Science, Technology and Innovation indicators

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CONFERENCE ABSTRACTS

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Open indicators: innovation, participation and actor-based STI indicators

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[AFR] Research & Innovation in Africa

Hugo Confraria
The characteristics of highly cited researchers in Africa

Recently it has been found that the number of scientific publications produced by African researchers, although small (2% of world share), is increasing more than the world average. At the same time, some East African countries have already produced research with a citation impact higher than the world average in specific fields. It has been suggested that this phenomenon may stem from those countries having a small scientific elite who produce most of their scientific publications with highly reputed international co-authors.; However, still very little is known about the characteristics of highly cited scientists in lower income contexts. This is unfortunate as these researchers wield a disproportional impact on their fields, and the study of highly cited scientists can enhance our understanding of the conditions which foster high impact work, the systematic social inequalities which exist in science, and scientific careers more generally.; In this article we aim to understand why some scientists in Africa are producing highly cited research. We intend to do so by questioning African researchers that produced highly cited papers (top 1%) during the last decade. Five central questions will be asked:; 1. How much funding you received and from who?; 2. What percentage of your working time do you spend on research, teaching and raising funds?; 3. Who do you collaborate with and how frequently?; 4. Where did you obtain your highest qualification?; 5. What are the factors that have impacted negatively your career?; To be able to explain how some researchers are highly cited in different subject areas, we will compute a multinomial probit regression model where the dependent variable will be a dummy variable that is 1 for an African author, which is a correspondence author in a highly cited paper, and 0 for a non-highly cited African researcher. We will group the explanatory variables in five dimensions: demographic characteristics; time spent on different activities; challenges faced in their career; collaboration patterns and research funding characteristics. After combining bibliometric data with our survey data, 5402 observations compose our sample of African researchers, from which 53 were corresponding authors of highly cited publications.; Our preliminary results suggest that, on average, researchers that published their first article longer ago, receive more funding, collaborate more often both internationally and in their own institution, spend more time supervising postgraduate students and didn't report that lack of mentorship and training opportunities were a challenge they faced during their career, have a higher probability of having a highly cited publication. In the paper we try to understand the mechanisms behind these results and derive potential policy implications. **(abstract AFR 2)**
Author keywords: Science in Africa; Development; Scientific capabilities; Survey; Science policy

Bassirou Diagne, Catherine Beaudry and Carl St-Pierre
Impact of mobility and collaboration on scientific output in Africa: first lessons from a pan-African survey

This paper analyses the African young scientific research production. The aim is to examine the impact of mobility and collaboration scientific output. Using a survey sent to young scientists in Africa, we find that devoting a higher proportion of time to teaching, which we associated with age, number of kids, raising a greater proportion of research funds and collaborating more often and mobility are the main factors that influence research output. Generally, collaboration and mobility increase the productivity of young African researchers. We noted that unlike the rest of Africa, collaboration outside the continent is more important than mobility for South African researchers. On the other hand, collaboration and mobility at the level of the continent has a positive impact on the production of young African researchers. Researchers who collaborate at the institution level have published more articles than those who do not. In addition, the survey shows that men are slightly more prolific than women in terms of research output. Individual research production is significantly enhanced by the number of supervisions. **(abstract AFR 3)**
Author keywords: research output; age; gender; funding; collaboration; mobility

Kylie de Jager, Chipo Chimhundu and Tania Douglas
Focus areas of research for medical device development in South Africa (2001-2013)

We present analyses of collaboration for medical device innovation in South Africa. First, we identify the focus areas of research on medical device development, as indicated by journal publications. Second, inspired by the prominence of devices related to the muscular and skeletal systems, we present actor and keyword networks for orthopaedic device development. Co-authorship is used as a proxy for collaboration between organisations (actors). Keywords are related to each other if they appear together on the same publication. A keyword analysis allows identification of the orthopaedic device types being researched, as well as the underlying cause, disease or anatomy addressed. The actor network was sparse, with high-ranking actors never collaborating. The keyword network identified several areas of innovation, but few of these appeared in more than one publication. A novel methodology, relating actors to keywords, produced a highly connected potential-collaboration network, directly linking high-ranking actors through areas of common interest. **(abstract AFR 4)**
Author keywords: health innovation; bibliometrics; developing country; social network analysis; centrality

[ALT] Altmetrics

Nicolas Robinson-Garcia, Irene Ramos-Vielba, Rodrigo Costas, Pablo D'Este and Ismael Rafols
Do altmetric indicators capture societal engagement? A comparison between survey and social media data

In this paper, we have presented preliminary analyses on the comparison between societal engagement through formal interactions with non-academic stakeholders and altmetric indicators. This study makes various contributions. First, it is one of the few analyses on altmetrics adopting an author-centric approach instead of an article-centric approach (Ke et al., 2017; Torres-Salinas & Milanés-Guisado, 2014; Robinson-Garcia et al., forthcoming). Second, it discusses the perception that social media mentions to scientific literature signal broader forms of impact by linking altmetric coverage with survey data on formal interactions of researchers. While the results presented point out towards an absence of relation between altmetric coverage of researchers and the number of types of non-academic partners with whom they interact, more in depth analyses are needed and further refinements will be applied analysing the relation between interactions with specific partners and mentions from specific social media platforms, controlling by fields and academic rank. **(abstract ALT1)**
Author keywords: altmetrics; knowledge transfer; societal impact; social engagement

Kuku Aduku, Mike Thelwall and Kayvan Kousha
Can conference papers have information value through Wikipedia? An investigation of four engineering fields

Wikipedia provides a widely-used overview of many academic fields, often referencing journal articles and books to justify its content. Previous studies have shown that these citations can, in turn, be used to help assess the knowledge transfer impact of the cited articles and books. Nevertheless, it is not known whether the same is true for conference papers. To fill this gap, citations in Wikipedia and Scopus were compared for conference papers (and journal articles) published in 2011 in four engineering fields that value conferences. Wikipedia citations had correlations that were statistically significantly positive only in Computer Science Applications, whereas the correlations were not statistically significantly different from zero in Building & Construction Engineering, Industrial & Manufacturing Engineering and Software Engineering. Conference papers were less likely to be cited in Wikipedia than were journal articles in all fields, although the difference was minor in Software Engineering. Hence, there is little evidence that Wikipedia citations are valuable as impact indicators in engineering fields, especially in the case of conference papers. **(abstract ALT2)**
Author keywords: Wikipedia citations; Citation analysis; Conference papers; Alternative indicators

Rodrigo Costas, Jeroen van Honk, Clara Calero-Medina and Zohreh Zahedi
Exploring the descriptive power of altmetrics: case study of Africa, USA and EU28 countries (2012-2014)

This paper discusses the possibility of introducing descriptive approaches in the application and use of altmetric information. The aim is to explore how topics are received and discussed in social media by using basic indicators (number of publications, total and average altmetric counts, coverage) and their contextualization in the analysis of altmetric thematic profiles. The altmetric reception of African publications, in contrast to publications from USA and EU28 countries, has been analysed. The findings show that basic altmetric indicators can inform the presence, density and coverage of publications across different altmetric platforms which can be used in the development of altmetric thematic landscapes for the different units of analysis. These descriptive perspectives enable to track the social media visibility of different research topics and monitor the thematic focus of nations across various social media platforms, opening up the opportunity towards more contextual approaches in the analysis of altmetric data. **(abstract ALT3)**
Author keywords: altmetrics basic indicators; altmetrics thematic analysis; Twitter

Clara Pardo
Scientific culture in Colombia. A proposal of an indicator system for science technology and innovation

In last decades, scientific culture has become a key element of Governance of Science, Technology and Innovation in the countries where it is important to determine measurement to analysis trends on scientific culture. Research questions that guide this paper are the following: i. What are information needs on scientific culture in Colombia?; ii. How can be measured scientific culture?; iii. What is the adequate structure for indicators of scientific culture?. In order to answer these questions, a mix of methodologies is used. First, we review the literature on scientific culture and indicators related to this topic. Second, we made a series of interviews with staff members of Colciencias to determine requirements of measurement on scientific culture. Third, with this information, we built an information matrix to prioritise information and determine indicators with respective metrics, and sources according to relevance and cost-effectiveness of estimation. Fourth, from indicators formulated and an indicator system is proposed determining for every dimension of scientific culture indicators related to inputs, process, and outputs designed indicator sheets that includes definition, objective, sources aggregation levels, time series, and calculation methods for indicators proposed. This study achieves formulate an indicator system from the definition of scientific culture a and its dimension proposing around 60 indicators through a multidimensional model that integrates different elements of scientific culture such as the individual and society establishing indicators to measure inputs, process and outputs in general form and specific initiatives for Colciencias. **(abstract ALT 4)**
Author keywords: Scientific culture; Indicators; Colombia

Nicolas Robinson-Garcia, Rakshit Trivedi, Rodrigo Costas, Kimberley Isett, Julia Melkers and Diana Hicks
Tweeting about journal articles: Engagement, marketing or just gibberish?

This paper presents preliminary results on the analysis of tweets to journal articles in the field of Dentistry. We present two case studies in which we critically examine the contents and context that motivate the tweeting of journal articles. We then focus on a specific aspect, the role played by journals on self-promoting their contents and the effect this has on the total number of tweets their papers produce. In a context where many are pushing to the use of altmetrics as an alternative or complement to traditional bibliometric indicators. We find a lack of evidence (and interest) on critically examining the many claims that are being made as to their capability to trace evidences of 'broader forms of impact'. Our first results are not promising and question current approaches being made in the field of altmetrics. **(abstract ALT5)**
Author keywords: altmetrics; twitter; scientific journals

Lutz Bornmann and Robin Haunschild
Do bibliometrics and altmetrics correlate with the quality of papers? A large-scale empirical study based on F1000Prime, altmetrics, and citation data

In this study, we address the question of the unclear meaning of altmetrics by studying their relationship with scientific quality (measured by peer assessments). In the first step, we analyze the underlying dimensions of measurement for traditional metrics (citation counts) and altmetrics – by using principal component analysis (PCA). In the second step, we test the relationship between the dimensions and quality of papers (as measured by the post-publication peer-review system of F1000Prime assessments) – using regression analysis. The results of the PCA show that altmetrics measure different things, whereas Mendeley counts are related to citation counts, and tweets form a separate dimension. The Altmetric Attention Score does not contribute in a major way to the relevant principal components. The results of the regression analysis indicate that citation-based metrics and readership counts are significantly more related to quality, than tweets and the Altmetric Attention Score. This result on the one hand questions the use of Twitter counts and the Altmetric Attention Score for research evaluation purposes and on the other hand indicates potential use of Mendeley reader counts. **(abstract ALT6)**
Author keywords: Altmetrics; Citation counts; Principal components analysis (PCA); F1000Prime; Mendeley; Twitter; Altmetric Attention Score

Eleonora Dagienė, Rūta Petrauskaitė and Ulf Sandström
Lithuanian Research Journals: Are They Ready for Altmetrics Ranking?

This paper discusses an attempt to build a methodology for the ranking of Lithuanian journals and book series. It aims at evaluating the quality of digital publishing and dissemination of content and will use the possibility to assess journals by various databases and technologies (e.g. indexing in Google Scholar or registering DOIs for papers). We propose and develop a journal ranking methodology that corresponds to the needs of contemporary scholarly communication and that is based on the principles of Open Science.; The need for ranking national journals, especially in the Humanities and Social Sciences, was raised after the completion of the Lithuanian Benchmarking Exercise in 2015. However, it is not clear which alternatives the Lithuanian research policymakers will consider, that is whether they will use the methods already adopted in several countries or create new and original methods involving alternative metrics. We suggest here that it is necessary to investigate whether national journals could be assessed according to the criteria of digital scholarly communication and altmetrics. Some years ago, attempts were made to register and to count national journals, although no reliable results were achieved.; In 2016, the first ranking according to digital standards in e-publishing was made, wherein only freely accessible databases were to be used for any metrics: visibility, citation counts or others. Led by this vision, the research, which began in May 2016, aimed to evaluate national journals according to the quality of digital publishing and their visibility in Google Scholar, DOAJ or ROAD databases. The initial list of 382 journals still published was selected, however, only 173 out of 198 journals published in digital format indexed by Google Scholar, and only 85 have Google Scholar Metrics (h5 index).; The second round of national journal ranking, expected to take place in 2018, could (or should) be based on a larger number of criteria, to be announced in advance. It would be useful for the Lithuanian journals to know how to improve publishing processes, because many of them are small, published by just a few academic persons without the help of an experienced editorial team. The journals willing to be ranked higher in the second round of ranking (e.g. in 2018) could improve the publishing process accordingly.; The outcome of this investigation reveals that many of the Lithuanian journals cannot be assessed as digital publications. **(abstract ALT7)**
Author keywords: journal ranking; digital publishing; altmetrics; national policy; national journals; Google Scholar Metric

[CM] Careers & Mobility

Jakob Tesch
The Influence of Organizational Publication Output on Job-Placement and Individual Output of Doctorate Holders

Previous studies have shown that the prestige of a university department is a function of a department's social capital and its publication output and that prestige positively affects job placement of graduates after conferral of their doctorate (Burris, 2004; Headworth and Freese, 2016). So far, few attempts have been made to assess the relationship between organizational- and individual publication output and job-placement directly and not mediated through prestige. This paper does so by scrutinizing how publication output and impact of organizations affects the publication output and job-placement of doctorate holders shortly after graduation. To do so, individual level micro data from the ProFile study was matched with organizational publication output and impact data from the Leiden Ranking with support from the RISIS project. Multi-level regression analysis is used to assess the effect of organizational productivity on job placement and individual publication output of the doctorate holders. The results show that even after controlling for individual preferences there is a significant relationship between organizational and individual level output in the way that the total number of citations positively affects the number of individual publications. Moreover, graduates from organizations with higher publication impact have higher chances of placement in research, development and teaching jobs. Limitations and future improvements to data are discussed. **(abstract CM1 1)**
Author keywords: department productivity; doctorate holders; academic careers; multi-level methods; data matching; RISIS project; organizational prestige

Carter Bloch, Malene Christensen, Qi Wang and Allan Lyngs
On the importance of studying abroad among postdocs – an analysis of postdoc fellowships in Denmark

