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Does openness in research micro-practices’ matter for
societal engagement commitment?

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BACKGROUND

2

- **Science policymakers** are interested in identifying and promoting research that makes an impact on society. (Benneworth & Jongbloed, 2010).
- For **researchers**, being committed with the production and transfer of relevant research is not always beneficial for their professional career:
 - ✓ **Incorporating non-academic interest in the research agenda** contradicts Merton's norms and may compromise research rigour and excellence, devaluating their research (Merton, 1973).
 - ✓ **Involving in knowledge transfer activities** is less recognised and rewarded than conducting excellent research and publishing in top journals.

There may be a **potential tension between** research policy priorities and researchers interests and research agendas priorities. (Gläser, 2012).

OUR FOCUS: KNOWLEDGE PRODUCTION

3

Researchers' commitment with the production of useful research

Open researchers: willing to incorporate non-academic influences in the research process from the beginning, which may contribute to increase the usability of the knowledge produced (Olmos-Peñuela et al., 2015 and 2016).

- **Open researchers** (involvement **with commitment**): they **incorporate non-academic influences** from the beginning of the research process in different research micro-practices.
- **Non-open researchers** (involvement **without commitment**), their research is **not influenced** by non-academic interests during the research process.

To consider researchers as open, they may demonstrate their openness (*commitment with the production of useful research*) in different research micro-practices.

OUR FOCUS: KNOWLEDGE PRODUCTION

4

Research micro-practices	Open behaviour
Inspiration	Identifying one potential question as one to which the individual can commit to do more research activity; researchers may <u>be inspired by users or external issues</u> for a concrete future research project idea
Planning	Producing a tangible method and plan to answer a specific question; a researcher may <u>include external knowledge, interests and needs as key research resources within that proposal</u> ('pro-social' behaviour, D'Este et al. 2013)
Execution	Undertaking a piece of research, gathering and analysing data to make a scientific contribution; a researcher may <u>incorporate external knowledge in its implementation</u>
Societal dissemination	Presenting results in ways accessible to potential users; a researcher may arrange dissemination activities together with users in ways that <u>allow users to provide feedback, to inspire new insights or future usable research orientations.</u>
Reframing	Deciding a future personal research agenda of potential interesting questions, partly shaped by past research; researchers <u>whose past research has been affected by external influences starts from a knowledge base of usable knowledge</u>

¹ (Olmos-Peñuela et al., 2015)

OUR FOCUS: KNOWLEDGE TRANSFER (SOCIAL ENGAGEMENT)

5

Different mechanisms to be engaged with third parties (different knowledge transfer mechanisms), that **imposes different burden** for the researcher in terms of effort and time (Bozeman and Gaughan, 2007).

Knowledge transfer activities (mechanisms):

- **Societal engagement without commitment** is conducted through KT mechanisms that do not influence or compromise future research agenda, which is reconcilable with Merton norms (*e.g. occasional consultancy*).
- **Societal engagement with commitment** is conducted through KT mechanisms that may influence /determine academic's research agenda towards more useful knowledge (*e.g. research contract*)

Non-committed engagement imposes less burden than committed engagement because the former only implies making available results to the users without compromising the research agenda.

How to encourage societal engagement committed activities that may lead to more useful knowledge?

RESEARCH QUESTIONS:

- Do *open researchers* (those conducting open research micro-practices) *engage differently* in *committed/non-committal* societal engagement compared to ‘no-open researchers’?
- What kinds of *policy frameworks* and approaches could help steer the academic system to promote researchers’ *committed* societal engagement?

EMPIRICAL WORK

7

DATA COLLECTION

Population: 4,240 researchers from the Spanish Council for Scientific Research (CSIC) able to conduct contracts or agreements

Source: online questionnaire (IMPACTO project)

Period: 7th April- 14th May 2011

Unit of analysis: the researcher

Sample: 1,583 researchers (37% response rate)

METHODOLOGY OF ANALYSIS

1. Researchers classification: OPEN and NON OPEN (from previous author's work)
2. Index for non-committal/committed engagement activities
3. **T-test analysis** to compare OPEN and NON OPEN researchers regarding their committed & non-committal engagement practices.

