THE WIDE ROLE OF INFORMATICS AT UNIVERSITIES

THE AUTHOR

1. Introduction

In the 1970s with the advent of the personal computer we entered into the Digital or Information Age. However it has only been in this century with the ubiquity of the internet, the smartphone, and the internet of things that digital has become truly pervasive. How do universities respond to this massive change? Informatics Europe established in 2018 a new working group to investigate what universities are doing to ensure that non-informatics teaching and research is informed by best practice in Informatics.

To better understand the state of affairs on this topic and discover best practices at European Universities, the working group conducted an online survey. We invited heads and members of Informatics/Computer Science/IT Departments (Schools, Faculties, Institutes) to complete a questionnaire. The request to fill out our survey was sent to all Informatics Europe members and it was also publicly available from the Informatics Europe website. The questionnaire was filled out autumn 2018. Forty eight universities (almost all IE members) from eighteen countries filled it out. The list of participants is in table 1.

Our survey was wide ranging. We wanted to understand how universities valued interdisciplinary research, about teaching Informatics to non-specialist students, what happens i n practice with hiring and supporting interdisciplinary academics. We wanted to know about how Data Science in particular fits into universities and finally the structures in place to support interdisciplinary work. The survey questions are in the Appendix A.

How Informatics (also called Computer Science or Computing) should position itself in a university is a political decision. The extremes we could imagine range from primarily being a service department to primarily being a research area that is isolated from other departments.
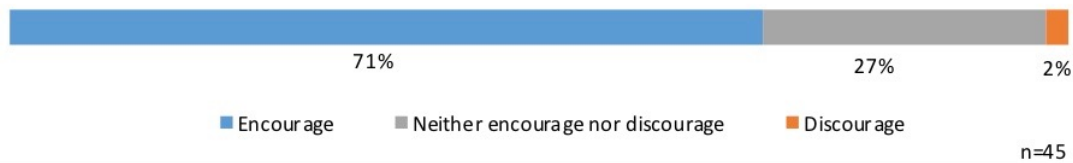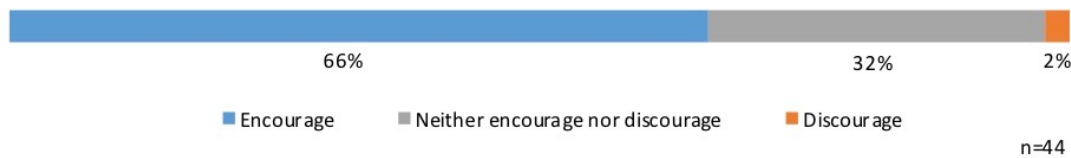
2. research

Luis Caires

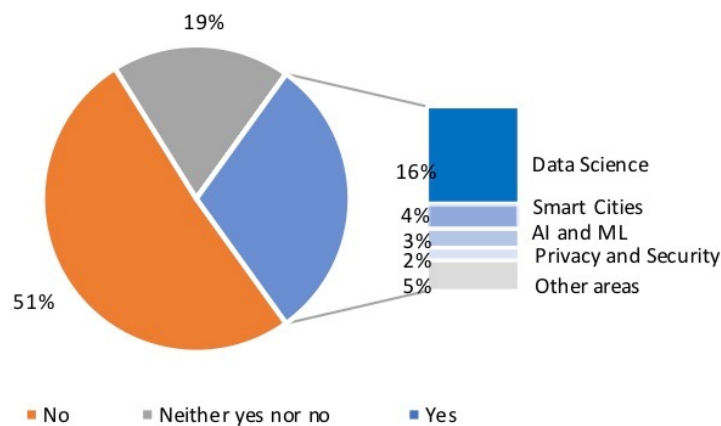|	Country	University
1.	Austria	TU Wien
2.	Belgium	Université Catholique de Louvain
3.	Bulgaria	Sofia University St. Kliment Ohridski
4.	Czech Republic	Masaryk University
5.	Denmark	Aalborg University IT University of Copenhagen University of Southern Denmark
6.	Estonia	Tartu University
	Finland	Aalto University
7.	Germany	RWTH Aachen Humboldt-Universităt zu Berlin Paderborn University of Stuttgart
8.	Hungary	Eötvös Lornd University
9.	Ireland	Technological University Dublin
10.	Italy	University of Bari Aldo Moro Università di Torino Alma Mater Studiorum - Universit di Bologna Università degli Studi di Milano Politecnico di Milano Università Roma Tre Università degli Studi di Milano-Bicocca Università degli studi "G. d' Annunzio" Chieti Pescara
11.	Latvia	University of Latvia Transport and Telecommunication University
12.	Netherlands	Delft University of Technology Tilburg University Utrecht University
13.	Portugal	Universidade Nova de Lisboa
14.	Romania	Babes-Bolyai Univ. Cluj-Napoca
15.	Spain	University of Almeria Universitat Politecnica de Catalunya University of Extremadura University Jaume I University of Málaga Complutense University of Madrid University Oviedo Universidad de Valladolid
16.	Sweden	Chalmers — Gothenburg University
17.	Switzerland	University of Bern EPFL University of Lugano ETH Zürich University of Zürich
18.	UK	Cambridge University University of Edinburgh Imperial College London University of Oxford