The purpose of this paper is to examine the importance of longer stays abroad for postdoctoral fellows funded by the Danish Council for Independent Research within the natural sciences. The analysis compares career paths and research performance for post-docs with and without a stay abroad. We look at the sectoral mobility (whether the postdoc remained in the university sector after the grant), career advancement and a number of aspects related to research performance such as productivity, citation impact, journal impact, international cooperation and international cooperation. The analysis includes postdoctoral scholarships financed by the DFF in Natural Sciences in the period 2001-2009, where we examine outcomes 6-8 years after the stay abroad. The sample includes two types of postdocs, individually funded postdoc fellowships (individual postdocs) and postdoctoral grants that are embedded in larger project grants (embedded postdocs). Overall, we find that both postdocs with and without prolonged stay abroad have fairly high research performance during and after the grant from the DFF. However, the results provide little indication that postdocs with extended stays abroad outperform postdocs with short or no stay abroad. This is also the case for international collaboration, where we find that postdocs with longer stays abroad actually have a lower share of articles with international collaboration than for postdocs with short or no stay abroad. Productivity, measured either in terms of counts or fractional articles, is highest among postdocs with a prolonged stay abroad, while the average citation impact is highest for postdocs with little or no stay abroad. When it is based on doctoral age instead of grant receipt, there is little difference among the two postdoc groups in the share that achieves tenure as associate professor or professor. **(abstract CM2)**

Author keywords: international postdoc fellowships; research performance; career advancement; international collaboration

Carey Ming-Li Chen
Do researchers with international mobility experiences have better academic performance through bibliometric indicators? The case study of Taiwan

This study aims to examine whether young researchers in Taiwan with international mobility experiences have better academic performance through bibliometric indicators. To answer the research question, this study attempts to identify the modes of international mobility based on the location where the researchers obtained their doctoral degrees, and whether they had received the grants of study/research abroad program from Ministry of Science and Technology (MOST) in Taiwan. The results indicate that the researchers with international mobility experiences although produced less publications than those who did not have international mobility experiences, their citation impact was significant higher. This study also examines which mode of international mobility has better synergy in term of helping researchers have higher research visibility, and the results shows that the researchers who earned the doctoral degrees abroad have the best citation impact among three groups, the researchers who obtained their doctoral degrees domestically, however, have lower citation impact, but the opportunities of having research visits at their late doctoral career or postdoctoral stages by receiving the grants from the government do help them increase their research visibility and they also have participated more international collaboration projects deeply. The result might be evident that the funding programs of abroad program from MOST are beneficial for young researchers, the programs offer opportunity to those who do not have chances to study abroad during their doctoral career to broaden their research visibility and get involved in international academic community to shorten their gap of competitiveness with those who obtained the doctoral degree abroad. Hence, the abroad program for researchers who obtained their doctoral degrees domestically is truly helpful, and it is even beneficial to the country by creating brain circulation. The evidences collected by this study would be useful for policy makers to evaluate the relevant funding programs and to encourage young researchers in Taiwan to broaden their research visibility. **(abstract CM3)**
Author keywords: international mobility; research career; internationalization

Nicolas Robinson-Garcia, Cassidy R. Sugimoto, Dakota Murray, Alfredo Yegros-Yegros, Vincent Larivière and Rodrigo Costas
Unveiling the multiple faces of mobility: Towards a taxonomy of scientific mobility types based on bibliometric data

In this paper, we analyse the phenomenon of scientific mobility by using bibliometric data. The main goal is to discuss problems derived from mobility indicators based on this type of data. First, we note how mobility instances are dependent on production levels and hence indicators based on these data should control by publications rather than overstate productivity differences between researchers. Second, we indicate that indicators based on a brain drain/gain frameworks do not reflect the complexity of the mobility phenomenon, omitting many cases where researchers are mobile without disconnecting from their country of origin. A taxonomy of mobility types is proposed in which we distinguish between 'travelers' and 'migrants'. We believe that these mobility types provide better insights of the complexity of mobility while at the same time providing technical grounds to develop mobility indicators for science policy makers. Further research will focus on the refinement and expansion of the proposed taxonomy. **(abstract CM4)**
Author keywords: international mobility; scientific workforce; global networks

Lucio Morettini, Emanuela Reale and Antonio Zinilli
Moving or remaining: international mobility and careers of PhD holders in Social Sciences and Humanities

PhD holders are a mobile type of workers. As reported by Auriol (2010) on the base of data collected by OECD, UNESCO and Eurostat, the proportion of PhDs who changed the country after graduation has increased appreciably between the mid-90s and the mid-2000s, and even more accentuated, increased the percentage of individuals who have decided to make permanent the change of country.

The flows are influenced by elements linked to professional opportunities (working conditions in countries of origin and countries of destination, language barriers) and local factors: the growing political and economic integration between the European countries has provided an incentive to the movement of all workers, including PhDs.; The aim of this paper is to investigate whether the likelihood of a PhD holder in Social Sciences and Humanities (SSH) to experience a period of international mobility during her career is influenced by the educational mobility. Furthermore, the analysis wants to shed light on the factors that might affect the possibility of PhDs with an international mobility to come back in the country of origin or to remain abroad.; We argue that PhD holders are more likely to have international mobility during their career if they experienced international mobility just after the end of the tertiary studies; moreover the possibility of PhDs working abroad to remain abroad is higher if they have had experienced the international mobility between the PhD graduation and the first job of their career path. Saying differently, we expect that an experience of international mobility at an early educational stage and before the first step of the career can affect the mobility of the career of PhD holders. **(abstract CM5)**
Author keywords: International mobility; PhDs; PhD career

Eric Iversen, Pål Børing and Richard Woolley
Sizing-up changing researcher mobility patterns in Norway using a combined data approach

This study presents a novel comparison of disease burden and publication patterns across countries and health conditions. The preliminary results obtained support previous findings of striking disparities across geographical areas: diseases which are only prevalent in developing countries are under-studied whereas some diseases in developed countries, such as cancer, receive a lot of scientific attention. **(abstract CM6)**
Author keywords: global burden of disease; research portfolios; health inequality

[GEO] Location-based Approaches

Douglas Robinson, Antoine Schoen, Laurens Patricia and Philippe Larédo
Developing global and local STI indicators for profiling the territorial embedding of marine biotechnology research centres

Our study tackles the challenge of developing STI indicators for assessing marine biotechnology (Blue Bio) research institutes that are geographically located in peripheral regions, far from major metropolitan areas. The promise of Blue Bio couples (a) the promise of new sources of knowledge and innovation with (b) the promise to stimulate jobs and growth in regions which struggle to prosper due to a number of factors, such as economic migration from peripheries to large cities and the decline of traditional coastal economic activity. In this paper, we outline the context of marine biotechnology assessment, the systematic approach that is being applied, and a glimpse at the results of its application to a specific case. **(abstract GEO1)**
Author keywords: STI Indicators; Marine Biotechnology; Blue Biotechnology; Regional Embedding; Territorial Embedding

Marion Maisonobe, Béatrice Milard, Laurent Jégou, Denis Eckert and Michel Grossetti
The spatial de-concentration of scientific production activities: what about citations? A world-scale analysis at city level (1999-2011)

Because of the international scope of scientific activities, studies on scientific activities speaks directly to debates in urban studies literatures about globalization. For some researchers, increase in exchanges implies a focus on mobility rather than on stable social entities (Urry, 2007; Adey, 2014). For other authors, this fluidity of exchanges benefits first to very large urban agglomerations, sometimes referred to as "world" or "global" cities (Sassen, 1991; Taylor, 2004), whose privileged situation and visibility allows them to capture the flows of resources and people and create more wealth than others. This communication aims to ascertain whether the territorial redistribution observed in the geography of scientific production between 2000 and 2007 (Grossetti et al., 2014) translated into a redistribution of the geography of citations, and therefore of scientific visibility. Are publications from formerly marginal locations able to influence researchers based in “world cities”, or is their impact mostly

"provincial"? Because the distribution of citations is extremely asymmetrical (Larivière et al., 2010), it could very well be that the geographic de-concentration of production activities did not lead to the geographic de-concentration of citations, but instead contributed to creating increasingly asymmetrical flows of information for the benefit of "central" cities and countries. This article aims to verify whether this is the case by analysing the geographic distribution of citations received over a 3-year period by publications produced between 2000 and 2007, using a method for localising the publications indexed in the Web of Science by urban areas. Results show a growing convergence between the geography of scientific production and that of scientific citations. The number of citations received by the world's 30 top publishing countries and cities tended to edge closer to the global average. While Singapore, China, India and Iran suffered from a deficit of visibility in 2000, their level considerably improved by 2007. Moreover, a decrease in the discrepancy between cities' scientific visibility has been observed in almost all countries of the world, except for three: Sweden, Egypt and Denmark. To finish, our results show that the gap between the share of citations and the share of publications has decreased across all disciplines. A significant asymmetry in favour of English-speaking countries has remained in the distribution of citations in humanities and social sciences (but it is diminishing). **(abstract GEO2)**

Author keywords: Citation analysis; Urban areas; World share; Deconcentration process; Scientific visibility

Wolf-Hendrik Uhlbach, Pierre-Alexandre Balland and Thomas Scherngell

Technological diversification of regions and public R&D funding: Evidence from the EU Framework Programmes

Over the last years the issue of technological diversification gained importance for STI policies. This is especially true in the context of regions, as an important unit for STI policies. Much research was therefore dedicated to explore the drivers of diversification. An increasing body of evidence suggests that diversification is a highly path dependent process in which regions tend to diversify into technologies that to a large extent draw on knowledge and capabilities that are already present in the region. This process is referred to related diversification. From a policy perspective the question arises which factors influence the capability for technological diversification and in particular whether and how public research and development (R&D) subsidies can be a positive impetus. Making use of regional participations in the EU Framework Programmes (FP) from the EUPRO database, it will therefore ask to what extent subsidization of certain technologies will promote diversification. Secondly it will investigate to what extent subsidization can allow regions to diversify into less related technologies. After establishing a convergence between FP projects and technology fields of patents, we explore the relationship between diversification and public funded projects by means of a fixed-effects linear probability model. Results indicate statistically positive effects of participation in FP projects and a decrease in the deferring importance of relatedness with increasing number of participations. Despite their statistical significance, the marginal effects are small. **(abstract GEO3)**

Author keywords: Relatedness; Diversification; EU Framework Programmes

Lionel Villard, François Perruchas, Thomas Scherngell, Michael Barber, Philippe Larédo and Jordi Molas-Gallart

Metropolisation, peripheries & funding of nano S&T production in Europe

The overall geographical deconcentration discussed by Grosseti and Maisonobe can go along with strong concentration effects for emerging S&T. This is what we have shown for nano S&T that agglomerates in 200 'metropolitan areas'. A first analysis of collaboration practices has highlighted that, within inter-cluster collaborations, inter-continental collaborations remain marginal. This warrants a more in-depth analysis of dynamics within Europe. These first analyses have also highlighted two complementary results : (a) the spatial distribution of knowledge production differs when looking at exploration (seen through publications) and exploitation (seen through patents) ; and (b) there are quite diverging dynamics between clusters. This presentation focuses on the role of public funding in this dynamics and more specifically on the role of European Union programmes (that are by far the largest funder in Europe), the role it plays in the agglomeration process observed,

in the collaboration patterns observed and whether the EU support applies more in exploration or in exploitation.
This is done through the development of a dynamic query for delineating nano S&T, the mobilisation of the OECD-based approach of 'functional urban areas' and the integration of three RISIS datasets dealing with publications, patents and European Projects (Abstract GEO4)
Authors keywords: nano S&T, urban areas, agglomeration dynamics, public funding

[GP] Gender perspective

Ulrike Busolt, Sandra Klatt and Wiebke Kronsbein
Gender gap in patent activities in Europe: Three Indicators INODE, FIPMIN and WIN describing the issue

Patenting is for many organisations an increasingly important business factor. However, the assessment of a gender impact on inventive activities of all European Union Member States reveals a pronounced gender gap in different ways.; Despite increasing gender balance of graduates and educational qualification, the under-representation of female researchers is still severe in the EU. In 2012, on average the share of women researchers is only 33%, the same number as in 2009. In relation to their participation in research and development women are also heavily underrepresented as inventors of European patents.; The proposed INODE indicator (invention gender gap indicator) describes in a nutshell to which extent European Member States make use of their potential of female researchers.; The number of female inventors in relation to the inhabitants of European countries varies significantly. Traditionally, the EPO applicants per million inhabitants per country are counted as an indicator for R&D output in terms of successful knowhow. In this calculation, Sweden produced the most applications per million inhabitants, followed by Finland, Germany and Denmark. However, this does not show the gendered view. We introduced the FIPMIN-indicator (number of female inventors per million inhabitants indicator) in order to give a measurement for the inventive productivity of women specifically. Innovation leader countries exhibit the highest FIPMIN-indicator.; The WIN indicator (women researchers and inventors indicator) gathers the majority of the European Member States in three groups (A, B and C). The A-level group of Member States has the highest percentage of female researchers and female inventors within the business enterprise sector (BES), whereas group B is at a medium level and group C performs below the EU mean values. **(abstract GP2)**
Author keywords: gender gap; patents; indicator

Núria Bautista Puig and Elba Mauleón
European Research Council Grants: excellence and leadership over time from a gender perspective

European Research Council (ERC) encourages the highest quality research through competitive funding in all research fields by promoting the frontier research of knowledge. There is increasing concern about gender aspects in science and technology activities. In this sense, this paper analyses the presence of men and women in the ERC grants on the occasion of the ERC 10th next anniversary. Large inter-gender differences in the presence of men and women by type of grant, research area and panel expert role were found. **(abstract GP3)**
Author keywords: ERC Grants; gender perspective; women and science

Lili Miao, Dakota Murray, Zaida Chinchilla-Rodríguez, Vincent Larivière and Cassidy Sugimoto
Glass Boundaries: Differences in Interdisciplinarity Between Men and Women

Federal funding agencies have invested resources into promoting interdisciplinary research as well as diversity, hoping to see returns in innovation. But most past research tends to explore only one of these topic, and tends to focus on their benefits to scientific impact, rather than the individual decisions of researchers. This study provides a preliminary analysis of gender differences in interdisciplinary research. Using the Academic Analytics dataset, we calculated the percentage of interdisciplinary researchers in each discipline, and explore the composition of disciplines with which these researchers are affiliated. We find that while female and male researchers are equally likely to

engage in interdisciplinary research, there are statistically significant differences in the composition of disciplines to which men and women affiliate. These results offer initial insight into how men and women navigate disciplinary boundaries in their research, and paves the way for more thorough investigation. **(abstract GP4)**
Author keywords: science policy; interdisciplinarity; gender

Dakota Murray, Cassidy Sugimoto and Vincent Larivière
A Balanced Portfolio? The relationship between gender and funding for U.S. Academic Professors

Research funding is at the heart of the modern research system—serving as both an input for research activity as well as an indicator of individual success. Previous research, based on small sample sizes or a small number of funding bodies, has shown that women tend to be disadvantaged in the grant peer-review process and to receive less funding than their male peers. Using a large-scale database of demographic information, metrics of scholarly output and impact, and funding data sourced from multiple U.S. federal agencies from the company Academic Analytics, this paper explore issues of age, gender, discipline, and levels of funding in the context of US academic research. Our results confirm that women tend to receive less funding than men, but that such disparities are not universal: women appear to be funded equal to or greater than their male colleagues in the Humanities and Social Sciences, but less in STEM disciplines. In addition, academically young women appear particularly disadvantaged compared to equally experienced male colleagues, a disadvantage that diminishes for academically older researchers. This work provides an early exploratory analysis that sets the foundation for further research on the degree to which funding contributes to or mitigate gender disparities in science. **(abstract GP5)**
Author keywords: Gender; Research Funding; Research Policy; Universities; U.S.A

Catherine Beaudry and Heidi Prozesky
Factors that affect scientific production in Africa: a gender analysis

This paper is aimed at describing and accounting for gender difference in publication productivity among African scientists. We find that, on average during the three years preceding data collection, men produced more published research than women. In order to explain this difference, potential covariates of gender and scientific production – identified on the basis of the most important theoretical and empirical explanations for gender differences in publication output – are controlled for by means of multivariate analysis using indicators built from survey data. Our results show that women's scientific production is affected negatively by the number of children, care-work and household chores. While it is positively affected by collaboration, and by mobility during their studies or career over the past three years, these factors do not in any significantly manner offset the negative impact of gender on scientific production. Results are interpreted in the African context, to identify priorities for policy aimed at addressing gender differences in scientific production among African scientists. **(abstract GP6)**
Author keywords: Scientific output; Gender; Africa; Children; Workload; Collaboration; Mobility

[HIS] STI History

Arlette Jappe
Who defines professional standards and which indicators are used in bibliometric research evaluation?