CSIC'S RESEARCHERS OPENNESS CLASSIFICATION

Openness construct (previous work: Olmos-Peñuela et al., 2015, 2016)

Openness variables	Type of variable	Range	% Yes	Mean (SD)	α Cronbach
Reframing	Binary	0-1	27.8		
Inspiration	Binary	0-1	71.4		
Planning	Continuous	1-4		2.52 (0.73)	0.78
Execution	Continuous	1-4		3.11 (0.55)	0.71
Dissemination	Binary	0-1	28.5		
Planning (top 50%)	Binary	0-1	48.9		
Execution (top 50%)	Binary	0-1	50.0		
Open breadth	Ordinal	0-5	0 processes: 10.3%		
			1 process: 19.1%		
			2 processes: 22.4%		
			3 processes: 25.3%		
			4 processes: 16.3%		
			5 processes: 6.6%		
Open researchers	Binary	0-1		22.9%	

CSIC RESEARCHERS' SAMPLE:

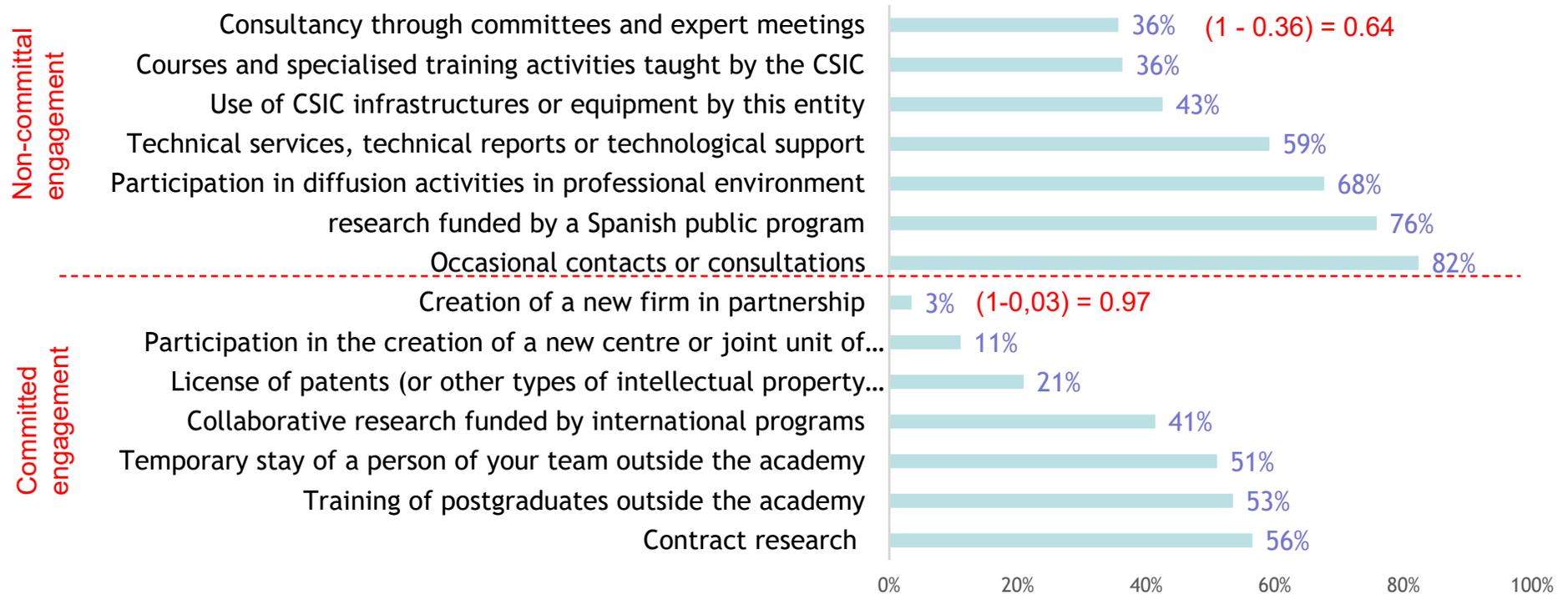
Open: 22.9%

Non Open: 77.1%

KNOWLEDGE TRANSFER MECHANISMS (activities) INDEXES

9

Indicate whether you have developed the following activities during the last 3 years



- We differentiate in terms of burden (commitment)
- We drawn on Bozeman and Gaughan (2007)'s methodology to create two indexes that take into account the degree of occurrence (more rare are more weighted).