TABLE 1. Participating Universities

When compared with single disciplinary research, does your University encourage or discourage (or neither) interdisciplinary research?

71% 27% 2%

■ Encourage ■ Neither encourage nor discourage ■ Discourage

n=45

When compared with single disciplinary research, does your Informatics department encourage or discourage (or neither) interdisciplinary research?

66% 32% 2%

■ Encourage ■ Neither encourage nor discourage ■ Discourage

n=44

Are there interdisciplinary areas of research where your university could (should) enter but aren't due to lack of university support?

19%

16% Data Science

4% Smart Cities
3% AI and ML
2% Privacy and Security
5% Other areas

51%

■ No ■ Neither yes nor no ■ Yes

Data Science: Applied Statistics, Bioinformatics, Biomedical Data Science, Data Analysis, Digital Health, Predictive/Precision Medicine
Smart Cities: Data-driven Economy, Smart Building, Remote Sensing, , Energy Management
*Other areas*: Design Interaction, Game Research, Quantum Computing, Informatics for Environmental Sciences

n=37

Are there other players who have helped increase the interdisciplinary research in your university?

- No
- Yes, we have other players and initiatives within a university
- Yes, there are external organizations helping to increase interdisciplinary research

22%

28%

20% National Research Council or Foundation

20% National Government

6% Industry

4% EU Programs

n=36

When compared with single disciplinary research, does your University encourage or discourage (or neither) interdisciplinary research?

