

Bibliometric analysis of publications authored by research groups in forestry, wood and paper science: a case study of Slovenia

Maja Peteh^{1*}, Polona Vilar², Tomaž Bartol³ and Primož Južnič²

¹Forestry Library - University of Ljubljana, Biotechnical Faculty, Department of Forestry and Renewable Forest Resources & Slovenian Forestry Institute, Večna pot 2 and 83, 1000 Ljubljana, Slovenia,

²University of Ljubljana, Faculty of Arts, Department of Library and Information Science and Book Studies, Aškerčeva 2, 1000 Ljubljana, Slovenia, ³University of Ljubljana, Biotechnical Faculty, Department of Agronomy, Jamnikarjeva 101, 1000 Ljubljana, Slovenia

*correspondence: maja.peteh@gozdis.si, polona.vilar@ff.uni-lj.si, primoz.juznic@ff.uni-lj.si, tomaz.bartol@bf.uni-lj.si

Highlights: We present a bibliometric analysis of all publications by Slovenian researchers in forestry, wood and paper science during the period 2005-2013. The relative proportions of different publication types (academic, non-academic, grey literature) are presented, also according to country of publication and year. The differences in publication activity among researchers are presented.

Keywords: Slovenia, forestry, wood technology, paper technology, publishing, bibliometric analysis, language of publication

Introduction

Bibliometric analyses are usually applied to journals and conference materials derived from specialized international databases, such as Web of Science, Medline or Scopus, and consequently describe only academic articles. Other published work, such as for example non-academic materials and publications of general interest, is not assessed.

The Slovenian Current Research Information System (SICRIS, (<http://www.sicris.si/>)) was launched in 1998 (Pečlin et al., 2012). It contains data from all researchers registered at the Slovenian Research Agency (ARRS). The system is unified, transparent, and systematic. It is a part of the Co-operative Online Bibliographic System & Services (COBISS, <http://www.cobiss.si/>). The database consists of different types of published material (academic, professional/technical/trade, grey literature, non-academic articles (of general interest), book chapters, conference proceedings, and other categories of publicly available works of researchers; see http://home.izum.si/COBISS/bibliografije/Tipologija_eng.pdf for details). Works are included in SICRIS on a researcher's personal initiative. Bibliographic data are catalogued by professional librarians and monitored by specialized national information centres in each scientific discipline. The SICRIS database is used for the assessment of research project proposals "with a combination of scientometric indicators and a sound international peer review with minimized conflict of interest" (Južnič et al., 2010). SICRIS is also linked to the Web of Science and Scopus for the assessment of research activities and includes the journals' impact factors and tracks the number of citations.

In terms of forest cover (58%), Slovenia ranks third in the EU. Activities related to wood value chains (such as forest management, sorting, logistics, sawing techniques and wood processing, and usually overlooked forestry research) are therefore considered of great national importance, and forest itself is regarded as natural heritage. In Slovenia, with 2 million inhabitants and its own language, 129 researchers were active in the fields of forestry, wood technology and paper technology during 2014.

Scientific research in Slovenia is financed, for the most part, by the Slovenian Research Agency (ARRS), which classifies forestry, wood technology and paper technology within the broader field of biotechnical (agricultural) sciences. Recently, very few funds have been available in Slovenia for the purposes of domestic (national) research in forestry and related areas. Thus, there is a need to acquire funds in the broader European scope. The content of current research thus usually meets the needs of the funding body, which does not necessarily correspond to the needs of primary users in Slovenia, for example those involved in work with Slovenian forests (forestry) and the timber industry (Kraigher, Humar, Peteh, & Simončič, 2015).

Methods and sample

This study evaluates publicly available bibliographic data available in SICRIS, which is used in the evaluation of researchers' scientific, professional and academic work and related activities.

We analyzed data for 169 active researchers registered at ARRS, in the fields of forestry, wood and paper technology. In total 67.7% of researchers are active in the field of forestry, 25.6% in the field of wood science and 8.3% in the field of paper science. 57.3% researchers possessed a PhD. Average duration of a researcher's activity was 9.27 years.

Evaluation of published materials

8,472 published works (different document types) were included in the analysis (Figure 1). The productivity is 5.6 works per researcher per year, but in the case of academic articles the average is 0.8, and in the case of conference materials 1.8.

