



Faculteit Sociale Wetenschappen

Expertisecentrum voor Onderzoek en Ontwikkelingsmonitoring (ECOOM)

**Scientific communication in the social sciences and humanities: Analysis of publication and collaboration patterns in Flanders**

**Wetenschappelijke communicatie in de sociale en humane wetenschappen: Analyse van publicatie- en samenwerkingspatronen in Vlaanderen**

Proefschrift voorgelegd tot het behalen van de graad van doctor in de informatie- en bibliotheekwetenschap aan de Universiteit Antwerpen te verdedigen door

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Antwerpen, 2016

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*“Take data seriously, but not too seriously”*

quote inspired by Henry small, quoted by Robert K. Merton and Eugene Garfield  
in Little Science, big science.. and beyond of Derek J. de Solla Price, 1986; p.ix

*“A room full of data is a quiet place”*

Kagan, 2009; p217

*Variety is not merely the spice but the very essence of scholarly life”*

Becher & Trowler, 2001, p.194



## Acknowledgements

*“Gratitude makes sense of our past, brings peace for today, and creates a vision for tomorrow.”*

Melody Beattie

During the five years of working on my PhD, numerous of people helped me in my work and life, both intentionally and unintentionally. Therefore, the list of people I would like to thank is probably endless, though I would like to give explicit thanks to:

- ❖ to Tim, my main supervisor, for time, guidance and patience.
- ❖ to Raf, for encouragement and recommendations
- ❖ to Ronald and Dimitri, for useful reflections
- ❖ to Gunnar, Mike and Diana, for kindness and international guidance
- ❖ to Rudi, Nele, Saskia, and all others involved, for constructing the VABB-SHW
- ❖ to H el ene, Robin and Lynn, for gathering data in dusty libraries
- ❖ to Cassidy and Hanna-Mari, for giving an example
- ❖ to all ADOC-colleagues, for connecting and giving feedback on presentations
- ❖ to Birgit and Marianne, for listening, extraordinary words and wine
- ❖ to Eric, for listening and caring
- ❖ to my conference friends, for inspiration, motivation, dancing and running
- ❖ to my improvisation theatre friends, for laughing, crying and living out of the box
- ❖ to my Karavaan & traveling friends, for providing dreams and exploring the world
- ❖ to my other friends, for seeing the twinkles and showing the light
- ❖ to Kathleen and Isabel, for providing perspective and solid ground
- ❖ to my family, for trust and hugs
- ❖ to my mama, for helping me grow
- ❖ to Merlijn, for living in the moment
- ❖ to Frederik, for support, love and so much more



## English abstract

This doctoral thesis presents research findings on scholarly publication and collaboration patterns in the social sciences and humanities, in Flanders, Belgium. It focusses on evolutions, policy effects, collaboration measurements and edited books and provides evidence-based results using the Flemish Academic Bibliographic Database of the social sciences and humanities (VABB-SHW). The thesis contributes to the literature on these aspects which so far have been lacking these types of analyses.

Over the course of the last few decades, bibliometric research has put more focus on analyzing publication patterns of the social sciences and humanities (SSH) and their constituent disciplinary groups. This takes place against the backdrop of a stronger interest in valorization of scholarly research and the installment in several European countries of performance-based research funding systems for the universities, as well as the creation of corresponding data instruments. In Flanders, this instrument is the VABB-SHW database, the primary information source for our analysis.

A first part of the research results presented in this thesis makes a contribution to a broad and comparative analytical overview of publication patterns in the social sciences and humanities. For Flanders, we have shown how the publication output of SSH researchers has steadily grown over the last decade. There exists a wide variation in publication patterns between the social sciences and the humanities, as well as between individual SSH disciplines. Differences pertain to publication type (including the distinction between peer reviewed publications indexed in the Web of Science versus those that are not), publication languages in relation to the local and the international audience for scholarly publications, and the degree of research collaboration measured through co-authorship. By means of a contrastive analysis – a comparison with publication data from CRISTin in Norway – , we have shown how Flemish scholars show a stronger inclination towards publishing in Web of Science (WoS)-indexed outlets than do their Norwegian counterparts. We discuss this finding in the light of variations in the two countries' funding systems and the ensuing incentive structures for publishing scholarly work.