71%   27%   2%
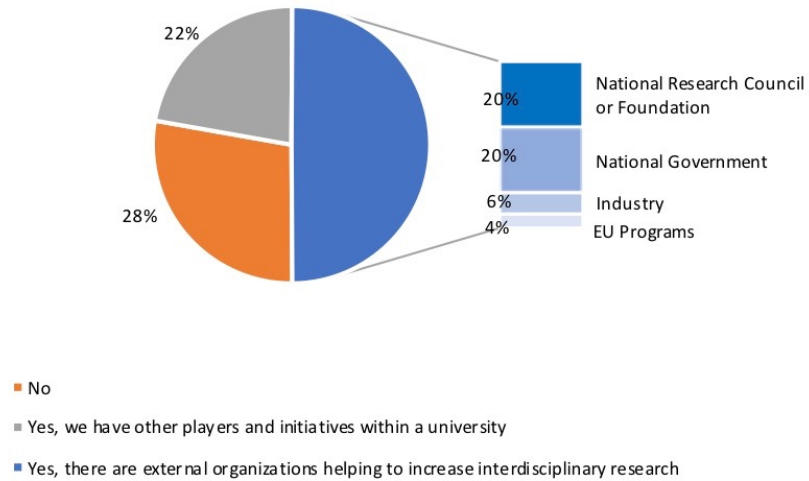
- Encourage
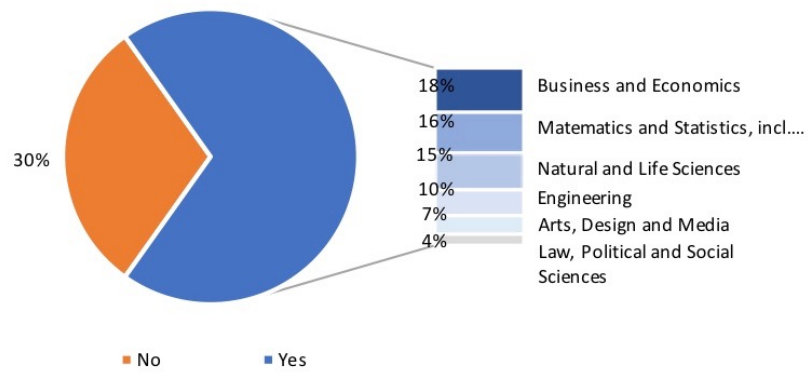- Neither encourage nor discourage
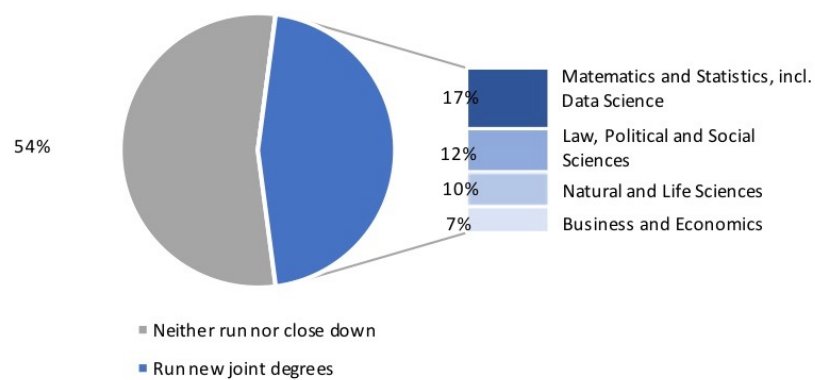- Discourage
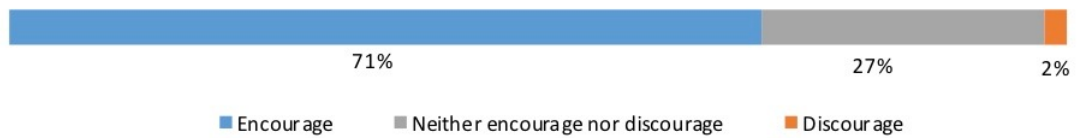
n=45

3. TEACHING

Inmaculada Garcia Fernandez

Does your university run joint degrees (e.g. X and Informatics, Informatics and X, X with Informatics, Informatics with X). If yes, what are they?
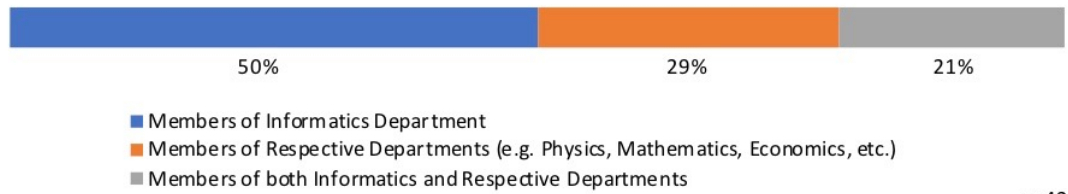
30%	18% Business and Economics
	16% Matematics and Statistics, incl....
	15% Natural and Life Sciences
	10% Engineering
	7% Arts, Design and Media
	4% Law, Political and Social Sciences

■ No   ■ Yes

n=46

Are there plans to run new joint degrees or to close down joint degrees? If yes what are they?