This work in progress paper investigates the existence and the spread of professional standards in research evaluation, based on a meta-analysis of 75 bibliometric evaluation studies in European countries from 2005-2016. This meta-analysis is part of a larger project on the professionalization of evaluative bibliometrics, conducted by Thomas Heinze, Sabrina Petersohn und the present author. Our theoretical propositions draw on Abbott's (1988, 1991) theory of professions. Based on this theoretical framework, we distinguish between expert organizations as professional suppliers of bibliometric assessment services on the one hand and the increasing proliferation of ready-made impact metrics that are available through multidisciplinary citation databases such as Web of Science or Scopus. This study investigates if evaluation studies conducted by professionals or expert organizations display a

strong divergence of methodologies for determining research impact or if there is in contrast a convergence towards de-facto standards of professional practice. In a second step, these results are compared to the assessment methodologies distributed by database providers. **(abstract HIS 1)**
Author keywords: citation impact metrics; standards for bibliometrics; professionalization of evaluative bibliometrics; research assessment; research evaluation; meta-analysis of evaluation studies; sociology of professions

Clemens Bluemel, Stephan Gauch and Florian Beng
Altmetrics and its intellectual predecessors: Patterns of argumentation and conceptual development

This paper attempts to provide an overview of the history and the pre-history of Altmetrics and thereby seeks to inform scholarly debate and reflection. Based on bibliometric analysis using WOS and SCOPUS databases, a corpus of 479 articles was constructed covering the topics of altmetrics and its intellectual predecessors. Applying qualitative analysis to the corpus, we identified three major waves of intellectual development corresponding to three peaks in publication output that engaged dominant patterns of argumentation: terminological turmoil, scrutinization, and conceptual development. We argue that these patterns of argumentations of the intellectual movements in the first two waves have been repeated in the most recent debate on Altmetrics. Based on this analysis, we provide some suggestions for conceptual development in altmetrics. **(abstract HIS2)**
Author keywords: Altmetrics; patterns of argumentation; conceptual development; scientometrics

Sabrina Petersohn and Thomas Heinze
Bibliometric Research Assessment as Professional Jurisdiction? Insights from the History of the Leiden Center for Science and Technology Studies (CWTS), 1980–2016

In recent years, the use of quantitative metrics in research evaluation has grown considerably, as has the number of actors producing and applying bibliometric methods and indicators. This paper recasts the emergence and proliferation of evaluative bibliometrics as an academic research field and quantitative research assessment as a field of professional experts in the Netherlands by focusing on one expert organization that has shaped both: the Centre for Science and Technology Studies (CWTS) at the University of Leiden. Based on Abbott's theory of professions and drawing on a comprehensive data set, including both archival and interview data, we show that the new professional field has been actively constructed by political actors in the Dutch science policy arena since the late 1960s and that CWTS has assumed a double role as a leading research institute and a provider of bibliometric research assessment services. These services were meant to be complementary to peer review, and CWTS thus assumed a position subordinate to peer review. Since the 2010s, CWTS has been challenged by ready-made bibliometric solutions commercialized by large database providers and publishing houses that, in turn, have attracted non-experts to perform bibliometric assessments. Therefore, bibliometric expert organizations like CWTS now are facing a much more competitive environment than in the 1990s and 2000s. **(abstract HIS3)**
Author keywords: Research evaluation; Expert organization; Evaluative bibliometrics; Professional jurisdiction; Sociology of Professions

[ID] Innovation Dynamics

Gaston Heimeriks, Antoine Schoen, Patricia Laurens, Lionel Villard and Floortje Alkemade
The evolving technological capabilities of firms

The ability of firms to develop new technological knowledge is considered essential for firms' long-term performance. We address the question how the characteristics of the technological knowledge base of firms drives performance? We first establish how the composition of the global patent portfolio of the world's top 2000 R&D performing companies can explain patterns of entry and exit of new technology domains for these firms. Second, we study how patterns of divergence among firms can be explained by the diversity, complexity and growth of the technological knowledge base of firms. Furthermore, we investigate how different sectors, general purpose technologies and countries of origin contribute to the performance of frontier firms. The results provide new insights about the

mechanisms underlying the global productivity slowdown, the emergence of frontier firms and patterns of technology divergence. New public policy lessons can be articulated. **(abstract ID1 1)**
Author keywords: productivity; technological change; firm dynamics; Innovation benchmarking; patent indicators

Daniel Vertesy, Maria Del Sorbo and Giacomo Damioli
In search of high-growth, innovative firms in Europe: evidence for cross-sectoral and cross-country differences

High-growth, innovative enterprises are a key source of business dynamics, but there is little statistical evidence on whether innovative firms are more or less likely to be also high-growth firms. To some degree, this is due to an inherent uncertainty about the thresholds that distinguishes high-growth firms from non-high-growth firms, illustrated by the lack of agreement between the definitions applied by Eurostat and the OECD. We introduce a methodology to address the uncertainty in the definition, and compute national and sectoral average scores for high-growth and innovation performance in order to assess such firms' distribution across countries and economic sectors. We compute multiple definitions of growth and innovation on a pooled sample representing around 450,000 European firms observed by the 2012 wave of the Community Innovation Survey (CIS). With the help of aggregate measures, we observe a trade-off between high-growth and innovation performance at the country-level, which disappears at the overall European sectoral level. This observation highlights the importance of structural differences across EU Member States in terms of firms' innovation profile, size and associated high-growth performance. **(abstract ID1 2)**
Author keywords: innovation; high-growth; enterprises; definition; indicators; sectors

Laurens Patricia, Antoine Schoen, Alfredo Yegros and Philippe Larédo
Exploration of knowledge in European large firms in the Chemicals and Pharma/biotech sectors: level and mode of collaboration in the corporate scientific publications and patents

This paper deals with the management of knowledge exploration in the largest European firms in the sectors of Chemicals and Pharma-biotech. It uses the scientific publications of the firms as a marker of the exploration of basic research and relies on the patents they applied for as a marker of the exploration of new technology. It provides empirical evidences on the contribution of internal and external collaborative exploration of knowledge and on the geographic locations of the R&D exploration. It contrasts the collaborative mode of knowledge exploration in scientific publications with the internal exploration of applied research in patents. It reveals the leading role of Germany in the exploration of applied R&D and the importance of overseas R&D in the basic knowledge exploration. **(abstract ID1 4)**
Author keywords: knowledge exploration; scientific publication; patent; corporate R&D; collaboration

Benjamin Layani, José Molero and José María Fernández-Crehuet
The Innovation Union's performance scoreboard for Research and Innovation: The digital basic capacities.

The Innovation Union Scoreboard (IUS) is an instrument of the European Commission developed under the Lisbon Strategy to provide a comparative assessment of the innovation performance of EU Member States. It can be observed that this composite indicator does not take into account any digital related data, though it has been revised after the adoption of the Europe2020 Strategy, that do consider the digital economy as a crucial innovation factor for Europe. Indeed, the digital agenda is one of the 7 strategic pillars of the Horizon2020 European policy.; Thus, this scientific work aims to explore to what extent countries digitalization is absent from the Innovation Union Scoreboard and thus questions the coherence between the European Union priorities and the main tool that has been established to monitor its evolution. More precisely, this paper raises three basic investigation questions: what digital basic capacities are determinant for the innovation system of a country and how do they actually impact? What Innovation Union Scoreboard sub indicators can be directly related to digital capacities? Should one advocate the integration of an extra digital related sub-indicator in the Innovation Union Scoreboard, and how could it be designed?; To do so, the methodology consists of the analysis of the correlations between the Innovation Union Scoreboard

database and the database of another European Commission's composite indicator: the Digital Economy and Society Index (DESI). An early analysis confirms the weight of the digital human capital in the national Innovation Systems and further analyses should pave the way for a better understanding of the relations between the basic digital capacities and the actual Innovativeness of European countries. **(abstract ID6)**
Author keywords: innovation system; digital data; innovation performance; indicators; Europe; ICT

Carita Eklund
Innovation Capability from Intangible Assets

Innovation has many overlapping definitions and interest groups. This short paper presents an indicator, intangible capital, used by innovation economists in valuating firm or industry level innovativeness. The contribution of this article is the linking of innovation capacity to intangibles bringing two lines of literature together. I demonstrate the link with firm level data of Danish firms 2008–2013. **(abstract ID7)**
Author keywords: intangible capital; innovation capability; innovation indicator; micro-level data

Antoine Schoen, Patricia Laurens, Alfredo Yegros and Philippe Larédo
Comparative analysis of knowledge production in analogous large European firms: how much do individual strategies matter?

This research analyses, with a comparative approach, the production of knowledge in two pairs of analogous large European companies: two German companies from the Chemicals sector (Bayer and BASF) and two Swiss companies from the pharmaceuticals sector (Novartis and Roche).; The results show that, within each of these two pairs, the firms, which display several similar main characteristics (same home country, same industrial sectors, annual sales and R&D investment of the same order of magnitude), differ significantly in the way they produce knowledge. Modalities of knowledge exploitation (assessed through the patents applied for by these companies) are alike, but new knowledge (assessed through the scientific publications authored by researchers from these companies) is being explored rather differently within the two pairs of analogous companies. **(abstract ID8)**
Author keywords: corporate research; positioning indicators; networks

[IS] Issues in Scientometrics

Carlos García-Zorita, Ronald Rousseau, Sergio Marugan-Lazaro and Elias Sanz-Casado
Rankings: competitiveness versus stability

Scientific journals are ordered by their impact factor while countries, institutions or researchers can be ranked by their scientific production, impact or by other simple or composite indicators as in the case of university rankings. In this paper, the theoretical framework proposed by Criado et al. (2013) for football competitions is used to define competitiveness in an academic context. Some characteristics to study competitive rankings are presented, competitiveness measures are considered in an academic context, and some axioms for competitiveness measures are presented. Furthermore, the notion of volatility of the elements in such rankings is introduced. Finally, these concepts are applied in the context of competitiveness among journals using an example of WoS-JCR categories.
(abstract IS1)
Author keywords: Rankings; Competitiveness measures; Ranking volatility

Jens Peter Andersen, Fereshteh Didegah and Jesper Wiborg Schneider
The necessity of comparing like with like in evaluative scientometrics: A first attempt to produce and test a generic approach to identifying relevant benchmark units

Scientific performance analysis frequently faces challenges when attempting to compare assessment units to relevant benchmarks. Rarely is a university department or research group directly and obviously comparable to another, and benchmarking can become arbitrary, if one does not take sufficient care in selecting appropriate comparisons. While field-normalization and percentile-based indicators can solve some issues with unit comparisons, there are still problems with size, topicality

and unit type. Do we compare departments to universities? Universities to countries?; In this paper, we propose a generic approach to algorithmically computing relevant benchmarks, fulfilling these criteria. The method operationalises an article-level classification system to construct topic profiles for variable input units and comparing them to profiles of other units publishing in the same areas as the unit of analysis. These units are considered virtual benchmarks, as they are not physical entities such as a university department, but rather the amount of research published within the topics given by the original unit of analysis, by other institutions. Comparisons between units are made by considering each profile as topicality vector in the given topic space. The similarity of the unit of analysis and the virtual units is then given by the angle between these topicality vectors.; The proposed method is presented using a development case, using a privately funded research centre in basic metabolic research as the seed. This development case is used to test various approaches to delineating research topics and testing topicality representations. The approach is subsequently applied to the Interdisciplinary Nanoscience Centre at Aarhus University, for which we have expert-defined benchmarks. The algorithmically generated benchmarks are compared to the expert benchmarks, with mixed results.; We conclude that the presented method is an important step in rethinking benchmarking as a process where units are compared to virtual rather than physical benchmarks. Our results indicate that while the overall, generic approach is promising, the implementation requires case-by-case tuning, depending on the input unit. Some of the methodical choices, such as the vector comparison metric, also require further research to analyse their robustness in ranking and discriminating between virtual benchmarks. **(abstract IS2)**
Author keywords: benchmarking; citation analysis; universities; university departments; research assessment; topicality; vector space models

Vincent Antonio Traag and Rodrigo Costas
Are citations driven by journal impact?