Though the above framework is part of a significant expansion of scientific understanding, in Flanders and elsewhere, of scholarly publication patterns, vast knowledge areas within this field remain unexplored. One subfield deserving of additional research effort is that of bibliometric studies of research collaboration. From a comparative perspective, the present thesis shows how, internationally, Flanders has a relatively high degree of research collaboration in the SSH, notwithstanding substantial disciplinary variations. This thesis also demonstrates the impossibility of a reliable assessment for most SSH disciplines of co-authorship based solely on data obtained from a citation index such as the WoS, with its notoriously insufficient coverage of many social science and especially humanities disciplines and bias towards English language publications. There is a significant overestimation of co-authorship rate in WoS-only data, when compared to the comprehensive, also non-WoS output of researchers registered in a national/regional database like the VABB-SHW. A second contribution of this thesis to SSH collaboration studies is the incorporation of new data sources and methods in bibliometric collaboration studies. We have shown how the edited book has been a neglected form of research collaboration, both between co-editors, as

well as between the edited book's editor(s) and the authors of the chapters contained therein. Including the editors and the editor-author-relation, changes the popular image of the lone humanities researcher.

To conclude, this thesis has formulated a number of recommendations both with regard to Flemish science policy, as well as pertaining to the further development of the data instrument at hand, the VABB-SHW, for the future analysis and/or assessment of SSH publication output. The three central recommendations are:

- to continuously monitor science in order to adjust research policy on all levels to the ever changing science process.
- to benchmark the VABB-SHW internationally and link the data with other national and international databases.
- to measure research collaboration with attention to the specific different characteristics of the fields, disciplines and research at hand.

## Nederlandstalige abstract

Het onderzoek opgenomen in dit doctoraatsproefschrift betreft publicatie- en samenwerkingspatronen in de sociale en humane wetenschappen in Vlaanderen, en focust hierbij op beleidseffecten, het meten van samenwerking en het publicatietype geëdite boeken. Aan de hand van empirische analyses van het Vlaams Academisch Bibliografisch Bestand voor de Sociale en Humane Wetenschappen (VABB-SHW) geeft dit proefschrift nieuwe inzichten weer omtrent wetenschappelijke communicatie in de sociale en humane wetenschappen (SHW).

Bibliometrisch onderzoek heeft zich de afgelopen decennia steeds meer gefocust op publicatiepatronen in SHW en hun respectieve disciplines. Deze evolutie gaat hand in hand met een groeiende interesse voor maatschappelijke impact en valorisatie van wetenschappelijk onderzoek en het installeren in verschillende Europese landen van prestatiegerelateerde financieringsmechanismen voor de universiteiten. Dit laatste gaat vaak gepaard met de opbouw van specifieke databanken, zoals het VABB-SHW in Vlaanderen. Het VABB-SHW bevat naast WoS-geïndexeerde artikelen en proceedings ook andere gepeerreviewde artikelen, proceedings en boekpublicaties, geselecteerd door het Gezaghebbende Panel.