54%	17% Matematics and Statistics, incl. Data Science
	12% Law, Political and Social Sciences
	10% Natural and Life Sciences
	7% Business and Economics

■ Neither run nor close down
■ Run new joint degrees

n=46

Who teaches the Informatics component of non-Informatics degrees?

50%	29%	21%

■ Members of Informatics Department
■ Members of Respective Departments (e.g. Physics, Mathematics, Economics, etc.)
■ Members of both Informatics and Respective Departments
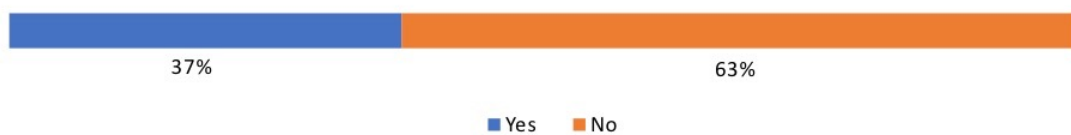
n=42

If Informatics is taught by people not located in an Informatics department are they Computer Scientists by training or research?

22%	51%	27%

■ They are Computer Scientists
■ They are not Computer Scientists
■ Informatics is not taught by people not located in an Informatics Department
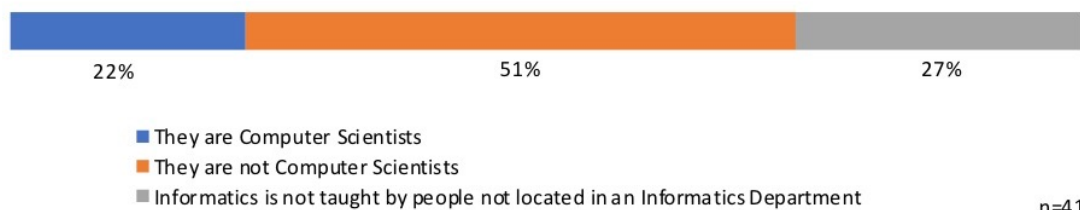
n=41

4. PEOPLE

Elisabetta Di Nitto

Does your university explicitly advertise/hire academics who focus on interdisciplinary research?

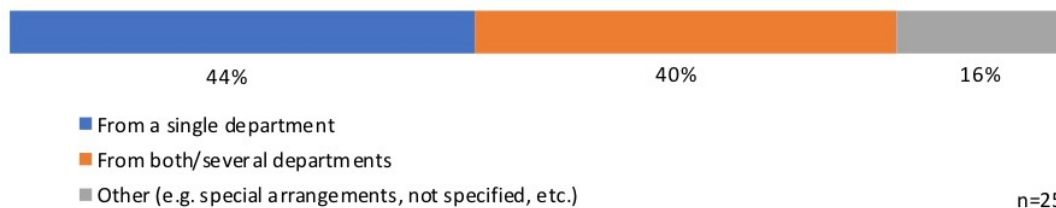|	
37%	63%

■ Yes ■ No

n=46

Are they rooted in a department, have a joint appointment across departments, or rooted in a centre?

74%	16%	10%

■ Rooted in a department
■ Have a joint appointment across departments
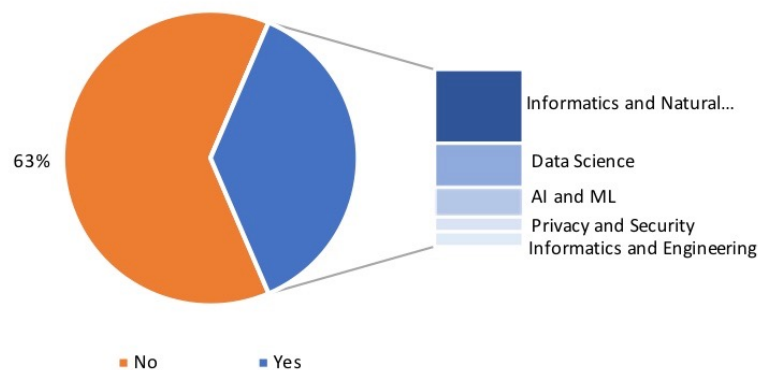■ Rooted in a centre

