Recognition through performance and reputation

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Abstract
As the various disciplines have different forms of social and intellectual organization (Whitley 2000), scholars in various fields may depend less on their peers, and more on other audiences for recognition and funding. Following Merton (1973) we distinguish between *performance* and *reputation* for building up *recognition*. We show that there are indeed differences between the disciplines: in life sciences and social sciences, the reputation related indicators are dominant in predicting the score that grant applicants get from the panel, whereas in the natural sciences, the performance related indicators dominate the panel scores. Furthermore, when comparing within the life sciences the grantees with the best performing non-grantees, we show that the former score higher on the reputation indicators and the second score better on the performance variables, supporting the findings that in life sciences one probably gains recognition over reputation more than over individual performance. We suggest that this may not be optimal for the growth of knowledge.

Introduction
In the Credibility Cycle (CC) (Latour and Woolgar 1986), recognition is the step that follows publications and that precedes money – the resource that enables a new round of research – which then may result in publications and recognition. This is a somewhat traditional view on the research process, as recognition is not only based on publications.

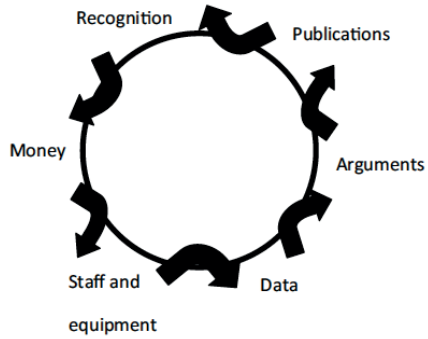

Figure 1: the Credibility Cycle

(Latour and Woolgar 1986)

As the various disciplines have different forms of social and intellectual organization (Whitley 2000), scholars in various fields may depend less on their peers, and more on other audiences for recognition and funding. For the CC this means that the phase "publications" should be

combined with other sources of recognition, such as innovations (e.g., patents), policy reports, and contributions to societal problem solving and to the public debate. More recently, also outputs related to other tasks of scholars, including teaching, community service are claimed to contribute to recognition – the extent to which needs further investigation. Another more recent phenomenon that may modify the credibility cycle is that money (grants) is not anymore solely an effect of recognition and an input for research, but receiving a (prestigious) grant is more and more seen as a performance, and bringing directly additional recognition (Van Arensbergen et al 2014; Van den Besselaar et al 2018).
Publications have many properties that may help to increase recognition. It could be the number of publications (productivity), the number of highly cited papers, the number of citations received (impact), the size and quality of the co-author network, the international nature of the co-author network, the journal impact factor (reputation of the journal), and so on. Furthermore, when recognition comes into play in e.g., grant selection procedures, also other signs of recognition may play a role – which can be found in the CV of the applicant: reputation or performance of the organizations the applicant has worked and/or collaborated with or is going to work, the reputation of the PhD supervisor, and the amount of earlier acquired grants (see above). These contributing factors partly relate to the performance of the applicant and partly to the reputation, a distinction already made by Merton (1973), and also at the level of research organizations and universities (Paradeise and Thoenig 2013).

Research question

Based on the considerations above, we try to find out whether reputation, performance, or both constitute the recognition that leads to winning new grants.

Data

We use data on a large and prestigious European grant program. We have data for 3030 of the applicants, which is 95% of all applicants in that round. We do have data on personal characteristics, the subfield of the proposal, the scores the application got from one of the 25 panels, and the full CV of all applicants. Furthermore, we collected bibliometric data from the Web of Science for (now 60%) of the applicants
For about 1800 of the applicants we downloaded the WoS records, and we checked for different name variants and for different (first) initials. The resulting records were processed by the BMX program (Sandström & Sandström 2009) and then first semi-automatically disambiguated. After that, a manual disambiguation was done. Using the BMX program, the scores for different performance variables were calculated – as mentioned in Table 1.

Table 1. Performance and reputation indicators.

Name	*Description*	*Type*
P-frac	Number of fractionally counted publications.	Performance
Citations(2y)	Field normalized citations, two years citation window.	Performance
Top5%	As above, but now the fields' top 5% cited papers.	Performance
Journal Impact	The field normalized average journal impact factor.	Reputation
Network quality	Median ranking (top 10%) score of linked organizations.	Reputation
Other Grants	The number of other obtained grants by the PI	Reputation

Several other variables could only be retrieved from the CVs of the applicants, and the various data processing steps were done using the SMS platform for data integration and enrichment.[1]

[1] The SMS platform: www.sms.risis.eu.

The extracted organization names were linked to the Leiden Ranking, in order to determine the quality of the host institution (where the project will be done) in terms of the share of 10% highest cited papers. In the same way, the organizations the applicant has collaborated with or has worked are given a rank-score. We use the median of these scores as indicator for quality of the applicant's network. We manually extracted information about other grants of the applicant from the CVs.
For a smaller set (four life science panels) we have not for 60% but for all applicants the bibliometric data. This smaller set is used for one of the analyses, and for those we also have some additional variables as showed in table 2.