Een eerste deel van de onderzoeksresultaten uiteengezet in dit proefschrift draagt bij tot een breed en vergelijkend analytisch overzicht van publicatiepatronen in SHW. Niet alleen werd vastgesteld dat de publicatieoutput in Vlaanderen het afgelopen decennium voortdurend bleef stijgen, eveneens is gebleken dat publicatiepatronen sterk verschillend zijn tussen de sociale en de humane wetenschappen en hun respectieve disciplines. Het onderzoek toont verschillen aan tussen deze disciplines op het vlak van het publicatietype (inclusief het onderscheid tussen gepeerreviewde publicaties wel en niet geïndexeerd in Web of Science (WoS)), publicatietaal (in relatie tot een lokaal of internationaal publiek) en de graad van samenwerking gemeten door middel van coauteurschappen. Aan de hand van een vergelijkende studie met de Noorse databank CRISTin wordt aangetoond dat Vlaamse onderzoekers een sterkere voorkeur hebben voor publiceren in WoS-geïndexeerde tijdschriften dan hun Noorse collega's, terwijl de toenemende voorkeur voor Engelstalige publicaties in beide landen gelijkaardig blijkt. Deze bevindingen worden besproken in het licht van verschillen op het vlak van financieringsmechanismen en de daaruit voortvloeiende incentives voor het wetenschappelijke publiceren.

Hoewel het bovengenoemde kader deel uitmaakt van een significante uitbreiding van internationale wetenschappelijke kennis omtrent wetenschappelijke publicatiepatronen in SHW, blijven brede kennisdomeinen binnen dit veld onvoldoende geëxploreerd. Een subdomein dat bijkomende onderzoeks aandacht verdient, is dat van bibliometrische studies naar wetenschappelijke samenwerking in onderzoek. Vanuit een internationaal vergelijkend oogpunt, toont het onderzoek in dit proefschrift aan dat de sociale en humane wetenschappen in Vlaanderen een relatief hoge graad van samenwerking vertonen, niettegenstaande het bestaan van substantiële verschillen tussen disciplines. Het proefschrift toont de onmogelijkheid aan van een betrouwbare analyse voor de meeste disciplines in SHW op basis van louter gegevens verkregen uit WoS, een publicatie- en citatiedatabank met duidelijk onvoldoende dekking van veel disciplines in de sociale en voornamelijk de humane wetenschappen, en een uitgesproken relatieve oververtegenwoordiging van Engelstalige publicaties. Wanneer data uit WoS

vergeleken worden met deze uit een omvattende databank zoals het VABB-SHW, blijkt er een significante overschatting te zijn van de frequentie van coauteurschappen in de data die uit WoS komen. Een tweede bijdrage van dit proefschrift aan de internationale literatuur omtrent samenwerking in de SHW is de inclusie van nieuwe databronnen en methoden, met name geëdite boeken. Het onderzoek toont aan hoe samenwerking binnen geëdite boeken tot uiting komt in de samenwerking tussen de editors, de samenwerking tussen de hoofdstukauteurs onderling en de samenwerking tussen de editors en de hoofdstukauteurs. Door elk van deze aspecten van samenwerking in beschouwing te nemen, kon de populaire voorstelling van de 'solitaire humane wetenschapper' aanzienlijk worden bijgesteld.

Als besluit formuleert dit proefschrift een reeks van aanbevelingen, zowel voor het Vlaamse onderzoeksbeleid als voor toekomstig onderzoek, evenals voor het VABB-SHW, omtrent toekomstige analyses en evaluaties van publicatieoutput in de sociale en humane wetenschappen. Drie belangrijke aanbevelingen zijn:

- Inzichten verkregen door het continue monitoren van wetenschappelijke activiteit moeten worden gebruikt om het onderzoeksbeleid op alle niveaus aan te passen aan het altijd veranderende wetenschappelijke proces.
- Het VABB-SHW dient internationaal gebenchmarkt te worden, alsook gelinkt met andere nationale en internationale databanken.
- Onderzoekssamenwerking dient gemeten te worden met aandacht voor de specificiteit van de wetenschapsgebieden, disciplines en het desbetreffende onderzoek.