n=31

How is their quality judged for both appointment and for promotion? For example are they judged according to the criteria of one of the departments or both. Are the people who judge from a single department or both?
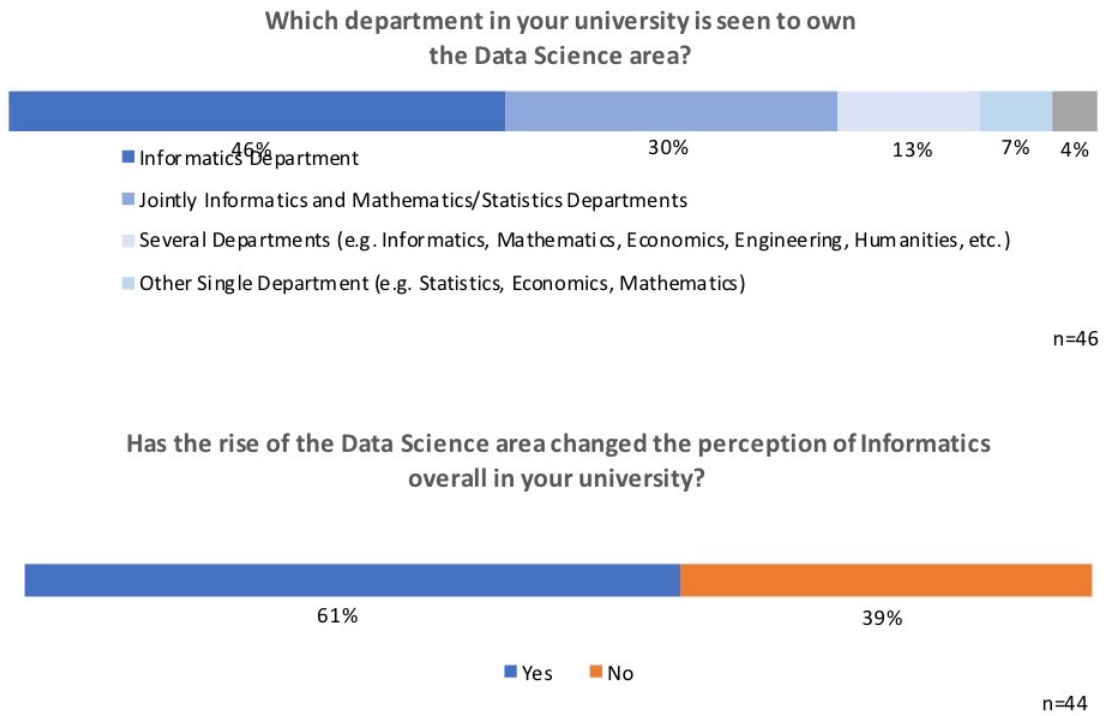
44%	40%	16%

■ From a single department
■ From both/several departments
■ Other (e.g. special arrangements, not specified, etc.)

n=25

Are there any initiatives planned to hire in interdisciplinary areas?

63%

Informatics and Natural...
Data Science
AI and ML
Privacy and Security
Informatics and Engineering

■ No   ■ Yes

n=43

5. Data Science

Eduard Groller

**Which department in your university is seen to own
the Data Science area?**

46%   30%   13%   7%   4%

■ Informatics Department

■ Jointly Informatics and Mathematics/Statistics Departments

■ Several Departments (e.g. Informatics, Mathematics, Economics, Engineering, Humanities, etc.)