Table 2. Additional performance and reputation indicators

Name	*Description*	*Type*
Top10%	As above, but now the fields' top 10% cited papers.	Performance
Co-authors	Average number of co-authors	Reputation
International	Average number of international co-authors	Reputation
Host quality	The ranking (10% PP) of the host institution	Reputation

We now can differentiate between indicators for performance and indicators for reputation. Performance is measured by indicators that say something about the individual researcher's scholarly work, such as number of publications (fractional count), the number of top cited papers, and so on. Reputation indicators are more indirectly related to the work of the scholar, such as the Impact Factor of the journals one publishes in, the ranking of organizations in the network, and the earlier grants. The last column of Table 1 gives the classification.

Method

We use the variables mentioned above to predict the score the applicants get from the panels, using stepwise linear regression. As disciplinary differences are expected to influence what are considered important for accumulating recognition, we do the analysis by discipline. In this version of the paper, it is done at the level of meta-disciplines: (i) life sciences and medicine, (ii) physics and engineering, and (iii) social sciences and humanities. We report here which variables play a role, and which not, but do not go into the numerical aspect of the regression outcome.
Then we look in more detail at the difference between the grantees and the group of best performing rejected applicants.

Findings 1: what predicts the panel score?

In Table 3, we show for the three different domains what variables are included in the stepwise regression outcomes, using the six variables from Table 1. We then compare the emphasis on reputation related aspects versus on the performance-based aspects. Please be aware that this is at the domain level, and that within the various domains the disciplines may differ. This is also the case within the social science and humanities, but as we use Web of Science bibliometric data, the scores for SSH are strongly dominated by economics and psychology. The two latter disciplines are strongly oriented at publishing in journal articles, whereas this is much less the case in the other SSG disciplines, such as literature, history, philosophy, anthropology, and sociology and political science.
What does Table 3 show? All the three reputation indicators are includedin predicting the scores of the life science applications, and only one of the performance-based indicators: top 5% cited papers. The overall score for *emphasis on individual performance* is low: 0.33. For the social sciences and humanities we find the same pattern, but with a different performance indicator:

citations. Finally, physics and engineering show a very different pattern. All the three performance variables contribute to predicting the score, and two of the reputational variables. Interestingly, the *journal impact* indicator does not. The overall *emphasis on individual performance* is high: 1.5.

Table 3. Performance or reputation

Name	*Life sciences*	*Physics and engineering*	*Social sciences and humanities*	*Type**
P-frac		+		Perf
Citations(2y)		+	+	Perf
Top5%	+	+		Perf
Journal Impact	+		+	Rep
Network quality	+	+	+	Rep
Other Grants	+	+	+	Rep
Perf/Rep**	.33	1.50	.33	

Source: Van den Besselaar et al. (2016)
* Perf = performance indicator; Rep = reputation indicator;
** Perf/Rep = number of performance indicators divided by the number of reputation indicators

Findings 2: reputation and performance within the very good group

As showed elsewhere, the selection process of grant panels is not very strong, as the best rejected applicants are in average at least as good as the granted applicants (Bornman et al 2010), and the predictive validity is low (Van den Besselaar & Sandström 2015). For four panels where we have bibliometric data for all applicants, we compare the granted applicants with the set of best performing non-granted applicants. Table 4 presents the results.

Table 4. Granted versus best non-granted: performance versus reputation

Name	*Granted*	*better?*	*Best non-granted*	*F*	*Sign*
Performance					
P-fractional	1.9	=	1.9	0.006	0.940
Citations(2y)	3.05	=	2.88	0.360	0.550
Top10%	1.23	<	2.18	11.54	0.001
PModel*	17.3	<	22.5	2.101	0.150
Reputation					
Journal Impact	2.31	>	2.07	2.455	0.120
Network quality	195.5	=	196.9	0.005	0.946
Ranking host	0.14	=	0.13	0.518	0.473
# co-authors	6.76	=	6.52	0.225	0.636
# international co-authors	1.73	=	1.65	0.610	0.436
Other Grants	2.7	>	1.7	5.413	0.022

* The PModel indicator is explained in (Sandström, Sandström & Van den Besselaar 2019)

As the table shows, the granted applicants score (marginally) significant better on two of the reputation indicators, and equal on the other four than the best-performing non-granted. In contrast, the best-performing non-granted applicants score better than the granted applicants on two of the four performance indicators and equal on the two others.

Conclusions and discussion

The conclusion is that in the life sciences reputation is more important than performance for acquiring funding. For the social sciences and humanities, but mainly for economics and psychology, we observe the same pattern. On the other hand, in physics and engineering the pattern is different and there performance seems to be dominant over reputation.

As future work, we will repeat the analysis at a lower level of aggregation: for the individual disciplines, and we will relate the findings to other characteristics at the field level, among other with the occurrence of gender bias and nepotism. We suggest that fields focusing on performance may be less susceptible to bias and more strongly following Merton's CUDOS norms.

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