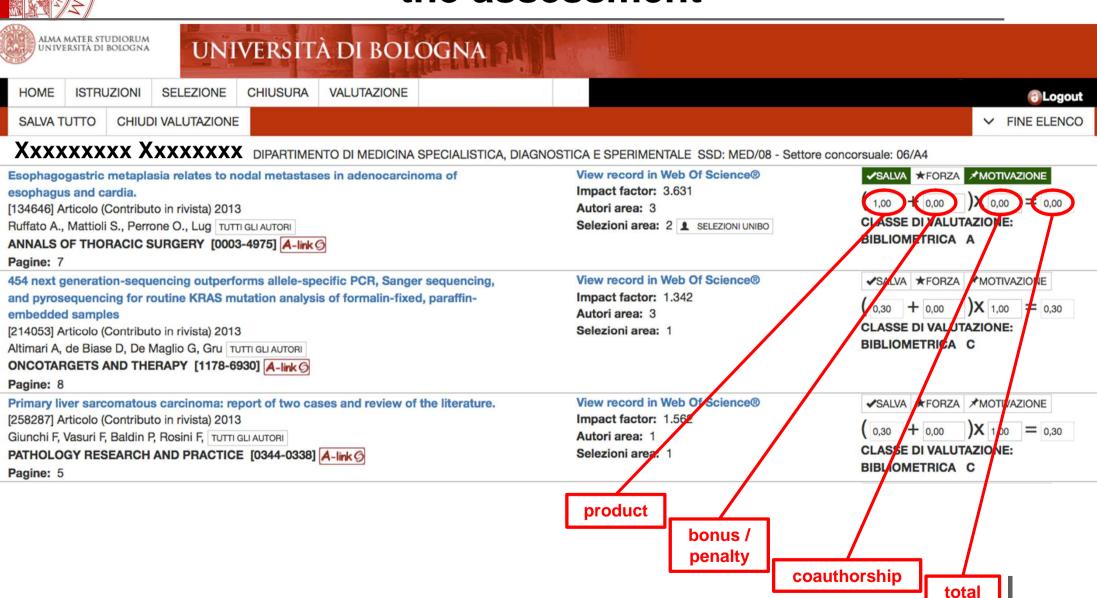








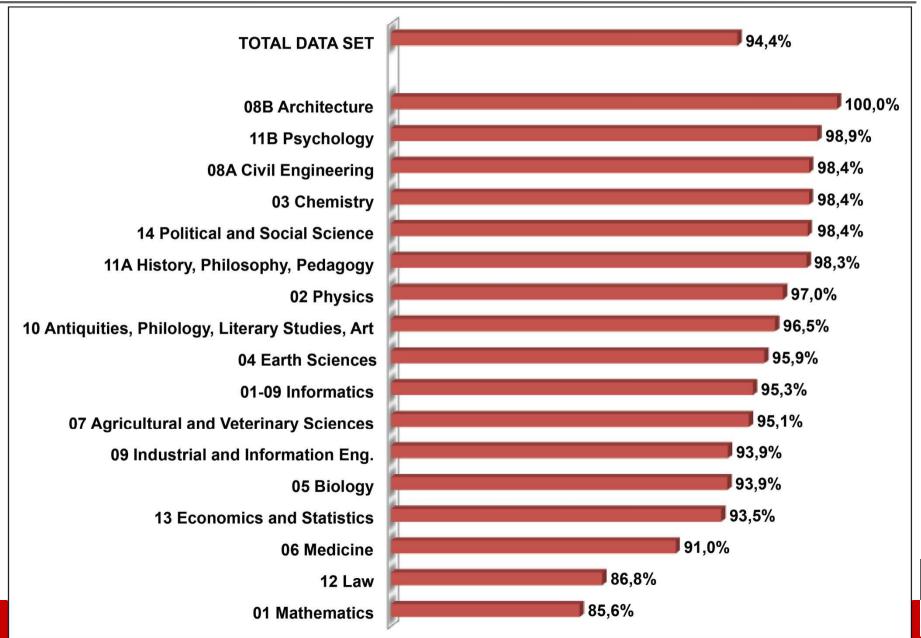






numbers of VRA:

Researcher applying for VRA





the VRA web application: publication of the results as of 05/10/2015

| Area | Publication of the results | Deadline for complaints |
|----------|----------------------------|-------------------------|
| Area 01 | 24/09/2015 | 08/10/2015 at 14:00 |
| Area 02 | 30/09/2015 | 14/10/2015 at 14:00 |
| Area 03 | 24/09/2015 | 08/10/2015 at 14:00 |
| Area 04 | 28/09/2015 | 12/10/2015 at 14:00 |
| Area 05 | 30/09/2015 | 14/10/2015 at 14:00 |
| Area 07 | 28/09/2015 | 12/10/2015 at 14:00 |
| Area 08A | 28/09/2015 | 12/10/2015 at 14:00 |
| Area 09 | 02/10/2015 | 16/10/2015 at 14:00 |
| Area 13 | 23/09/2015 | 07/10/2015 at 14:00 |
| Area 14 | 02/10/2015 | 16/10/2015 at 14:00 |



number of selected products

| Area | PANEL members (n°) | Selected products per researchers | Selected products | Max number of products per researcher | Selected products per researcher (average) |
|---|--------------------------|---|-------------------|---------------------------------------|--|
| 01 Mathematics | 5 | 513 | 417 | 8 | 6.2 |
| 01-09 Informatics | 4 | 821 | 615 | 12 | 10.1 |
| 02 Physics | 5 | 705 | 615 | 8 | 7.3 |
| 03 Chemistry | 7 | 1,377 | 1024 | 8 | 7.3 |
| 04 Earth Sciences | 4 | 318 | 276 | 8 | 6.8 |
| 05 Biology | 6 | 1,253 | 930 | 8 | 6.8 |
| 06 Medicine | 9 | 2,932 | 2,413 | 12 | 9.1 |
| 07 Agric. and Vet. Sciences | 4 | 1,559 | 1,180 | 7 | 6.7 |
| 08A Civil Engineering | 4 | 436 | 345 | * | |
| 08B Architecture | 3 | 354 | 321 | 8 | 7.9 |
| 09 Industrial and Inform. Eng. | 7 | 5,701 | 3,616 | * | |
| 10 Antiq., Philol., Liter. St., Art History | 10 | 1,996 | 1,944 | 12 | 7.2 |
| 11A History, Philosophy, Pedagogy | 10 | 1,293 | 1,265 | 8 | 7.4 |
| 11B Psychology | 4 | 592 | 491 | 7 | 6.7 |
| 12 Law | 8 | 1,146 | 1,131 | 8 | 6.9 |
| 13 Economics and Statistics | 7 | 890 | 748 | 4 | 3.6 |
| 14 Political and Social Science | 5 | 844 | 818 | 8 | 7.1 |
| Total | 102 | 22,730 | 18,149 | | |



bibliometric evaluation: number of papers

| Area | WoS/JCR | Scopus | W/S |
|--------------------------------|---------|--------|-------|
| 01 Mathematics | 566 | - | - |
| 02 Physics | 2,423 | 2,328 | 2,474 |
| 03 Chemistry | 2,441 | - | - |
| 04 Earth Sciences | 382 | 403 | 430 |
| 05 Biology | 1,616 | - | - |
| 06 Medicine | 5,178 | - | - |
| 07 Agric. and Vet. Sciences | 1,592 | 1,610 | 1,725 |
| 08A Civil Engineering | 316 | 297 | 337 |
| 09 Industrial and Inform. Eng. | 1,574 | 1,739 | 1,819 |
| 11B Psychology | 590 | 587 | 656 |
| Total | 16,678 | 6,964 | 7,441 |



bibliometric evaluation: number of journals

| YEAR | JCR | Evaluations | Scopus | Evaluations |
|------|--------|-------------|--------|-------------|
| 2008 | 8,232 | 13,348 | 18,384 | 37,135 |
| 2009 | 9,216 | 14,746 | 19,202 | 39,184 |
| 2010 | 10,312 | 16,348 | 20,425 | 43,798 |
| 2011 | 10,748 | 17,102 | 21,320 | 41,903 |
| 2012 | 10,936 | 17,429 | 22,310 | 46,506 |
| 2013 | 11,022 | 17,638 | 22,644 | 45,741 |



final remarks

The VRA is a complex process needing dedicated resources and more applications:

- Interview and analysis: 2 (part time)
- Data and database engineering: 1 (full time)
- Software engineering: 1 (full time)
- Bibliographic Metadata support: 2 (part time)
- Helpdesk: 2 (part time)
- Official documentation:1 (part time)
- Panel VRA: 85
- Commission VRA: 17 + PRR
- Researchers: 2780



final remarks

What does the future hold?

- VQR 2 + new CRIS IRIS + interuniversity focus group on «Evaluation and research» and «Interoperability»:
 - Improvement of interoperability between the catalog data and external databases
 - Improvement of the services provided:
 - Scopus: journals percentile for ASJC / year
 - WoS: paper metadata including journal ISSN, SC, year, etc..., file with all the data of journals including percentiles, citations percentiles per document type
 - Decrease of the needing of resources for VRA



thank you for your attention!

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