■ Other Single Department (e.g. Statistics, Economics, Mathematics)

n=46

**Has the rise of the Data Science area changed the perception of Informatics
overall in your university?**

61%   39%

■ Yes   ■ No

n=44

6. Structure

Luis Caires

Inmaculada Garcia Fernandez

**Does your university set up centres for interdisciplinary work?
If yes, for what are these centres?**
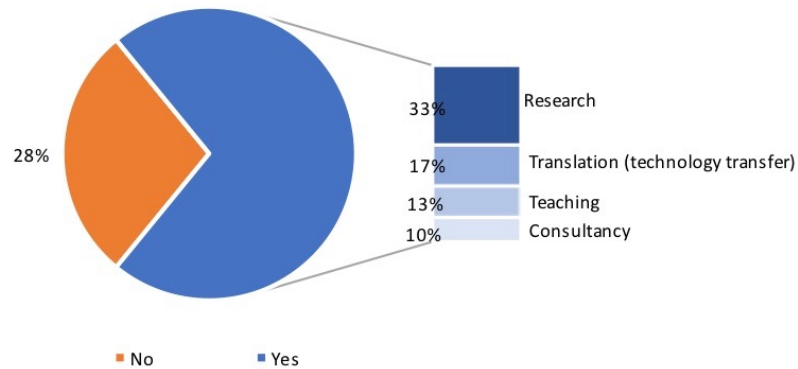
33% Research
17% Translation (technology transfer)
13% Teaching
10% Consultancy

28%

■ No   ■ Yes

n=46

**Are they rooted in a single department, owned by the departments involved
or independent?**

29%   17%   4%

■ Independent
■ Owned by the departments involved
■ Rooted in a single department   n=36

**Are they rooted in a single department, owned by the departments
involved or independent?**

53%   25%   22%

■ Elsewhere on campus   ■ Nearby a department   ■ Within a department
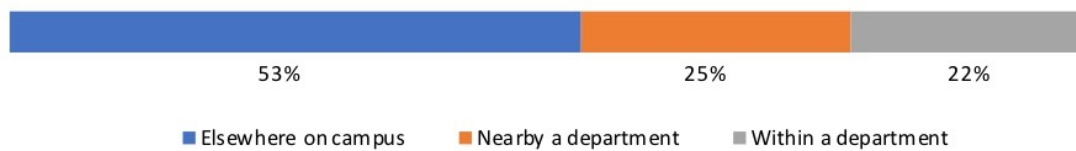
n=36

How are any centres funded? Does the university provide any money to startup or are they funded by external money?

38%	25%	38%
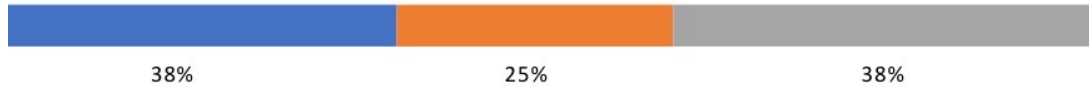
- ■ Internal funding (University, departments money)
- ■ External funding (money from local and national government, national and EU research funds, industry)
- ■ Both internal and external funding

n=32

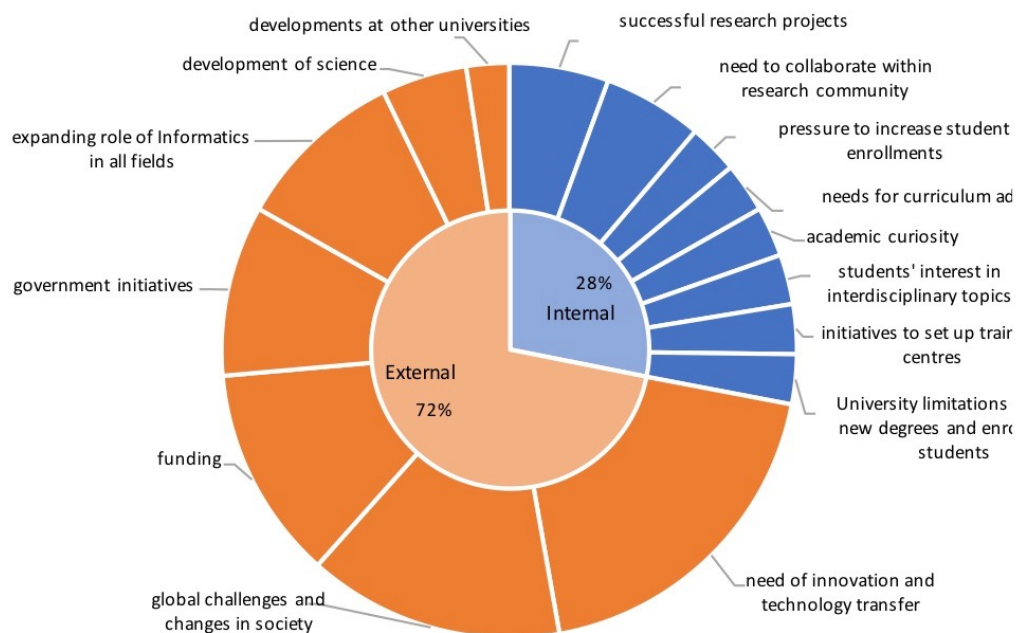**Are there plans to set up more centres or to close centres?**