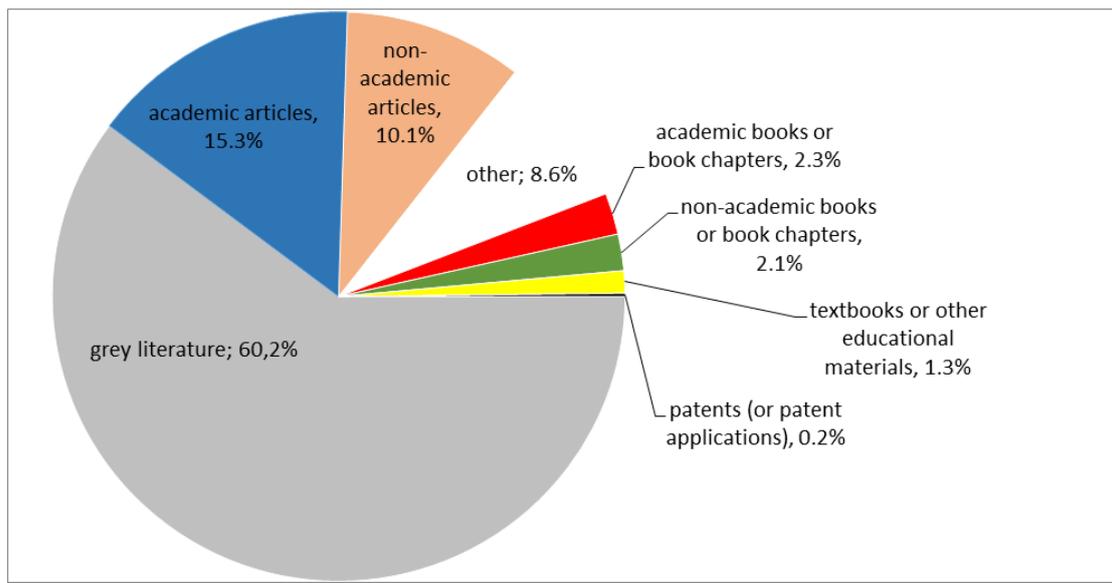


Figure 1: Published works by Slovenian researchers in the fields of forestry, wood technology and paper technology (n=8,472) in the period 2005-2013, by general categories of the national bibliographic system (source: COBISS).