Articles in high-impact journals receive more citations on average. However, the cause of this effect is not clear. Are articles more highly cited because they are of higher value? Or are they more highly cited because they appeared in a higher impact journal? Understanding the relationship between citations and the impact factor is complex. We here try to disentangle this relationship based on citations to arXiv preprints. We find that citations to the published version of a publication are almost equally strongly driven by the journal where the article is published as by the number of citations to the arXiv version. Publications with more arXiv citations tend to be published in higher impact journals, but the effect is rather weak. **(abstract IS3)**
Author keywords: Citations; Journal Impact; Impact Factor; arXiv; preprint

Tindaro Cicero and Marco Malgarini
The effect of research collaborations on citation impact: a dynamic panel data analysis

The aim of this study is to evaluate the effects of research collaborations on scientific impact; we will distinguish four type of collaborations (national, international, institutional and academic-corporate collaborations) and evaluate the importance of each of them on citation impact during the last 15 years. We innovate with respect to previous studies using a dynamic panel data approach, allowing to control for the growing trend of citations over time. According to our results, at the aggregate level only international collaborations enhance the scientific impact of publications, whilst national, institutional and intersectoral collaborations do not play a significant role. Relevant differences emerge however at disciplinary level: international collaborations remain generally significant and have a positive effect, while corporate collaborations are found to be detrimental to citations in some fields, a result possibly due to the fact that this kind of collaboration does not pursue scientific impact as its primary target. In mathematics and computer sciences, however, collaborations have generally a negative effect on scientific impact, the only exception being corporate collaborations, that are found to enhance impact. Also, no effect of collaborations is found in biomedical areas. **(abstract IS4)**
Author keywords: Collaborations; Impact; dynamic panel data

Belén Álvarez-Bornstein, Adrián A. Díaz-Faes and María Bordons
Relationship between research funding and scientific output in two different biomedical disciplines

When studying scientific output arising from funded research, it is relevant to determine the effectiveness of investments on research. In this study two biomedical disciplines are analysed regarding scientific publications and their research funding profile as obtained from the WoS funding acknowledgements field. The main characteristics of funded-research are analyzed from a bibliometric perspective. Disciplines differ in their funding rate, percentage distribution of funding sources by institutional sector and type of financing. In both disciplines, funded research is more likely to be published in high impact factor journals and to receive more citations than non-funded research, as well as to present international collaboration. The institutional affiliation of authors has an influence on the likelihood of reporting financing, which is positive for university and multi-sector centres but negative for companies in the more basic discipline. The interest of these findings for sponsor organisations will be outlined. **(abstract IS5)**
Author keywords: Funding acknowledgements; Scientific output; Research performance; Research impact; Scientific collaboration; Biomedical research

Ludo Waltman and Vincent Antonio Traag
Use of the journal impact factor for assessing individual articles need not be wrong

Most scientometricians reject the use of the journal impact factor for assessing individual articles. This critical perspective on the impact factor has received widespread support in the scientific community, as demonstrated by the influential San Francisco Declaration on Research Assessment. The use of the impact factor at the level of individual articles is often criticized on statistical grounds, in particular by referring to the skewness of journal citation distributions. We present a theoretical analysis of statistical arguments against the use of the impact factor at the level of individual articles. Our analysis shows that these arguments are not convincing. In fact, computer simulations demonstrate the possibility that the impact factor is a more accurate indicator of the value of an article than the number of citations. The debate on the impact factor and its use in research evaluations is very important, but it should be based on correct statistical arguments. **(abstract IS6)**
Author keywords: Impact Factor; Citations; Assessment; Evaluation

Wolfgang Glänzel and Bart Thijs
Bridging another gap between research assessment and information retrieval – The delineation of document environments

The combination of cognitive mapping and citation analysis used in scientometrics has already successfully proven its usefulness. About a decade ago the combination of Information Retrieval and scientometrics was introduced: Bibliometric Aided Retrieval. In this paper we want to take a step further forward because the urgent need for setting reference standards for bibliometric indicators beyond the opportunities offered by traditional subject classification or provided by advanced clustering exercises. In order to do so, we first need to determine a proper cognitive environment for each individual document indexed in the underlying bibliographic database. This environment will then be used for creating the citation reference standard for indicators that are applied to the documents. **(abstract IS8)**
Author keywords: Information Retrieval; Citation Analysis; Citation normalization; Bibliographic Coupling

Valeria Aman
Does the Scopus author ID suffice to track scientific international mobility? A case study based on Leibniz laureates

This study explores the relation between CV data and Scopus data in regard to tracking international mobility of scientists. To test the consistency and applicability of data on mobility episodes, residence countries as provided in CVs of a set of German scientists were compared against the country information in the affiliations of their publications. Therefore, the CVs of Leibniz-laureates were coded for the period 1996-2015 and their publications were gathered on the basis of Scopus author ID. Scopus author ID proves to have a high degree of precision. The ideal case was found for the majority of laureates; namely that a scientist publishing in sources that are covered by Scopus has a single author id and each author id relates to a single scientist. The comparison of these two data sources

shows that bibliometric data is suitable to identify a scientist's international mobility and appears to be a good solution if there are no CVs available or if they are incomplete. Furthermore, the reasons for inconsistencies in mobility data are discussed. These reside in merged identities (where two authors are combined under a single author ID), lack of co-author affiliations, incomplete CV data, and other reasons. **(abstract IS10)**
Author keywords: Scientific international mobility; Bibliometrics; Scopus author ID; CV data

Andrea Reyes-Elizondo, Clara Calero-Medina and Martijn Visser
Affiliated hospitals: the challenge of academic medical centers

The delimitation of universities poses several challenges for science and technology studies in general and rankings in particular. Given that the educational and research systems worldwide are heterogeneous and in a constant state of change, assigning the relationship between universities and affiliated organizations such as research centers and hospitals becomes problematic. In this paper we present the work that the Leiden Ranking has done to address the complex issue of delimiting academic hospitals into the wider perimeter of universities. In this paper we present the work that the Leiden Ranking has done recently to address the issue of delimiting academic hospitals into the wider perimeter of universities. **(abstract IS11)**
Author keywords: academic hospitals; university rankings; affiliated organizations

Loet Leydesdorff, Caroline Wagner and Lutz Bornmann
"Interdisciplinarity" at Different Levels of Aggregation: Betweenness and Diversity in Journal Citation Networks (Draft of a Tribute to Eugene Garfield)

Journals were core to Eugene Garfield's research interest. Journals can be considered as the units of analysis of bibliographic databases such as WoS and Scopus. We elaborate on a research question which Leydesdorff & Rafols (2011) addressed, but did not conclusively answer, namely, how to distinguish and rank journals in terms of their interdisciplinarity. In addition to the classification of journals into disciplinary and subdisciplinary categories, the effects of a classification model on cases at the margins and between classes has remained a problem. **(abstract IS12)**
Author keywords: journa; interdisciplinarity; betweenness; diversity; granularity

Peter Van Den Besselaar and Ulf Sandström
Influence of cognitive distance on grant decisions

The selection of grant applications generally is based on peer and panel review, but as shown in many studies, the outcome of this process does not only depend on the scientific merit or excellence, but also on social factors, and on the way the decision-making process is organized. A major criticism on the peer review process is that it is inherently conservative, with panel members inclined to select applications that are line with their own theoretical perspective. In this paper we define 'cognitive distance' and operationalize it. We apply the concept, and investigate whether it influences the probability to get funded. **(abstract IS13)**
Author keywords: grant selection; bias in decision making; cognitive distance

Zsófia V. Vida
Authors' cognitive distance on collaboration networks via Author Bibliographic Coupling Analysis

Research collaboration networks is a widely analysed area in the field of Information Science. Numerous factors influence the coming into existence of research collaboration networks. The greater the distance between actors, the less likely they will engage in collaboration. In this study we reveal the relation between social and cognitive distance at the authors' level. We determine: 1. how we can measure cognitive distance between authors and 2. what cognitive distance contains. We compare two fields, Physical Geography and Economics. We analyse the related WoS records that contain at least one Hungarian author between 2010 and 2014. To determine cognitive distance, we use an extension of bibliographic coupling (BC), the so-called Author Bibliographic Coupling Analysis (ABCA). During the extension from BC to ABCA, the references of one paper are assigned to all authors of the paper. We analyse the similarity of the commonly used references between pairs of authors via ABCA. Since we project references from papers to authors, there are two possibilities for a pair of

authors to have a common reference: 1. the two authors are co-authors so both of them get the common reference 2. the two authors are not co-authors but they use the same reference because of their common research interest. In this study we separate this two cases. We call the first case social component. We determine it through co-authorship networks. The second case is called pure cognitive component. This component can sign potential future collaborations. We call the total of the two cases, the results of the 'normal' ABCA, entire cognitive similarity. We compared these three similarity types. We looked into the distribution of similarity types on different similarity scales on the two selected fields. We found higher similarity values between authors in Physical Geography in the case of entire cognitive similarity and the social component of cognitive similarity. In Physical Geography the rate of collaborative papers was higher than in Economics. The more frequent collaboration caused a stronger social component, so the entire cognitive similarity between authors in Physical Geography was higher. In the case of pure cognitive similarity, we found stronger similarity between authors in Economics.Our findings proved that pure cognitive distance between authors can show a different picture than entire cognitive distance via ABCA because of the filtering of the social factor. With the help of pure cognitive distance, we can sign potential future collaborations. (abstract IS4)
Author keywords: cognitive similarity; social similarity; bibliographic coupling; Author Bibliographic Coupling Analysis; collaboration networks

[NM] New Methodologies

Diana Maynard and Benedetto Lepori
Ontologies as bridges between data sources and user queries: the KNOWMAK project experience

This paper describes ongoing work in the KNOWMAK project, which aims to develop a web-based tool providing interactive visualisations and state-of-the-art indicators on knowledge co-creation in the European research area. One of the main novel developments in this work is the use of ontologies to act as a bridge between the data sources (research projects, patents and publications) and user queries, in order to address the problems of mapping between heterogenous data sources with different vocabularies while still maintaining a level of standardization necessary for summarising the information required to provide informative views about the highly dynamic S&T landscape. **(abstract NM1)**
Author keywords: Natural Language Processing; ontologies; knowledge co-creation; scientometrics

Alfredo Yegros, Maria Francisca Abad, Robert Tijssen and Ismael Rafols
Exploring the misalignment between global burden of disease and publication patterns in health research

The Brexit is expected to exert a measure of influence over the UK, as well as the current 27 EU Member States. In this paper, we provide a basic description about the affection of the Brexit. Our concerning focuses on which countries and in which research fields would be mostly affected. To answer these questions, we listed the primary collaborations involved the UK and identified their mainly collaborative research subjects. Further, to estimate the influence on the Brexit, we examined how the UK exists inside the original 28 EU nations, by visualizing its position in the collaboration networks and the research subject map.; Decision: **(abstract NM3)**
Author keywords: Brexit; research collaboration; European

Gemma Derrick
Exploring in-group heuristics in peer review panels assessing societal Impact

This this paper explores the nature of groupthink in panels assessing a formal, ex-post societal Impact criterion. To this end, I explore instances where the probability of groupthink leading the evaluation were higher through the exploration of the group-based errors in decision making of social loafing, shelving and satisficing. **(abstract NM4)**
Author keywords: Peer review; Societal Impact; Evaluative practice; Group processes; Evaluation indicators

Stephan Stahlschmidt
Abstract Readability as a Soft Parabolic Glass Ceiling for Citations

Readability denotes a linguistic concept and explains how the structure of a text influences the comprehension of its content. While academic texts have been found very difficult to read if compared to non-academic texts, no or a slightly negative correlation has been empirically observed between readability and citations. This observation contradicts theoretical work on the relation which states, depending on the degree of readability, a positive or negative relation between readability and citations.; This research-in-progress paper suggests a more flexible modelling approach to the relation, as the common, but simple correlation coefficients seem ill-suited to express the positive and simultaneously negative relation between readability and citations in their single number statistic. Instead a functional approach based on nonparametric quantile regression is presented resulting in a parabolic shaped relation for highly cited articles. **(abstract IS7)**
Author keywords: readability; citations; correlation; nonparametric quantile regression

Patricia Helmich, Peter Neuhäusler and Rainer Frietsch
Cycles and evolution of topics in scientific journal publications and patent data – analyzing keywords and textual data

The evolution of scientific topics and technologies follows most often a similar pattern that can be characterized by different stages of development which is empirically testable. This model can be extended by introducing a distinction between a more science-push oriented first boom and a market-pull triggered second boom, a so-called double boom cycle. We rely on these models and further develop the concept by distinguishing between a first explorative cycle and a second diffusion oriented cycle, and in particular we aim to extent the empirical implementation of the model. Our hypothesis is that the two cycles have different characteristics. Thus, we analyze patent and publication data in order to examine the trends. Parallel to common methods like counts of bibliometric and patent data, we also consider the content of the publications and patents based on textual data. Therefore, we propose a method that automatically determines the focus of the textual data extracted from scientific works related to a technology cycle. While many existing works focus on the classification of scientific texts into fine-grained topics, our method aims to characterize the foci of technology cycles. Our first approach performs a classification by characterizing a cycle based on relevant single terms extracted from the textual data. We apply this method to patents and publications by Fraunhofer in three different technological fields and find that we are able to characterize the explorative and the diffusion oriented cycles. However, we also encounter problems that rise doubts on the single term-based and one-dimensional definition of technological fields. In order to address these issues, we further develop our method by considering term phrases rather than single terms in order to characterize the cycle. Moreover, we perform a clustering of the patents and publications so that we are able to detect several foci that evolve in parallel. For the labeling of the foci, we take advantage of the fact that, contrary to other texts, scientific texts provide structured information such as assigned keywords that address the focus of the text. We extract the keywords that are assigned to the cluster and analyze if they represent properly the whole cluster. The representative keywords are chosen in order to characterize the focus of the cluster. If there are not enough representative keywords available, we determine new keywords by extracting relevant terms from the textual data representing the cluster. The focus of the cycle is then represented by the characterizing keywords and terms. By applying this further developed method, we aim to increase the performance of our approach. **(abstract NM5)**
Author keywords: technology cycles; identification; bibliometrics; patents; text mining; classification

Yves Fassin
A New Qualitative rating system for scientific articles and a new fame index

An innovative evaluation index approach is proposed based on a categorization of academic publications and their authors into ratings comparable to the financial ratings such as Moody's and S&P ratings (AAA, AA, A, BA, BB, B, C,..). This rating is based on combined citation indexes (h-index, g)-index, etc...). Building on this categorization that integrates additional qualitative

information, citations and publications, a new index is proposed for authors and journals, the fame-index or f-index. This new index integrates some qualitative elements of the influence of the researcher's articles. **(abstract NM7)**
Author keywords: Method; Evaluation; citations related index; f-index

Johan Eklund and Gustaf Nelhans
Topic modelling approaches to aggregated citation data

In this research in progress paper we report on preliminary results from the proposed novel uses of topic modelling approaches to bibliographic references as sources for "bags-of-words" instead of actual text content in scientometric settings. The actual cited references, as concept symbols for paradigmatic approaches to earlier research could thereby be used to cluster We will demonstrate an explorative approach to using cited reference topics for the discovery of hidden semantic reference structures in a set of scientific articles. If found fruitful and robust, this approach could complement existing text based and citation based techniques to clustering of research that might bridge the two approaches. By approaching references as "words" and reference lists as "sentences" (or documents) of such "words", we demonstrate that the topical structure of document collections can also be analyzed using an alternative and complementary source of content, which additionally provides an interesting perspective on bibliographic references as units of a metalanguage describing document content. **(abstract NM8)**
Author keywords: topic modeling; aggregated citations; concept symbols; bag-of-references; latent Dirichlet allocation