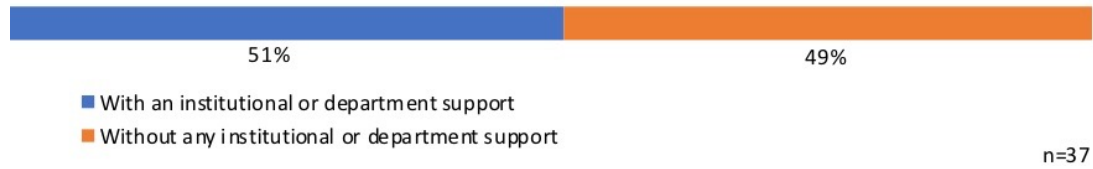| 24%	76%

- ■ Set up more centres
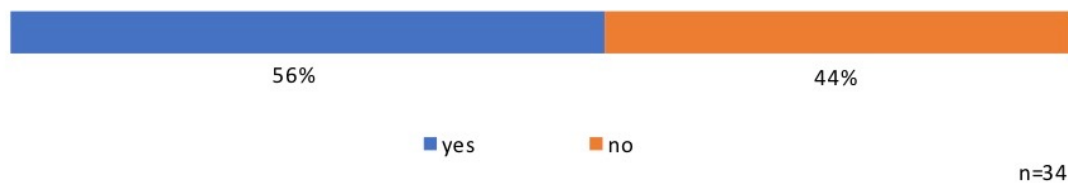- ■ Neither set up nor close centres

n=41

What are the drivers or pressures (both internal to the department /school/ faculty/ university and external to the university) that you see on the horizon that may lead to new activity?

Is substantial interdisciplinary work undertaken by academics without any institutional or department support?

| 51% | 49% |

■ With an institutional or department support
■ Without any institutional or department support

n=37

Are there any centres for interdisciplinary work that have been set up due to a strategic decision by the university or department/school/faculty rather than as supporting activities of existing faculty?

| 56% | 44% |

■ yes   ■ no

n=34

Does your university have something in their official strategy to widen the role of Informatics or to encourage interdisciplinary research?

| 50% | 50% |

■ yes   ■ no

n=36
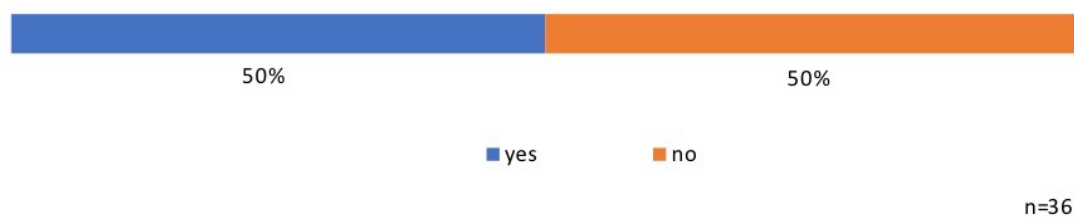
Appendix A. Survey: The Wide Role of Informatics at Universities

(1) Research

  (a) When compared with single disciplinary research, does your university encourage or discourage (or neither) interdisciplinary research? If so how? (e.g. funding, time, physical centres) Encourage Discourage Neither encourage nor discourage

  (b) Does your Informatics department encourage or discourage (or neither) interdisciplinary research? If so how? Encourage Discourage Neither encourage nor discourage

  (c) Are there interdisciplinary areas of research where your university could (should) enter but aren?t due to lack of university support? If so what are they?