$$f_i = \frac{\sum_{n=1}^N b_{nj}}{N}$$

$$\text{Index} = \sum_{j=1}^J (1 - f_i)$$

RESULTS (1)

10

Descriptives

Engagement scale index variables	Mean	Std. Dev.	Min.	Max.	Alpha Cronbach
Committed engagement	1.30	0.87	0	4.07	0.60
Non-committal engagement	1.47	0.98	0	3.56	0.62

T-TEST ANALYSIS:

Differences in committed /non-committal engagement for 'non open' and 'open' researchers

	Committed engagement index		Non-committal engagement index	
	NON OPEN	OPEN	NON OPEN	OPEN
Mean	1,33	1,71	1,46	2,18
t-test	Differences ***		Differences ***	

Source: Own elaboration from IMPACTO project survey

RESULTS (2)

T-TEST ANALYSIS:

Differences in committed /non-committal engagement for 'non open' and 'open' researchers for each process

	Committed engagement index		Non-committal engagement index		T-TEST
	NON OPEN	OPEN	NON OPEN	OPEN	
Inspiration	1,06	1,39	1,10	1,62	Differences ***
Planning	1,10	1,52	1,21	1,77	Differences ***
Executing	1,15	1,46	1,28	1,68	Differences ***
Dissemination	1,28	1,62	1,35	2,08	Differences ***
Reframing	1,37	1,52	1,53	1,88	Differences ***

Source: Own elaboration from IMPACTO project survey

PRELIMINARY RESULTS

- **Open researchers** are more involved than non open researchers in **both** committed and non-committal societal engagement.

IMPLICATION:

- Promoting societal impact from research **relies less on stimulating the act of transfer**, and more on **creating environment within which researchers feel ensured to commit with engagement acts from the beginning of the research process** (i.e. open research)

POTENTIAL ACTIONS/POLICIES

- Actively promoting & stimulating different kinds of committed behavior:
 - ✓ Promote **committed (open) research micro-practices** thus orientate it towards increasing the production of useful research (resources).
 - ✓ Recognize **committed (open) research micro-practices** research to reduce the barriers to committed engagement. (recruitment & career promotion)
 - ✓ Researchers should experience how to deal with commitment in their **academic formation processes** (PhD), where commitment is not seen as compromising the scientific identity.

Thank you for your attention

Suggestions and comments are welcome!



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Continuous variables	Measure	Sub-items	Method and descriptive statistics
Openness during planning processes	Measured as an index on a Likert scale ranging from 1 (never) to 4 (regularly) regarding frequency with which the researcher engages in each of the following activities when conducting a research project.	<ul style="list-style-type: none"> To identify the potential results of your research that can benefit users To identify the potential users who can apply the results of your research To identify intermediaries in order to transfer the results of your results 	<p>Sum of the three items divided by the number of applicable items</p> <p>Range: 1-4 Mean: 2.52 S.D: 0.73 α Cronbach: 0.78</p>
Openness during execution processes	Measured as an index on a Likert scale ranging from 1 (not important) to 4 (very important) regarding the degree of importance the researcher attaches to each of the following items, as reason for interacting with external entities (firms, public government agencies, non-profit organisations).	<ul style="list-style-type: none"> To keep abreast of about the areas of interest of these non-academic entities To test the feasibility and practical application of your research To obtain information or materials necessary for the development of your current lines of research To explore new lines of research 	<p>Sum of the four items divided by the number of applicable items</p> <p>Range: 1-4 Mean: 3.11 S.D: 0.55 α Cronbach: 0.71</p>

Source: Olmos-Peñuela et al. (2015, 2016)

Binary variables	Description	Descriptives % of '1'
Openness during reframing processes	Coded '1' if the researcher has experienced changes or substantial changes in the past research agenda as a result of the relationships with non-academic entities, and '0' otherwise.	27.8%
Openness during inspiration processes	Coded '1' if the researcher's scientific activity was inspired or substantially inspired by the practical use and/or application of knowledge outside the academic environment, and '0' otherwise.	71.4%
Openness during societal dissemination processes	Coded '1' if the researcher, as a result of collaborating with non-academic entities, reported as important or very important the following three results identified as co-creative dissemination activities he/she got: 1) obtaining patents or other intellectual property right; 2) developing exhibitions and/or exhibition catalogues; generating clinical guidelines, standards, and 3) codes of practices), and '0' otherwise.	28.5%

Source: Olmos-Peñuela et al. (2015, 2016)