Nicolas Carayol, Agenor Lahatte and Oscar Llopis
Novelty in Science

In this article we propose a new measurement of novelty in science based on the frequencies of pairwise combinations of articles keywords. We argue that this approach more accurately grasps "thematic novelty", that is the exploration of new research questions, as compared to journal reference atypicality. Our empirical evidence is based on more than ten million research articles published in the journals references in the WoS from 1999 to 2013, for which we have very complete; and detailed data. We show that the number of distinct keyword combinations follows a very similar growth pattern as the number of research articles (equal constant growth rates). At the article level, novelty is shown to be stable over the whole period. Novelty is found to increase with the number of authors, the number of institutions involved, and the geographical span of the teams, across all fields of science and within each broad field. Further, novelty is strongly and positively related to; the citation impact. Finally, we show that top-impact journals play an exceptionally significant role in bringing novelty into the system of science. **(abstract NM9)**
Author keywords: novelty; keywords; science; atypicality

Cinzia Daraio
A doubly conditional performance evaluation model, the democratization of evaluation and Altmetrics

The main contribution of this paper is to propose a performance evaluation model which can be used as a democratic evaluation tool for "value creation" in a learning and participatory environment. It may be seen as a revisited version of the Ricardo's approach of comparative advantages but in the context of a broader framework including theory, methodology and data dimensions. In so doing we define the problem of the "democratization of evaluation" as the co-existence of highly skewed indicators with normal shaped indicators. After that, we introduce another meaning of Altmetrics as an answer to the need of democratization of performance indicators. **(abstract NM10)**
Author keywords: Science participation and communication; Measuring impact and engagement; Altmetrics; Democratization of evaluation

Zehra Taskin, Umut Al and Umut Sezen
First Stage of an Automated Content-Based Citation Analysis Study: Detection of Citation Sentences

Content-based citation analyses, which are focused on giving meaning to the citations are important studies in the literature in terms of ethical problems and manipulations on citations. Analyzing

contents of citations is important to evaluate research/er performances properly for decision makers and managers. There are two options to gather citation sentences for content-based studies: manual and automated techniques. Automated techniques provide a useful method that requires least human effort. The main aim of this research in progress is to present an automated citation sentence extraction model for APA Style citations by using finite state grammars. To achieve this aim, Nooj software is used. The importance of this study is to create an automated extraction tool for scientific articles in any language or field, which use APA style. This tool may be used easily with the purpose of providing meaningful citation data to all content-based citation analysis studies carried out by the decision makers and managers. **(abstract NM11)**
Author keywords: Content-based citation analysis; Machine learning; Finite state grammars; Nooj

[OA] Open Access

Thed Van Leeuwen, Ingeborg Meijer, Alfredo Yegros and Rodrigo Costas
Developing indicators on Open Access by combining evidence from diverse data sources

Abstract; Increasingly, the academic communities are confronted with the demand to publish their findings in an open environment. Science policy and science management has a need for evidence of this change in publishing behavior, which results, as a consequence, in an increasing demand for bibliometric analysis of the shift towards Open Access (OA) publishing. In this study, covering the period 2009-2014, we present the outcomes of the development of OA labels on publications processed for the Web of Science (WoS), and in particular on the in-house version at CWTS. Main reason for this labeling of publications is the need for insight on OA publishing, while the WoS database currently does not serve this purpose well. We have chosen five data sources (DOAJ, ROAD, CrossRef, PubMedCentral, and OpenAIRE), leading to 7 different methods, from which we collect information to attribute OA labels to WoS publications. By using these five sources, we are able to distinguish between Gold and Green OA. Next, we calculated for EU countries the OA shares of the national outputs.; An important conclusion from the study is the increase of OA format publications for EU countries in the period we studies, while the countries with explicit OA mandates, the UK and the Netherlands, have the highest shares of OA output. Another important conclusion is that among the five sources, not one single source we used for attributing OA labels to the WoS publications is enough to cover the OA share among the national output, while it also varies among EU countries which source is most important. **(abstract OA 1)**
Author keywords: Bibliometric indicators; Open Access publishing; Data sources

David Brooke Struck, Guillaume Roberge and David Campbell
The Influence of Open Access, Gender and Co-authorship on Citation Scores

Citation rates are frequently used as a measure of research excellence, and while normalization procedures are usually applied to control for differences of discipline and year of publication (to create a level playing field for comparison), several other parameters are also known to have impact on citation scores: open access (OA) status, gender composition of research teams, and international co-authorship. These parameters are also known to correlate with each other; international collaborations have a greater likelihood of being available in OA, and women are known to participate less often than men in international collaboration.; The question addressed by this study, then, is how each of these three parameters influences citation rates. All three parameters are integrated into a multivariate regression model to distill the influence that each one has independently, controlling for the others. The study uses a custom dataset crossing data from Scopus (Elsevier) and the oaIndx (1science). The data on authors in Scopus was enriched using the NamSor API to determine their gender. The dataset is filtered to screen out confounding factors, focusing on one publication year, only those publications for which all authors can be unambiguously tagged as either women or men, and papers that are confirmed as peer reviewed in the production process of the oaIndx. Two subfields of research are considered—one dominated by male authors, and one closer to gender parity.; The study demonstrates that OA status has the largest magnitude of effect. Controlling for the number of authors and number of institutions involved in producing a publication, international co-authorship is shown to lend a citation advantage in one of the two subfields. Furthermore, the involvement of women in a research

team is shown to have a positive impact on citation scores; however, in the subfield where overall authorship is close to gender parity, the positive impact of women's involvement diminishes as the share of women increases among the authorship group of a paper. These findings should inform the consideration of citation scores in research performance evaluation. **(abstract OA 2)**
Author keywords: open access; citation advantage; women in research; research evaluation; international collaboration

Peter De Padua Krauss, Jorge H. C. Fernandes and Ricardo Barros Sampaio
Open Access Coherence Study in publications related to the Zika outbreak

Scientific articles indexed in open databases, such as PubMed Central and SciELO, have their free access granted. These databases are considered Open Access repositories, in which the act of registration assumes an open license. For those who expect to make full use of the document (read, understand, reuse and redistribute) the right of access expressed by the license may be insufficient. Ideally the same right of access would be observed to the attachments, figures and tables, as well as in the cited and referenced documents. The document depends on objects (its internal components and external documents it cites), and these objects have their own licenses. For the user of the document, the licenses of the dependencies should not present additional restrictions to the use: this is the principle on which the proposed concept of OpenCoherence rests, that is, the coherence of the license of a document with the licenses of its dependencies. The project, initiated by members of Open Knowledge Brazil in 2015, will now have its continuity in the scope of Open Science, with metrics and obtaining indexes in scientific articles marked with JATS (XML format for Journal Article Tag Suite). In this approach, public health content related to the outbreak of the Zika virus is evaluated. **(abstract OA 3)**
Author keywords: Open Access Metrics; OpenCoherence; Citations

[RP] Research Systems Performance

Benedetto Lepori, Emanuela Reale and Andrea Orazio Spinello
Conceptualizing and Measuring Performance Orientation of Research Funding Systems

This paper develops and tests empirically a quantitative indicator of performance orientation of public research funding. Grounding on the literature on the allocation of public funding, we develop a coding scheme for the extent of performance orientation based on the categorization of the allocation mode and allocation criteria of each funding instrument. By using data on the repartition of funding by instrument collected in the PREF project, we are able to construct a synthetic indicator for the whole national funding system. Using PREF data, we test the indicator on a sample of 12 countries and we perform a set of robustness and sensitivity analyses. **(abstract RP1)**
Author keywords: Reseaerch funding; Performance orientation; Project funding

Robert Tijssen and Winnink Jos
Capturing R&D excellence: country-level performance indicators and international statistics

We define 'R&D excellence' in terms of scientific research contributing to 'high end' technology, where 'excellence' refers to the top segment of a statistical distribution based on internationally comparative performance scores. Our measurements are derived from frequency counts of literature references ('citations') between patents and research publications during the last 15 years. The 'D'-section in R&D is represented by 'excellent' citing patents are defined as those that were among the top 10% most highly cited by other patents. The 'R'-section are the peer-reviewed research articles in international scholarly journals that are cited by these 'top technology' patents.; After analyzing 4 351 180 citing patents and 13 742 865 cited research publications, we find very large differences between countries worldwide in terms of the volume of domestic science contributing to patented technologies worldwide. Where the USA produces the largest numbers of cited research publications, Switzerland and Israel outperform the US after correcting for the size of their national science systems.; Attempting to tease out the key 'enabling factors' that may affect these performance differentials, across a set of 20 advanced economies, we find that the volume of R&D expenditure correlates with the sheer size of cited publications, as does the degree of university research cooperation with

domestic firms. However, when broadening the comparative framework to 70 nations worldwide, and correcting for size of their national science systems, the availability of human resources and quality of universities become important explanatory factors.; Our R&D outputs oriented 'excellence' approach, with its focus on 'high end' science-based technology, provides added value to input-oriented analyses based almost entirely on R&D expenditure statistics. Our country-level findings are indicative of significant disparities between national R&D systems. However, meaningful in-depth interpretation of those findings requires further unfolding of our data, especially at the level of major 'R&D powerhouse' universities and industry-oriented research institutes. **(abstract RP2)**
Author keywords: Research and Development; R&D Excellence indicators; Breakthrough technologies; Scientometrics; Enabling factors

Gunnar Sivertsen
Problems and considerations in the design of bibliometric indicators for national performance based research funding systems

This paper presents an overview of the designs of bibliometric indicators for direct use in national performance based research funding systems (PRFS) in fourteen countries. The focus is on eight specific problems and considerations that are typically involved in such designs. An initial analysis demonstrates that PRFS need to be examined in their national contexts to understand their motivations and design, and that differences must be expected and respected. One of these differences is the main choice between using bibliometric indicators to inform panels or using them directly in the funding formula. Another difference is the emphasis given to either of the two main purposes of PRFS, research evaluation and funding allocation. The purpose of the paper is to enrich the increasing literature on possible adverse effects of bibliometrics in PRFS with insight into how the systems are motivated and designed in national contexts, and thereby to create an arena for mutual learning. The effects may also depend on the design. **(abstract RP3)**

Jesper W. Schneider, Kaare Aagaard, Martijn Visser and Thed van Leeuwen
Examining potential database effects in longitudinal country impact analyses using fixed journal sets

Longitudinal studies of research performance, for example of countries, using time series derived from citation databases seem straightforward but they pose an important methodological challenge seldom addressed. The citation databases are open systems where journals are included or excluded according to indexing priorities of the vendors. An open system entails that analysis of performance changes over time become very challenging as no proper baseline securing invariance is in place. Hence, developments such as growth rates become intermingled with database effects because of indexing policies. One solution to this challenge has been the used of fixed journal sets as baselines for analyses of research productivity. In recent years, the use of fixed journal sets have been few, but the present paper re-introduces the use of such sets albeit this time in the context of citation impact analyses. Often overlooked in longitudinal studies of impact development is the fact that the citation normalization factor in open citation databases is also conditioned on the developments in such databases and that such developments in principle can create an imperceptible inflation effect, where the relative citation score used to normalize the observed citation scores is driven downwards from year to year. A potential result with policy implications could be that the impact of some countries seem to go up, whereas in fact it is a database effect and thus is not related to potential policy initiatives as might be argued. The present short paper is the first in series of analyses that will scrutinize such potential database effects in longitudinal studies of citation impact. Our main aim is to substantiate recent findings of long-term stability between national impact rankings, as well as the diminishing gaps in impact values between many countries. Our primary questions is to what extent such developments are due to database effects. From a policy perspective, it is an important issue to clarify. **(abstract RP4)**
Author keywords: citation impact; time series analysis; fixed journal set; country analysis; methodology

Marco Alfò, Sergio Benedetto, Marco Malgarini and Scipione Sarlo
On the use of Bibliometric information for assessing articles quality: an analysis based on the third Italian research evaluation exercise

Peer review is usually considered the main method for assessing quality of scientific products; there is however growing evidence that the use of advanced bibliometric indicators measuring scientific impact can be a useful support. However, scientific impact is only one of the possible characterization of the concept of quality: hence, in this sense bibliometrics is just a partial measure of a concept that can be fully assessed only by the expert judgement of peers. But using only peer review in large research evaluation exercises may become very costly and almost unfeasible, paving the way to an extensive use of indicators to inform the judgement of peers. The degree according to which bibliometrics are good proxies for peer review, and the problem concerning which indicator or combination of indicators should be used, are greatly disputed issues. The aim of this paper is to shed some light on the matter, using a sample of articles, drawn from the third Italian research evaluation exercise, evaluated by both peer review and bibliometrics. In the following, we will first briefly describe the Italian evaluation exercise, and afterward present the dataset that will be used in the analysis. The relationship among peer review assessments and various bibliometric indicators is then thoroughly investigated by regression models. We conclude that the best proxy for peer evaluation seems to be obtained by combining information from citations and journal impact. **(abstract RP5)**

Janne Pölönen, Tim Engels, Raf Guns and Frederik Verleysen
Is my publication peer reviewed? A comparison of top-down and bottom-up identification of peer review in the framework of the Finnish and Flemish performance-based research funding systems

In performance-based research funding systems (PRFSs) evidence of peer review is typically considered a minimum requirement of included publications. Originating from the sciences, pre-publication peer review has become a widely accepted standard in publishing of new results, also in the social sciences and humanities (SSH). Because the notion of peer review remains challenging to SSH, it is not always crystal clear whether a publication channel applies peer review, or what kind, or whether a specific article, chapter or book has gone through pre-publication peer review.; In this contribution we analyse the occurrence of lack of clarity in terms of peer review status in the SSH (1) by comparing the classification as applying peer review or not applying peer review of journals in Finland and Flanders, (2) by contrasting bottom-up reporting of peer review of publications by authors versus top-down identification of peer review by panels responsible for producing authority lists of peer-reviewed publication channels, and (3) by studying co-publications (articles or books) one university has reported as peer-reviewed and another university as not peer-reviewed.; We hypothesize that diverging opinions regarding the peer review status of publications and publication channels will be more common for humanities disciplines than social sciences. The rationale is that it is more common for humanities researchers to communicate by means of the same publication channels with both an academic audience and a wider audience of intellectuals outside academia. Our results support this hypothesis, showing that discrepancies in identification of peer-reviewed outlets, as well as peer-reviewed publications, are more common in the humanities. **(abstract RP6)**
Author keywords: social sciences and humanities; peer-review; research publications; academic/scholarly journals; performance-based research funding systems; current research information systems

Vincent Antonio Traag and Ludo Waltman
Replacing peer review by metrics in the UK REF?