  (d) Are there other players who have helped increase the interdisciplinary research in your university? For example has a funding body focused a programme on interdisciplinary PhD studentships which academics applied for?If so what external organisations and what programmes have increased interdisciplinary research at your university?

  (e) Please comment on any advantages or disadvantages you perceive of your university?s arrangements.

(2) Teaching

  (a) . Does your university run joint degrees (e.g. X and Informatics, Informatics and X, X with Informatics, Informatics with X). If yes, what are they? Yes No

  (b) Are there plans to run new joint degrees or to close down joint degrees? If yes what are they? Run new joint degrees Close down joint degrees Neither run nor close down

  (c) Who teaches the Informatics component of non-Informatics degrees? For example, is programming taught to Physicists by members of the Physics department, of the Informatics department or is there a servicing organisation within your university that teaches Physics students to code (or some other mechanism)?

  (d) If Informatics is taught by people not located in an Informatics department are they Computer Scientists by training or research? They are Computer Scientists They are not Computer Scientists Informatics is not taught by people not located in an Informatics department

  (e) Please comment on any advantages or disadvantages you perceive of your university?s arrangements.

(3) People

(a) Does your university explicitly advertise/hire academics who focus on inter-disciplinary research? Yes No

(b) Are they rooted in a department, have a joint appointment across depart-ments, or rooted in a centre? Rooted in a department Have a joint appoint-ment across departments Rooted in a centre

(c) How is their quality judged for both appointment and for promotion?For example are they judged according to the criteria of one of the departments or both? Are the people who judge from a single department or both?

(d) Are there any initiatives planned to hire in interdisciplinary areas? Yes No

(e) Please comment on any advantages or disadvantages you perceive of your university?s arrangements.

(4) Data Science

(a) Which department in your university is seen to own this area? Is it Informat-ics, Statistics, jointly or somewhere else? Informatics Department Statistics Department Jointly Informatics and Statistics Department Somewhere else (please specify)

(b) Has the rise of this area changed the perception of Informatics overall in your university? Yes No

(c) Please comment on any advantages or disadvantages you perceive of your university?s arrangements.

(5) Structure

(a) Does your university set up centres for interdisciplinary work? If yes can you say which they are? Yes No

(b) Are they for research, translation (technology transfer), consultancy, and/or teaching? Research Translation (technology transfer) Consultancy Teaching

(c) Are they rooted in a single department (say which one), owned by the de-partments involved or independent? Rooted in a single department Owned by the departments involved Independent

(d) Are they physically located within a department, nearby or elsewhere on campus? Within a department Nearby a department Elsewhere on campus

(e) How are any centres funded? Does the university provide any money to startup or are they funded by external money? Does the university provide longer term money?

(f) Are there plans to set up more centres or to close centres? If so what will they be? Set up more centres Close centres Neither set up nor close

(g) What are the drivers or pressures (both internal to the department/ school/faculty/universit and external to the university) that you see on the horizon that may lead to new activity?

(h) Is substantial interdisciplinary work undertaken by academics without any institutional or department support? Without any institutional or department support With an institutional or department support

(i) Are there any centres for interdisciplinary work that have been set up due to a strategic decision by the university or department/school/faculty rather than as supporting activities of existing faculty? If so which centres?

(j) Does your university have something in their official strategy to widen the role of Informatics or to encourage interdisciplinary research? If so what is it?

(k) Please comment on any advantages or disadvantages you perceive of your university?s arrangements.

(l) Is there anything we have missed in the survey that you wish to tell us?