Table 1: Population and sample distribution by scientific field of knowledge^a

□	Population [□]	Population [□]	Sample [□]	Sample [□]	%-Differences [□]	
	(N) [□]	(%) [□]	(N) [□]	(%) [□]	χ^2 -test-(*) [□]	
■	Biology & biomedicine [□]	771 [□]	18.2% [□]	244 [□]	15.4% [□]	-2.8% [□]
■	Food science & technology [□]	285 [□]	6.7% [□]	128 [□]	8.1% [□]	1.4% [□]
■	Materials science & technology [□]	562 [□]	13.3% [□]	201 [□]	12.7% [□]	-0.6% [□]
■	Physical science & technology [□]	569 [□]	13.4% [□]	204 [□]	12.9% [□]	-0.5% [□]
■	Chemical science & technology [□]	480 [□]	11.3% [□]	209 [□]	13.2% [□]	1.9% [□]
■	Agricultural sciences [□]	412 [□]	9.7% [□]	203 [□]	12.8% [□]	3.1%* [□]
■	Natural resources [□]	759 [□]	17.9% [□]	277 [□]	17.5% [□]	-0.4% [□]
■	Social sciences & humanities [□]	402 [□]	9.5% [□]	117 [□]	7.4% [□]	-2.1% [□]
■	TOTAL[□]	4,240[□]	100[□]	1,583[□]	100[□]	□

Table 6. Results of statistical tests about differences between *open scientists* and *less-open scientists* regarding professional characteristics

Hypotheses	Professional characteristics	Values for <i>less-open scientists</i> (means or distributions)	Values for <i>open scientists</i> (means or distributions)	Statistics	p-values	Results
H1 _a	Field (SSH vs STEM)	SSH: 7.6% STEM: 92.4%	SSH: 8.7% STEM: 91.3%	Chi-Square	0.550	No differences
H1 _b	Hermeneutic vs Experimental	Hermeneutic: 4.7% Experimental: 95.3%	Hermeneutic: 6.3% Experimental: 93.7%	Chi-Square	0.272	No differences
H2 _a	% Formal engagement	42.64%	46.80%	t-test	0.000	Formal LESS-OPEN < Formal OPEN ***
H2 _b	Firms	28.1%	62.5%	Chi-Square	0.000	Firms LESS-OPEN < Firms OPEN ***
H2 _b	Government agencies	41.8%	46.7%	Chi-Square	0.138	No differences
H2 _b	Non-profit organisations	19.0%	31.5%	Chi-Square	0.000	NPO LESS-OPEN < NPO OPEN ****
H2 _b	International organisations	27.9%	41.0%	Chi-Square	0.000	Intern LESS-OPEN < Intern OPEN ***
H3 _{s1}	Internal dynamic field	3.77 ^a	3.78 ^a	Mann-Whitney	0.827	No differences
H3 _{s2}	External dynamic field	2.80 ^a	3.42 ^a	Mann-Whitney	0.000	Ext-Dynam LESS-OPEN < Ext-Dynam OPEN ***
H3 _b	Multidisciplinarity	26.2%	45.7%	Chi-Square	0.000	Multidisc LESS-OPEN < Multidisc OPEN ***

^a Means are provided for ordinal variables for practical purposes: they indicate direction of differences between *open scientists* and *less-open scientists*.

*** indicates that the coefficient of the statistic is significant at 1%

Table 7. Results of statistical tests about differences between *open scientists* and *less-open scientists* regarding personal characteristics

Hypotheses	Personal characteristics	Values for <i>less-open scientists</i> (means or distributions)	Values for <i>open scientists</i> (means or distributions)	Statistics	p-values	Results
H4 _a	Gender	Male: 63.2% Female: 36.8%	Male: 63.0% Female: 37.0%	Chi-Square	0.939	No differences
H4 _b	Age	48.8	49.1	t-test	0.648	No differences
H4 _b	Seniority	Post-doctoral: 14.6% Tenured scientist: 37.4% Scientific researcher: 29.2% Researcher professor: 18.9%	Post-doctoral: 15.7% Tenured scientist: 36.7% Scientific researcher: 25.3% Researcher professor: 22.3%	Chi-Square	0.424	No differences
H4 _c	Working conditions	2.82	2.90	t-test	0.134	No differences

*** indicates that the coefficient of the statistic is significant at 1%