Several countries have national research assessment exercises that, among others, evaluate the research impact of research institutions and universities. A recurrent question regards the role of citation indicators in such exercises. Whereas some countries have adopted a system of citation driven performance based funding, other countries rely on peer review. In particular, the assessment exercise in the UK, known as the Research Excellence Framework (REF), relies (mostly) on peer review. The role of citation indicators in the REF was critically examined in the Metric Tide report. The report concluded that citation indicators can inform peer review but not replace it. The Metric Tide citation analysis was based on correlations at the publication level. We argue that correlations should be studied at the institutional level, rather than at the publication level. We find that correlations at the institutional level are significantly higher than at the publication level. For some fields, the correlations at the institutional level are quite strong, especially when compared with benchmark

values obtained from a bootstrap procedure. Our results imply that low correlations are no argument against the use of citation indicators in these fields. **(abstract RP7)**
Author keywords: UK REF; Citation indicators; Peer review results

[SSH] SSH session

Sándor Soós, Zsófia Vida and George Kampis
Mapping the scientific impact of European funded SSH projects

The main objective of the work reported in this paper was to outline and to test a system of indicators and measures that can be expected to represent the scientific impact of European funded SSH projects (under the 6th and 7th Framework Programme). The main challenge was to find a reasonable trade-off between policy-demands such as general and quick applicability, and the problems of the quantitative assessment of SSH research. In order to explore the practical value of our toolkit, we have undertaken an empirical study to address two (set of) research questions: (RQ1) Given the pool of European funded SSH projects, do these indicators signal different impact dimensions, as it was assumed in our proposal? If so, do empirical results support our proposed taxonomy, i.e. outline similar dimensions? (RQ2) Can the pool of European funded SSH projects can be characterized along these dimensions and indicators? Are there recognizable „impact profiles", that is, groups of projects sharing a similar composition of indicator values? **(abstract SSH 1)**
Author keywords: SSH; impact assessment; research projects; EU framework programmes

Linda Sile, Janne Pölönen, Gunnar Sivertsen, Raf Guns and Tim Engels
European databases and repositories for Social Sciences and Humanities research output: exploring comprehensiveness

One of the major challenges when attempting to acquire an accurate overview of research activities in SSH is the limited access to comprehensive data. The typical data sources such as the Web of Science and Scopus have limited coverage for SSH research output. It has been shown that in some disciplines the coverage can be as low as 2% (Law in Flanders, Belgium). To acquire a more accurate representation of SSH research, several countries have created national data infrastructures aimed at comprehensive coverage of national research output (e.g., CRIStiN in Norway, VABB-SHW in Flanders, Belgium, VIRTA in Finland). Such databases are rich sources for insights on national SSH research output, yet knowledge on the existing databases is limited.; To address this knowledge gap, in Autumn 2016 a study aimed to acquire an overview of existing national databases in Europe was launched within the framework of the COST action "European Network for Research Evaluation in the Social Sciences and Humanities". Surveying 39 countries, 24 databases were identified as national. However, the findings indicate that these databases vary greatly in terms of their comprehensiveness. On the basis of the acquired overview, the second stage of the study is being launched in Spring 2017 with a purpose to acquire more detailed information on the content and its comprehensiveness of the identified European national databases of research output in the SSH. Insights into the content and comprehensiveness of the explored European databases is the focus of this paper. **(abstract SSH 2)**
Author keywords: research output; databases; social sciences and humanities; comprehensiveness; Europe

Alberto Martín-Martín, Enrique Orduna-Malea and Emilio Delgado López-Cózar
Journal Scholar Metrics: building an Arts, Humanities and Social Sciences journal ranking with Google Scholar data

This paper describes the creation of "Journal Scholar Metrics" (JSM), a prototype web application that ranks journals in the areas of Arts, Humanities, and Social Sciences (AH&SS) on the basis of the citations their articles have received according to Google Scholar Metrics (GSM). To identify as many AH&SS journals as possible, a master list of 66,454 journals covered by various databases was developed. All AH&SS journals in that list were searched on GSM. Additionally, a series of keyword searches were carried out to identify journals covered by GSM which weren't present in the master list. A total of 9,188 AH&SS journals with names written in Latin characters were found in the 2015 edition of GSM (which displays data about articles published between 2010 and 2014). Besides the

journal-level indicators provided by GSM (H5-index and H5-median), several additional indicators were computed (H5-citations, H5-index and H5-citations without journal self-citations, and journal self-citation rate). Journals are displayed by subject categories and by country of publication. Quartiles were computed for each category, and journals in a category were further classified either as core (high affinity to the category) or related (partial affinity). A detail page for each journal is also available, displaying journal indicators, as well as a list of other databases were the journal is indexed. **(abstract SSH 3)**

Author keywords: Google Scholar; Journal Rankings; H index; Arts; Humanities; Social Sciences; Web application

[TRA] Transnational Research

Lili Wang, Xianwen Wang and Fredrik Piro

Scientific research and funding networks between China and the European Union

Using co-publication and funding data between China and the EU28, this study examines the effect of funding on co-publication and vice versa. Our datasets include publication and funding information extracted from Thomson Reuters Web of Science as well as The European Union's Seventh Framework Program for Innovation and Research (FP7) and the currently ongoing framework program Horizon 2020 (H2020), with funding data provided by the European Commission. Our results show that scientific collaborations between China and the EU28 have been mainly financially supported by Chinese agencies. In the process of collaborating with China, there is an obvious integration phenomenon in the European Union, in particular between the new EU members and those that joined the EU earlier. We also find that earlier scientific co-publications between countries have a significant and positive effect on writing joint proposals in FP7 and H2020. Our results show that FP7 or H2020 funding proposal collaborations, although unsuccessful in directly getting the EU funding – contributed significantly to later publications. **(abstract TR1)**

Author keywords: scientific collaboration; research funding; collaboration network; funding network; joint publications; funding proposals; the European Union

Zaida Chinchilla-Rodríguez, Lily Miao, Dakota Murray, Nicolas Robinson-García, Rodrigo Costas and Cassidy Sugimoto

A large-scale comparison of the position of countries in international collaboration and mobility according to their scientific capacities

This work presents a preliminary analysis of the relationship between collaboration and mobility indicators at the country level. The results show that there is a significant relation between the flow of mobile researchers and the capacity for publishing with foreign partners in the more prolific countries. The number of countries in collaboration and mobility is significantly related and it is expected that the increase (or decrease) of countries with co-affiliation will be proportional to that in the number in international collaboration.; Size matters and scientific relationship are highly resource-dependent. Less developed countries present the highest ratios of collaboration and as opposed to the most advanced ones. However, the advanced and proficient countries accumulated 87% of mobile authors and international publications with an extremely low representation of mobility in developing and lagging countries. In all cases, mobility is lower than collaboration. Advanced countries serve as the main partners, especially for proficient and developing countries, while the lagging countries tend to share mobile researchers among themselves.; In addition, the possibilities to reach foreigner partners depends on the capacities of countries. The distribution of the number of partners in collaboration and mobility is an important variable in determining the extent to which the internationalization process take place among a different set of countries or to reveal the gap between those countries that have a high presence in one dimension and low in the other one.; This empirical analysis is necessary to construct a more robust framework to better support the assessment of different scientific systems beyond generalist rankings. These indicators will be useful for science policy analysts and decision makers seeking to invest in programs that will foster mobility and international partnerships. **(abstract TR2)**

Author keywords: International collaboration; Mobility; Science policy

Emanuela Reale and Antonio Zinilli
Public funding of transnational research: evidences from network analysis

1. Aim of the paper; Transnational research activity is a key issue in the R&D policy at both national and supra-national level. Different mechanisms and logics for integration drive the decisions of funders to mobilize resources for carrying our research programs that go beyond those funded by the European Framework Programs.; In this paper we want to investigate the linkages of ministries and funding agencies of European countries in transnational EU research programs, and how the decisions of creating the mentioned linkages change over the years. Thus the research questions are: what factors influence the policy decisions to participating through funding mobilization to transnational research programs? How the decisions change over time? **(abstract TR3)**
Author keywords: transnational research; ERA-Net; network analysis; public R&D funding

Koen Jonkers, Peter Fako, Lorenzo Isella, Thomas Zacharewicz, Ulf Sandstrom and Peter Van den Besselaar
A comparative analysis of the publication behaviour of MSCA fellows

The Marie Sklodowska Curie Action (MSCA) fellowship scheme aims, as a part of the European framework programmes, to promote scientific excellence, mobility and research collaboration in the European Research Area. As most elements on the EU Framework Programmes, it also aims to widen capacity development throughout the EU in Member States with different levels of scientific development. This paper analyses the mobility, publication and international copublication behaviour of a group of European researchers that have taken part in the Marie Sklodowska Curie Action (MSCA) Fellowship schemes. It compares researchers from two groups of countries before and after being granted the fellowship.; The first group of countries (FPIC) receives a relatively large share of their research funding budget from the European Framework Programmes and a relatively low share from the European Structural and Investment Funds. The second group of countries (ESIFIC) presents a lower Framework Programme funding intensity but the Funding intensity of the European Structural and Investment funds is higher. The funding intensity levels associated with these broad programmes are taken as an indication of the level of scientific development. It strongly correlates with the average impact of the publications made by researchers in these countries.; The analysis finds that successful applicants from the ESIFIC countries do indeed perform significantly below the applicants from FPIC countries at the time of selection on the impact of their research, measured as the sum of the citation impact of their publications per year. We do not observe a convergence between the impact of publications from researchers from ESIFIC and FPIC countries: a significant difference remains in terms of their citation impact. Post grant publication performance is correlated especially to pre-grant performance.; The paper first provides the policy context and embeds the work in the broader scientific literature on scientific mobility, collaboration and research performance. It proceeds by outlining the methodological approach taken to address the research questions. The results section discusses the outcome of the author level analyses. In the discussion the identified performance increase of MSCA fellows is compared with the pre- and post-grant performance of grantees in other individual based grant schemes. The concluding section summarizes the findings and discusses potential policy implications. **(abstract TR4)**
Author keywords: scientific mobility; research evaluation; marie sklodowska curie action; EU Framework Programme; citation impact; widening

[UNI] Higher Education in Europe

Barbara Antonioli Mantegazzini and Benedetto Lepori
Funding of European Higher Education Institutions: a cross-country and longitudinal perspective

In the background of the changes in the model for allocation of funding for Higher Education Institutions (HEIs) in European countries, this paper aims at investigating empirically to which extent these policy reforms translated into changes in how HEIs are funded. We consider in this respect three dimensions: (1) the level of concentration of funding, (2) differences in funding per student and (3) differences in the composition of funding, distinguishing between core budget, third-party funds and

student fees. We look to differences in this respect between countries and type of HEIs (universities vs. colleges, respectively public vs. private HEIs), as well as to changes over time for the period 2008 to 2014. We build on a newly matched dataset between the European Tertiary Education Register (ETER), for the years 2011-2014, and the EUMIDA dataset referring to the year 2008. This paper therefore represents the first empirical investigation of HEI's funding patterns over a large number of countries and with a longitudinal perspective. **(abstract UNI1)**
Author keywords: Higher education funding; New Public Management; Performance-based allocation

Daniele Checchi, Irene Mazzotta and Sandro Momigliano
Research assessment in Italy: have the results of universities converged?

Two research assessments with an impact on university funding took place in Italy, covering the periods 2004-10 and 2011-14. After adjusting the grading in order to increase comparability across the two exercises, we show that university grades exhibit a significant degree of convergence. We also find that convergence is largely due to changes in the relative productivity of researchers who participated to both exercises and to the hiring decisions of universities. The speed of convergence falls instead when we include the changes due to researchers' retirement (an event which is almost entirely determined by age). These results suggest that convergence may reflect changes in the behaviour of individuals and institutions induced by the monetary and reputation incentives created by the national research assessment. **(abstract UNI2)**
Author keywords: research assessment; university; performance based funding; Italy

Barbara Heller-Schuh, Martina Dünser and Benedetto Lepori
Concentration processes and its effects on research performance: Evidence from European public sector research organisations

While the literature on firm mergers and acquisitions and their effects on innovative performance and R&D activity is quite extensive (see, e.g., the recent review on research on postmerger integration in Graebner et al., 2017), systematic approaches to analyse rationales and outcomes of mergers of Public-Sector Research Organizations (PSRO) are still scarce (exceptions are Cai et al., 2016; Estermann & Bennetot Pruvot, 2015; Hidalgo-Hidalgo & Valera, 2016; Pinheiro, Geschwind & Aarrevaara, 2016a; Pinheiro, Geschwind & Aarrevaara, 2016c). Similar to their firm-equivalent, motivations for PSRO mergers and take-overs are manifold, such as improving the quality of research and teaching activities, the realisation of economic gains, consolidation of the national research system or strengthening the institutional position in relation to funders and project partners. Rather than the growth of the organisation, increased attractiveness for potential staff and students, research activities and scientific output as well as enhanced international visibility are of major importance when it comes to evaluating the performance and the competitiveness of public-sector research. However, the link between mergers and take-overs and subsequent research activities is not straightforward. On the one hand, research activities after a merger may, for instance, increase due to the more efficient use of funding through economies of scale; on the other hand, they also may decrease after the merger due to the elimination of duplicated programmes, especially if the involved institutions are similar with respect to their profiles.; The objective of this study is to analyse the effects of concentration processes in public sector research organisations (PSRO) on their research activities. By concentration processes we refer to mergers, defined as the fusion of two or more institutions of similar or different size and type to create a new legal entity, and take-overs, where the entity taken-over is absorbed by an existing entity. We provide quantitative evidence on the extent of merger processes by mobilizing a unique database covering a large number of European countries developed in the RISIS project. Further, we pursue a systematic comparison of research activities before and after the event of merger or take-over on different levels of aggregation (by event, country and type of organisation) and link it to country- and event-specific aims and rationales of concentration processes. Research activity is measured by the number of participations in European Framework Programmes (EU FP), but will be extended in the future to other measures like publication performance. **(abstract UNI 3)**
Author keywords: Public sector research organisations; Higher education; Merger; European Framework Programmes; Research performance