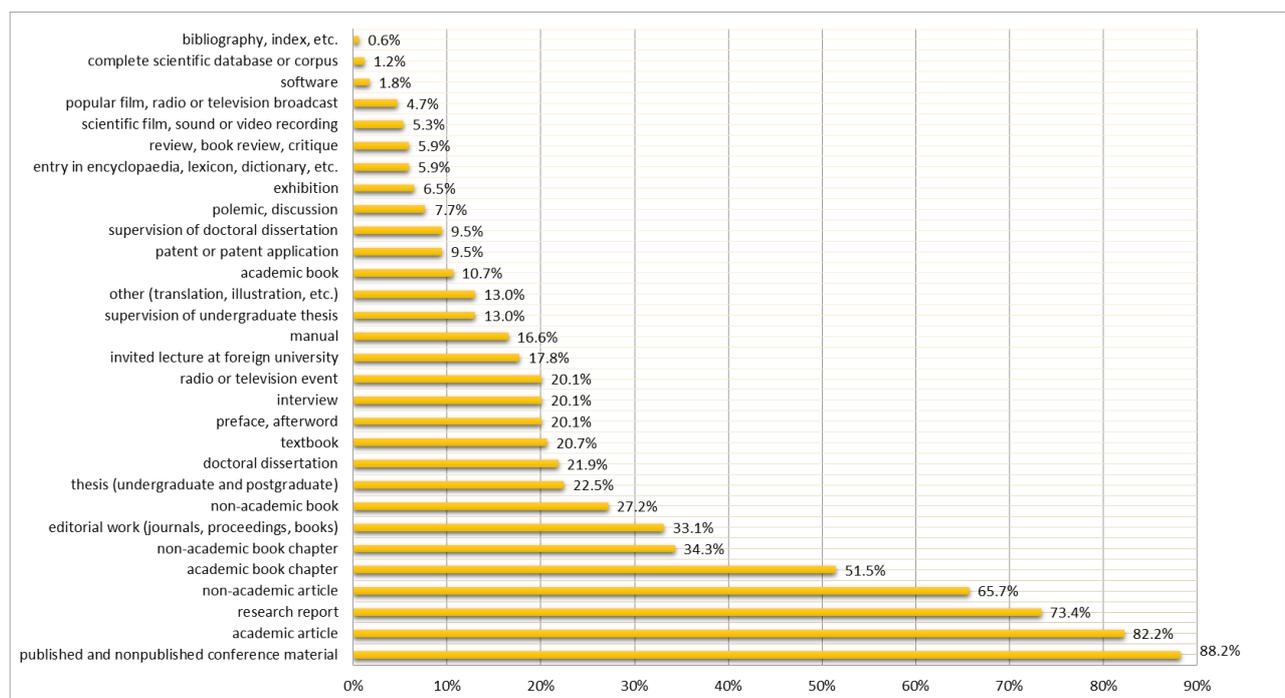


Figure 2: Participation of 169 researchers in different types of publications (and related activities), in the fields of forestry, wood technology and paper technology (n=8,472) in the period 2005-2013 (source: COBISS).

A further analysis focused on different types of publications (Figure 2). Not all researchers publish works in all categories. For example, only 65% of researcher had published academic articles in the period surveyed.

70% of all documents were published in Slovenia, mostly in the Slovenian language. However, 58% of academic articles and 52% of conference contributions were published internationally, as well as 37% of academic book chapters and 17% of non-academic book chapters.

Discussion

In this paper we addressed two issues: first, the amount of published material, outside the scholarly journal and peer review system, and second, the amount, type and language of material published both in Slovenia and internationally.

Publishing in international scholarly journals is considered a principal element of a researcher's work and is usually the only production used for evaluation purposes. However, significant effort is devoted to preparing other types of publications that reflect the researcher's experience and which are as valuable, both in science as well as practice. In forestry, non-academic publications as well as grey literature represent a large proportion of published material. In Slovenia this is due to SICRIS, where all that material is catalogued and used for evaluation purposes. Forestry grey literature includes a large amount of different graduation thesis where different areas have been researched and they provide interesting data from the past. Since forest conditions must be monitored over a longer period in time, efforts must be made to provide those steady and stable data.

There is an increasing demand by different stakeholders for the dissemination of research outputs to other professional and nonprofessional publics, also via social networks and news media. But non-academic types of publications, especially those published for a wider audience and for small language groups, are not playing a role in research evaluation, even though on the other hand they are important for how the public accepts investment in R&D and improving the wood value chain.

References

- Južnič, P., Pečlin, S., Žaucer, M., Mandelj, T., Pušnik, M., & Demšar, F. (2010). Scientometric indicators: peer-review, bibliometric methods and conflict of interests. *Scientometrics* 85: 429-441. <http://dx.doi.org/10.1007/s11192-010-0230-8>.
- Kraigher, H., Humar, M., Peteh, M., & Simončič, P. (2015). Znanost in znanje o gozdu, gozdarstvu in lesarstvu = Science and knowledge of forests, forestry and woodworking. In: Zupančič M.(ed.) *Gozd in les: Slovenski gozd za Slovenijo = Forest and wood: Slovenian forest for Slovenia* (pp. 10-18). Ljubljana, Gozdarski inštitut Slovenije, Založba Silva Slovenica. p. 10-18. <http://eprints.gozdis.si/id/eprint/1254>.
- Pečlin, S., Južnič, P., Blagus, R., Sajko, M. Č., & Stare, J. (2012). Effects of international collaboration and status of journal on impact of papers. *Scientometrics*, 93: 937-948. <http://dx.doi.org/10.1007/s11192-012-0768-8>.

Acknowledgements: This article is a result of doctoral research, in part financed by the European Union, European Social Fund and the Republic of Slovenia, Ministry for Education, Science and Sport in the framework of the Operational programme for human resources development for the period 2007 – 2013. It was co-financed by the Slovenian Research Agency (ARRS) through the project Evaluation of the research groups in the field of agriculture, forestry, fisheries and food industry in Slovenia and in comparable countries (V5-1425 (B)), and by the EUFORINNO project (RegPot No. 315982).