[POSTERS] List of Posters

Ricardo Barros Sampaio, Ara Anderson, Ed Noyons and Wagner De Jesus Martins
Biomedical Research Laboratories Classification based on Scientific Publications: A case study of Instituto Oswaldo Cruz
Scientific research in recent years has evolved to a more transdisciplinary approach, where expertise from different areas are necessary to solve difficult problems and in shorter periods of time. On the area of biomedical research concepts such as translational medicine has become a common topic with journals focusing on this particular subject and articles explaining the implementation process for such a complex issue. However, in practice, the ability to easy collaboration amongst researchers from different subareas of biomedical research or even classify their work, is a hard task. The research developed by the authors looked at a large biomedical research institution with 72 laboratories and 456 researchers' affiliated to them and, based on their publications for the past years, has proposed different classifications using three techniques common to scientific research. Although, publications are not the only product developed by this research institution, which has technical schools, specializations and post grad schools besides a great number of doctorates and pos-doctorates, we have focused on publications to build an argument on how to explore new possibilities for future arrangements. The result, based on the current organization of the laboratories by their areas of research and affinity and the results of collaboration network clustering, classification of research areas and co-word analysis based on Medical Subject Headings (MeSH), were analyzed and regrouped, using an unsupervised statistical learning technique for classification. **(Pos02)**

Jaco Blanckenberg and Charl Swart
Investigating whether the year of first publication can be used to determine the age or PhD age for African scholars
In this paper we aim to test the validity of employing academic age (time from the year of first publication to present) as a proxy for age and PhD age of scholars in the African context. We rely on data collected from a survey conducted amongst African scholars as well as bibliometric data from the Web of Science and Scopus. We find that academic age is not a good proxy for the age and PhD age of individual scholars. Academic age can however be used as a proxy for average PhD age. **(Pos03)**

Ulrike Busolt, Sandra Klatt and Wiebke Kronsbein
Project GEDII - Gender Diversity Impact – State of research
The impact of gender diversity on research productivity, quality and innovation is very unevenly evidenced. Using innovative methods for the analysis of the diversity-research productivity relationship, GEDII will develop a reliable diversity measure that is sensitive to power, status and information sharing differentials within teams and across public & private organizations. This Gender-Diversity-Index (GDI) will thus provide a much more nuanced and realistic measure of the impact of gender diversity on research productivity, quality and innovation across countries and sectors. By combining disparate conceptual approaches to gender diversity with an innovative assessment tool, GEDII will for the first time provide clear and comprehensive evidence for the link between gender diversity and research performance and enable research policy- and decision-makers to significantly enhance the capacity of European research. **(Pos04)**

Cláudia Daniele de Souza, Daniela De Filippo and Elias Sanz Casado
The role of collaboration in the Brazilian scientific production
Collaboration is an essential aspect of scientific research and in the specific case of Brazil has experienced a large increase in the last decades. Assuming that public and institutional policies implemented by the Brazilian government to promote internationalization have benefited the impact and visibility of Brazilian scientific production, this paper aims to analyze the role of scientific collaboration and its possible influence on scientific publications during the years 2000-2015. Multidisciplinary database Web of Science (WoS) was used as sources of information. Among the main results was the important increment of the number of papers, the percentage of each type of collaboration, the index of co-authorship, the number of citations by documents and the percentage of publications by quartiles. The year 2012 seems to be a turning point in Brazilian scientific

collaboration: was determined by an increase in joint publications, a large number of authors by publications, a higher average impact and the improvement in the quality of journals. It concludes that it may be indicating a positive impact of the establishment of various national government funding strategies to increase international scientific collaboration. **(Pos05)**

Ekaterina Dyachenko, Alena Nefedova and Ekaterina Streltsova
Foreign researchers in Russia: the perspective of hiring institutions
Russia remains one of the countries with the low level of incoming scientific mobility. In 2015 only about a quarter of public research organizations hired foreing researchers. The practice of hiring foreign researchers is unevenly distributed in the field of academic organizations. In our study, we want to look "from within" at how the policy measures and tools developed to attract foreign scientists work in Russian organizations. We were interested in identifying systemic biases in the accessibility of these measures and tools to organizations as well as barriers to attracting foreign researchers. The study is based on the interviews with senior academic administrators. We interviewed administrators in more than hundred research organizations which let us analyze a wide variety of attitudes to hiring foreign researchers. Among other things we found that many administrators do not want to hire foreigners, that sometimes they have false beliefs, and that money is not the only important factor. **(Pos06)**

Antonio Eleazar Serrano-López and Daniela De Filippo
Do scientifically relevant subjects arouse general interest? Bibliometric and altmetric analysis of green and sustainable science and technology output
This paper analyses a new subject category, Green and Sustainable Science and Technology, established in the 2015 edition of Journal Citation Reports. Assuming that the creation of a new WoS category attests to scientific interest (expressed as an increase in output and impact), the aim here was to verify whether that interest has had any social impact. A bibliometric and altmetric analysis was conducted of output in the field. Two-thirds of the 53 606 papers found in the new WoS category through 2016 were published in 2012 or later. These papers were multi-assigned to a number of subject categories, most prominently: Energy Fuels; Environmental Science; Engineering, Environmental; and Chemistry, Multidisciplinary. The altmetric indicators showed that 21.03 % of the papers released in the last 5 years (7921 of 37 027) were mentioned in social networks, primarily Twitter, Facebook and Post. A similar percentage, 18.33 %, of the papers was read on Mendeley, CiteULike or Connotea and a positive correlation was found between the numbers of readers and citations. **(Pos07)**

Daphne Getz, Eran Leck, Vered Gilad, Bahina Eidelman and Oshrat Katz Shacham
Obstacles in Nanotechnology Transfer from the Academy to the Industry in Israel
Over the past decade, the Israeli Government has invested over 160 million dollars in the nanotechnology domain. This investment includes the establishment of six nano centers in Israel's research universities, purchase of advanced equipment and machinery, absorbing first class scientists in the academy, financing nano research and promoting cooperation between various actors via joint projects. Despite the clear potential of the nano domain, evidence suggests that the Israeli nano industry is far from realizing its full potential. This is mainly due to considerable difficulties in technology transfer from the academy to the industry. This serious obstacle hinders the successful commercialization and implementation of promising technologies developed by the academy in the industry, thus impeding the growth of the entire nano industry in Israel. This research employs a wide range of methods to evaluate and the main challenges and problems in the transfer of nano technologies from the academy to the industry. These include mapping relevant research outputs (e.g. publications, patents etc.) to better understand the potential of the nano domain in Israel; structured interviews with policymakers in the academy, government and the Israeli nano-industry and an opinion survey targeting stakeholders from the academy and nano industry. The outputs of the research include a series of recommendations aimed at proposing possible solutions to improve the technology transfer from the academy to the industry.

Juan Gorraiz, Steve Reding, Johannes Sorz and Christian Gumpenberger
On the reception of the new metrics in the Social Sciences and Humanities: a case study for the University of Vienna
This paper offers an overview and the results of a survey concerned with the reception of new metrics in the Social Sciences and Humanities (SSH), which was conducted at the University of Vienna in 2016. This survey was addressed to the scientific staff in all the SSH faculties at University of Vienna and the participants were consulted regarding their habits and their opinions concerning the use of new metrics for the assessment of research outputs, their opportunities and limitations. The enquiry conducted in this context primarily served to survey the various publication cultures and different reactions in the SSH. Taking the existing disciplinary diversity into account the insights serve to improve the required infrastructure and offered services in accordance with the needs expressed by the respondents. A general trend we observed is that researchers in more advanced stages of their careers tend to be more skeptical regarding the suitability of metrics in the assessment of scientific output. Researchers in the SSH, working in well-established academic and epistemic traditions, have firm – even if often tacit – concepts and perceptions of research quality assessment, building on the quality of the scientific argument presented, overall longitudinal assessment of individual achievement and on reputation/authority in the field. Thus the development of new indicators and evaluation methods for the SSH has to go hand with the different publication and epistemic cultures. **(Pos09)**

Yasushi Hara
SPIAS - SciREX Policymaking Intelligent Assistant System
How innovation emerged from the science? What is the role of the scientist, inventor, and entrepreneur during R&D Process from the fundamental scientific discoveries to marketization? Current innovation studies mainly focus on firm's entrepreneurial behavior and/or technological circumstances to analyze the emerging process of innovative product, but still a very few article tackle on the issue how these innovative products created by scientific discoveries, its feasibility via bibliographic data, and the role of public policy during this time-absorbing process. I will aim to figure out socio-economic dynamics of innovation process in a nutshell. To solve this puzzle, my research will focus on following three major issues; (1) Create the ECOSYSTEM (Target of Research): Expanding and Using digitalized big-data analyzing system for micro-data innovation study; (2) Making the ROAD (Target of Field): Knowledge flow analysis in Pharmaceutical Industry and star scientist analysis in ICT Industry; (3) Building the BRIDGE (Target of Implication) : Under (1) and (2), evaluating Science, Technology and Innovation Public Policy in Japan. To analyze the knowledge flow between science and innovation in one single window to understand socio-economic dynamics of science, technology and innovation, our team have built SPIAS (SciREX Policymaking Intelligent Assistance System, http://spias.grips.ac.jp, password restriction; ID: scirex, PASSWORD: A4Fr3k8ZLxMrJZvR), which is joint work with Japan Science and Technology Agency(JST), National Institute of Science and Technology Policy (NISTEP), and Research Institute of Economy, Trade and Industry (RIETI), and private companies. In this system, it visualizes the relationship between scientific categories by means unique national language processing algorism such as fastText (Bojannowski et al. 2016) and MeCab: Yet Another Part-of-Speech and Morphological Analyzer. And., it indicates the detailed information of competitive fund in Japan such as KAKEN (Grants-in-Aid for Scientific Research), JST, and NEDO (New Energy and Industrial Technology Development Organization). In addition to, this data platform not only involves scientific paper and patents based on J-global (by JST) database, but also includes product information such as Press Release data by NIKKEI, Inc. and aim to implement Product Database. One of main limitation of SPIAS is that covering database is mainly focus on scientific activities in Japan. To realize entire sketch of innovation activities in continuous changes of scientific trajectory, it is mandatory to append international data of patent, paper, product to make any comparative study in industry, or nation level. Hence, I aim to append international scientific paper and patent data such as PATSTAT by EPO throughout this research. Throughout the study, as public policy implication, I will evaluate Science, Technology, and Innovation Policy change in Japan especially from 1990s to 2010s by means of data-driven approach and interview-based qualitative approach. And I aim to suggest that (a.) Incorporation process of National University in 2003 by National University Corporation Act (Act No. 112) has

structural impact in the relationship of knowledge creation and transfer process in the ecosystem of science and innovation, (b.) Inflexibility of Governance system of funding; under SPIAS and corresponding dataset in RISIS and star scientist analysis, mission-oriented funding determines the technological trajectory.

Richard Heidler, William Dinkel and Anke Reinhardt
Broadening the reviewer pool of the German Research Foundation: Drivers, effects and perspectives
Today, the scientific system uses peer review extensively as an assessment and decision-making instrument. This leads to a perceived burden (and therefore fears of negative effects) on the science system itself and on the individual reviewers. So far, very little is known about the characteristics of this increasing demand and even less about its consequences for decision-making processes that rely on peer review. Our contribution will provide empirical insights into the characteristics of the German Research Foundation's (DFG) review system and reviewers. Based on a dataset of the DFG's proposals and reviews, we develop a set of indicators to measure the peer review load both at the individual and at the systems level. **(Pos11)**

Julia Heuritsch and Sarah De Rijcke
Insights into the effects of indicators on knowledge production in astronomy
This paper addresses the relationship between the research behaviour of astronomers and how their science is being evaluated. It has been argued that quantifying research output has particular 'constitutive effects' in leading to a gap between what is being highlighted in evaluations and other aspects of what researchers consider as valuable elements in producing high-quality content. This paper sheds light on how astronomers define high-quality research and how they think that creating knowledge of value is actually encouraged or hampered by evaluation processes. In the framework of an explorative pilot-project for a PhD study, nine interviews were conducted with astronomers from Leiden University, and a document analysis was performed on relevant institutional (self-) evaluation documents, annual reports, and CVs of the interviewees. The aim of this study is to contribute to a better understanding of to what extent indicators shape the conduct of research in astronomy. Putting these findings in relation with how astronomers define quality subsequently prepares the conceptual groundwork for further empirical research and for policy advice for bridging a potential 'evaluation gap'. **(Pos12)**

Zhigang Hu, Gege Lin, Taian Sun and Xianwen Wang
An EU without the UK: research collaborations between the UK and the EU27
The Brexit is expected to exert a measure of influence over the UK, as well as the current 27 EU Member States. In this paper, we provide a basic description about the affection of the Brexit. Our concerning focuses on which countries and in which research fields would be mostly affected. To answer these questions, we listed the primary collaborations involved the UK and identified their mainly collaborative research subjects. Further, to estimate the influence on the Brexit, we examined how the UK exists inside the original 28 EU nations, by visualizing its position in the collaboration networks and the research subject map. **(Pos13)**

Ying Huang, Lin Zhang and Alan Porter
The effects of various similarity measurement approaches on interdisciplinary indicators
Various indicators have been proposed to measure the degree of interdisciplinarity of various research elements (e.g. papers, journals, researchers, collections of researchers or institutes, and fields), and these indicators may produce conflicting results when they use different measures for interdisciplinarity. More and more scholars reach a consensus that interdisciplinarity, as the diversity of disciplines involved in research, has three distinct components: the number of disciplines cited (variety), the distribution of citations among disciplines (balance), and, crucially, how similar or dissimilar these categories are (disparity). Different dissimilarity or similarity metrics may result in divergent interdisciplinarity degree results. However, to what extent the similarity measuring approaches may affect the interdisciplinarity indicators is seldom discussed in the literature. In this

paper, we address the above research question from four perspectives, respectively, comparisons among (1) various subject classification schemes; (2) variant citation matrixes; (3) different time windows; and (4) discrepant analysis objects. The initial results show that: First, using a finer classification system with more subject categories increases the possibility that one cites sources from different subject categories; Second, on the basis of Salton's cosine normalization, the interdisciplinary values obtained by different settings are highly correlated to each other, especially in terms of different citation similarity matrices (cited, citing and cross-citation) and in general, with different time window; Third, results based on an aggregated dataset tend to overly expands the 'interdisciplinarity' degree of multidisciplinary journals, and the average interdisciplinarity score of individual publications can better describe the interdisciplinarity of the corresponding journals. **(Pos14)**

Najko Jahn, Wolfram Horstmann and Birgit Schmidt
Do jointly appointed researchers attribute their university affiliation? A case study from the University of Göttingen
Institutions face several challenges around tracking their researchers' publication output and related impact. In this research in progress paper, we focus on multiple affiliations by one individual, an indicator of inter-institutional research collaboration. We present the preliminary results of an institutional case study from the University of Göttingen which assessed how jointly appointed researchers acknowledged their university affiliation. Based on these findings we discuss how institutional affiliation policies can promote good practices around these institutional information needs. **(Pos15)**

Benedetto Lepori and Philippe Larédo
Mapping Knowledge Dynamics in the European Research Area. The KNOWMAK project (poster submission)
The KNOWMAK project aims to develop a web-based tool providing interactive visualisations and state-of-the-art indicators for the understanding of knowledge co-creation in the European research area. Datasets containing information about projects, publications and patents are enhanced with semantic information enabling indicators to be generated, that are used to inform users about the state of art in the research area and new trends. Existing research databases are enhanced by the use of ontologies which map between topics, data, and user queries, so that information can be enhanced, interlinked and aggregated. **(Pos16)**

Alberto Martín-Martín, Enrique Orduna-Malea and Emilio Delgado López-Cózar
Scholar Mirrors: Integrating evidence of impact from multiple sources into one platform to expedite researcher evaluation
This paper describes the creation of "Scholar Mirrors", a prototype web application that aims to provide a quick but accurate representation of the situation of a scientific discipline by integrating data from multiple online platforms. We chose the discipline of Bibliometrics / Scientometrics as a case study. After carrying out a series of keywords searches in Google Scholar Citations (GSC) and Google Scholar (GS), 813 relevant researchers were identified. Researchers were further classified as core (those who work mainly on Scientometrics) or related (those who work in other disciplines, with occasional incursions into Scientometrics). Additional information about these researchers was collected from other platforms (ResearcherID, ResearchGate, Mendeley, and Twitter). Up to 28 author-level indicators were collected about each researcher, as well as data about up to 100 of the most cited documents displayed in their GSC profile. The document-level data from all GSC profiles, as well as the data extracted from the keyword searchers in GS, was aggregated to create a list of the top 1000 most cited documents in the discipline. This document collection was further processed to generate a list of the most influential journals and publishers in the discipline. The results are accessible from the "Scholar Mirrors" website, which presents the results in four sections: authors, documents, journals, and book publishers. Lastly, the paper presents the main features of the web application, and the main limitations and future challenges of the product. **(Pos18)**

Gabriela Michelini and Angela Corengia

Work in progress: The diffusion of science policies and the interaction of actors in the adoption of Argentina's national innovation system

The adoption of national innovation systems (NIS) has been a trend in Latin America during the last decade, introducing organisational structures and institutional relations from a systemic perspective. This paper presents the preliminary results of a research that aims to observe the internal associativity among the different actors involved in the national innovation system described by the plan "Argentina Innovadora 2020" and their role on the adoption of science and innovation policies. At the core of this national plan is a relational definition of innovation that has left to the national state the role of obtaining the internal associativity among the actors of the NIS. This research addresses the interplay of actors in the adoption of the policies and their role in the networking of the system to discuss relation of policy-making and practices of innovation. The research design is based on multiple case studies. The analysis unfolds in two specific dimensions: a) the adoption of science policies and the building of NIS; b) the profile of the actors involved and their relations.; By considering the actors' perspective, this project introduces new elements to approach empirically the diffusion of science policies in developing countries. The focus on actors, their perspectives and relationships, prompts the analysis of the role of international players in the adoption of innovation policies at the national level. The assessment of the relation between the systemic organization and the sectorial dynamics is expected to provide more insight into the complex linkages between actors, their identities, and interest perceptions over technology and innovation-based goods production and, thus, inform both policy-making and further research on regional indicators of innovation. **(Pos19)**

Marianne Noel and Frédérique Bordignon

The pitfalls of signature. Questionning affilation in French research and higher education institutions

With the emergence of the citation cycle, scientific activities have entered an accountability regime (Wouters, 1999). Publications in prestigious journals account for the activities of labs and departments, contribute to their higher visibility and allow them to access funding (sometimes through a performance-based system), are used to attract attention and students to the laboratory (Rushforth & de Rijcke, 2015). In this context, affiliation is a topic (or a variable) of growing interest in science policy, as illustrated by the occurrence of the term (more than 70 times) in the proceedings of the STI conference in 2016. It is mainly addressed in technical terms (for instance how to clean addresses) but not only. With the development of social media, being easily identified and recognizable is nowadays an important issue for individuals in academia. It's also a challenge for institutions. Affiliation reflects multiple socialities; it can mean joining or being part of a group, even sometimes excluding oneself from this group. Scientific activities take place in multiple collectives arranged around instruments, projects, domains or specialties, funding schemes... with professionals belonging to various organizations, institutions, etc. As emphasized by Pontille (2004), the history of the scientific signature is closely tied to how research is organized in a field. Signature is also a sign that should be understood inside a larger agency connected to the genesis of acts, their making and their archives (Fraenkel, 2008). In universities, various services are in charge of analysing and managing research outputs to inform institutions' strategy: library, office of research, knowledge transfer structures, etc. In this study, we focus on how doing bibliometrics affect their role in the larger framework of the university organization. Job profiles in libraries are moving towards "data librarian" profiles because of the need of technical skills to retrieve information from databases, particularly for bibliometric analyses (Astrom & Hansson, 2013). In this paper, we propose to investigate the relation between information professionals and high-level management as revealing tensions (between monitoring and building fiability). Adopting a data infrastructure perspective, we wouldlike to question the intersection between collection, classification and evaluation practices. The goal of the paper is also to share information about the situation in France. For 10 years, the continuous creation of new funding schemes and structures has led to a landscape where research organizations and universities overlap largely. The French research and innovation system is often characterized as a "millefeuilles", a pastry with multi-layered structure. Recommendations on affiliations have been issued at the national level (Dassa et al, 2015), but they are considered as an unrealistic ideal. Our case study deals with a

prestigious school of engineering setup in a large university campus. We will present the context and stages of development of a tracking tool that includes 1/ the tagging of the multiple versions of the lab's name (up to 1200 versions were found in the study period) and 2/ an attempt to identify articles containing the school's name in the main databases (WoS, Scopus and HAL), a work that has been developed in interaction with the main commercial providers. We will describe actors being pulled back and forth between conflicting and non-coordinated demands and emphasize intended effects of these tagging/tracking activities. At least, this work aims to examine the lessons derived from the development of multiple affiliations as a possible consequence of growing interdisciplinarity and question the pertinent scale of analysis. Would the solution be, as suggested by ORCID, an Organization ID? **(Pos20)**

Asako Okamura
Measurement of cultural and social relevance of science: construction of indicators for the relationship between STI and society
In today's fast-paced world, science, technology and innovation (STI) impacts all areas of life, at both the individual and organizational levels. The degree of acceptance and absorption capacity of STI varies for different people and organizations, both within countries and at a cross-cultural level. Given its impacts on individual and collective values, choices, and behaviours, it is clear that there is a need for a deeper understanding of the cultural and social aspects of STI. In order to do so, we must first measure these concepts and acquire meaningful indicators to inform society and policy-making practices. This study in progress proposes a design for creating such indicators. Since 2016, the SciREX Center's "Science and Technology Innovation and Society Measurement" project has attempted to identify indicators that can be used to describe a desirable relationship between STI and society. Such indicators can be used to encourage behavioural changes of individual actors so that they build a more desire relationship between science and society. As a step towards that end, we held several workshops to develop a plan for creating those indicators. This proposal introduces the process of that discussion. **(Pos21)**

Asako Okamura, Shinano Hayashi, Hitoshi Koshiba, Hiroki Tanaka and Yui Nishimura
Identifying core questions for STI studies: An exploratory international comparison of syllabi
It has been six years since the launching of Japan's Science for RE-designing Science, Technology and Innovation Policy (SciREX) program. Thus, we believe that now is an opportune time to take stock of not only the Japanese program, but also leading science of science policy programs in other nations. This study applied a quantitative approach to examine the distribution of science, technology, and innovation (STI) research programs and agendas, which is not the traditional approach to conducting an overview of preceding studies. This study focused on analysing frequent topics on the syllabi of various STI educational programs. Meanwhile, the SciREX program in Japan held discussions at multiple workshops with STI stakeholders in 2016 to share common key terminologies and science questions, which consist of key chapters in core parts of curricula used in six participating Japanese universities. Both activities (quantitative analysis of syllabi and developing core curricula) aim to identify research agendas that respond to societal needs and changes. At the initial stage of this research, our study focused on the analysis of contents of STI education programs in various institutions, since it is necessary to design the educational programs to meet current political needs, as well as to connect future policymaking with research through curriculum design. Two analytical approaches were applied in this study: 1) a qualitative approach to science questions and curricula using a consensus-building process in workshops and interviews, and 2) a quantitative approach to syllabi analysis using the correspondence method and the topic model text mining technique. The former approach focused on STI communities such as policymakers and researchers in Japan, while the latter approach targeted six Japanese university programs and six international programs. This research in progress paper recognizes that it is necessary to examine the relationship between educational programs and outcomes such as the social impact of graduates. However, more time is required for observation and use of sophisticated analytical methods. In the meantime, it is important to analyse the connection between the distribution of educational focuses in programs and

stakeholders' interests in pursuing evidence-based policymaking in science, technology, and innovation. **(Pos22)**

Jinseo Park, Soohong Eum, Jimin Byeon and Kyoutae Kim
The Comparison of Election Promises in Science and Technology using Co-word Mapping
In this study we explore the co-word mapping to analyse election promises in science and technology. With co-word mapping we can detect which issues are main topics in S&T campaign promises and how the S&T campaign promises are different from each party. We confirmed that the overlay mapping is useful to compare the position of each party on overall keyword map. This study shows that South Korea's S&T-related election promise focused mainly on S&T as a source of economic growth or industrial competitiveness and these election promises are distant from the demands of S&T academy or union. **(Pos23)**

Espen Solberg and Marco Capasso
Measuring the green transition: A quantitative study of the shifting balance between R&D for fossil vs. renewable energy in Norway
It is widely recognised that international climate agreements require a radical transition from fossil based energy to renewable energy sources. This is also the case for Norway, where current policies aim for a "smooth transition" combining continued exploitation of oil and gas resources with a parallel development of renewable energy. In this paper, we use a special module of the Norwegian R&D survey to shed light on patterns of change in the balance between petroleum oriented R&D and R&D directed towards renewable energy. Our preliminary findings show firstly that petroleum oriented R&D maintains a strong position in Norway, within industry and at technical research institutes. Secondly, we find so far few signs of a radical "greening" of R&D activities, neither in terms of total R&D expenditure nor on the level of industry sectors. In our ongoing analysis, we go from this macro level to study internal reallocations of R&D occurring within firms. A core question is whether a smooth transition towards renewables derive from a diffused process, where all firms gradually shift their focus toward renewables, or if instead only specific firms, already focused on renewables, increase their research efforts?

Lili Wang and Shan Jiang
Mapping the development trajectory of 3D printing technologies
NO ABSTRACT **(Pos25)**

Sanaa Zebakh, Rigas Arvanitis, Hicham Boutracheh and Mohamed Sadiki
Trends in the Moroccan agricultural research: an exploratory bibliometric analysis (2005-2015)
The objective of the study is to analyze the agricultural research publications in Morocco during 2005-2016 period based on the SCOPUS database. In Morocco, The national higher education and research system has been evolving rapidly during the last decade with new actors, a series of new policies and research funding programs, as well as a profound change in the overall economic and political context of the country. In the agricultural sector, since 2008, policy has relied on a national strategy for sustainable development, called the "Moroccan Green Plan". The final objective of this work will be to identify the thematic orientations and the effects of this policy on both the scientific production as well as the agricultural production. It will contrast the research realized in the public agricultural research institutions of the country with the research done in the universities, as well as work done with national and international collaborations. This first study examines the growth of publications and citations, the collaboration patterns through co-authorship, and the thematic orientations through an original classification convenient for to the agricultural field. This work should be also a pilot study for both policy makers and researchers and engineers in the country in order to devise indicators that focus on orientations, strengths and Weaknesses of the research system.;

Keywords : agriculture research, publication productivity, research policy, R&D trend, bibliometric study, research governance, agronomy, veterinary sciences , agriculture-multidisciplinary. **(Pos26)**

Zhao Qu

Technological innovation in Electromobility: A focus on applicants and inventors

Over the last two decades, Electromobility (e-mobility) has gained significant popularity as a favourable approach to circumvent problems related to both resources and pollution whilst meeting mobility demands. Germany and China have respectively set themselves the goal of becoming the lead market for e-mobility by 2020 following concrete implementation strategies on a national level, receiving a good deal of attention from scholars. Owing to the complexity of the content covered by e-mobility, the existing patent research primarily centres on a statistical analysis with differences in criteria, in particular identifying the origin of innovation. In retrospect, we have drawn a blank in comparative patent study from a broad cross section of applicants or inventors. This paper refines indicators to measure and compare innovation in e-mobility-related technologies from perspectives of applicants and inventors, allowing us to base analyses on a unique and integrated patent dataset reconstructed upon Cooperative Patent Classification (CPC). We partition applicants manually and then cross reference the data of applicants with their technological classifications, co-patents, co-inventions and market coverage, aiming at comparing the development, collaboration and diffusion of technologies between countries. German players show a larger share of e-mobility innovations, from a technological as well as a sector-specific point of view. China relatively retains strong momentum in patent grants and emerging technologies, with the former findings indicating that both countries still have more spaces on the issue of e-mobility to move up. **(Pos27)**

Zhu Yingchun and Chen Yu

Research on Evaluation of National Innovation Capacity

Based on the data from 2013 - 2014, 30 indicators were used to evaluate the innovation capacity of 40 countries from five aspects: innovation resources, knowledge creation, enterprise innovation, innovation performance and innovation environment. The results show that, according to the score of innovation capacity, the 40 selected countries can be divided into three groups. The first group is the top 15 countries in rankings, mainly western developed countries, which are generally recognized as innovation-oriented countries. The second group is countries ranking from the 16th to the 30th, including some developed countries and a few emerging countries, among which have intense competitions and the third group is countries ranking from 31st to the 40th, mostly developing countries. A country's innovation capacity is closely related to its stage of economic development. There is a remarkable positive correlation between score of innovation capacity and GDP per capita, countries with a higher GDP per capita tend to have a higher score of innovation capacity. The United States, Japan and European countries remained unshakable status as global innovation leaders. 10 emerging economies in this study are ranking in lower positions in the third group, except that China outstood in the 18th place, holding a lead position among countries in the second group. Hungary＆Turkey hold the last two spots in the second group. China's GDP per capita reached USD 7,590, only higher than India and South Africa among the 40 countries. However, China's innovation capacity score was close to European countries with a GDP per capita of approximately USD 50,000. In other words, China's innovation capacity had surpassed other countries at a comparative level of economic development. **(Pos28)**

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