## Contents

Acknowledgements.....	5
English abstract.....	7
Nederlandstalige abstract.....	9
Contents.....	11
List of figures.....	15
List of tables.....	18
1 Introduction.....	21
1.1 Main objectives and research questions.....	21
1.2 Overview of the chapters.....	24
1.3 Notes.....	26
PART I: Literature study.....	27
2 Contextualizing science.....	27
2.1 Science and scientific communication.....	27
2.2 Science policy.....	29
2.2.1 Recent evolution.....	29
2.2.2 Characteristics and recent development of the Flemish performance-based research funding model.....	30
2.3 Measuring science with bibliometric indicators.....	33
2.3.1 Scientometrics.....	33
2.3.2 Performance-based research funding systems.....	35
3 Disciplinary cultures and their publication patterns.....	37
3.1 Disciplines and academic cultures.....	37
3.1.1 Defining disciplines.....	38
3.1.2 Analysing disciplinary cultures.....	39
3.2 Factors influencing disciplinary differences.....	40
3.2.1 Personal factors.....	41
3.2.2 Environmental factors.....	44
3.2.3 Epistemological factors.....	45
3.3 Publication patterns in the SSH.....	49
3.3.1 Audience.....	50

3.3.2	Publication type .....	52
3.3.3	Publication language .....	56
4	Research collaboration .....	59
4.1	Definition of research collaboration .....	59
4.2	Importance of research collaboration .....	59
4.3	Factors influencing research collaboration.....	61
4.4	Measuring research collaboration through co-authorship.....	64
4.5	International collaboration .....	66
4.6	Collaboration in the SSH .....	68
PART II: Empirical study .....		70
5	Research data and methodologies .....	70
5.1	The VABB-SHW.....	70
5.2	CRISTin database .....	73
5.3	Edited books.....	74
5.4	Processing and completion of the data .....	75
5.5	Analysis of the data.....	77
6	Overview of the results.....	83
6.1	Publication patterns.....	83
6.2	Collaboration practices .....	90
6.3	Edited books.....	96
6.4	Limitations and challenges.....	99
7	Conclusion.....	102
7.1	Summary of the main results.....	102
7.2	Recommendations .....	104
7.2.1	Policy recommendations.....	104
7.2.2	Possible improvements of the database.....	112
7.2.3	Suggestions for future research .....	114
8	Full text of included publications.....	123
8.1	Changing publication patterns in the social sciences and humanities, 2000-2009 (Scientometrics, 2012).....	124
8.2	Bibliometric analysis of research in the social sciences and humanities at the Flemish universities, based on the Flemish Academic Bibliographic	

Database for the social sciences and humanities (VABB-SHW) (Vlaams Indicatorenboek, 2013; translated in English) .....	147
8.3 The representation of the social sciences and humanities in the Web of Science. A comparison of publication patterns and incentive structures in Flanders and Norway (2005-9) (Research Evaluation, 2012).....	160
8.4 Patterns of co-authorship in journal articles in the SSH (2000-2010) (STI-proceedings, 2012) .....	178
8.5 Co-authorship of journal articles and book chapters in the SSH (2000-2010) (JASIST, 2014) .....	189
8.6 Edited books in the social sciences and humanities: Characteristics and collaboration analysis (Scientometrics, 2015) .....	211
8.7 What's special about book editors? A bibliometric comparison of book editors and other Flemish researchers in the social sciences and humanities. (ISSI-proceedings 2015) .....	230
8.8 Book editors in the social sciences and humanities: an analysis of publication and collaboration patterns of established researchers in Flanders (Learned Publishing, 2015) .....	238
REFERENCES .....	263
APPENDIX .....	280
A. List of scientific communication .....	280
A.1. List of presentations .....	280
A.2. List of original articles .....	281
A.3. List of proceedings papers .....	282
A.4. List of Posters.....	282
A.5. List of report chapters.....	282
B. Additional Tables and Figures .....	284
B.1. Share of female and male researchers in the SSH disciplines in the VABB-SHW .....	284
B.2. Classification of disciplines .....	286
B.3. Growth in weighted publication counts .....	287
B.4. Share of different languages for VABB-GP and VABB-WoS (2000-2011) .....	287
B.5. Share of English per publication type (2000-2012).....	288
B.6. Selection of book publications in 2010.....	289
B.7. Collaboration in monographs .....	289

B.8. Disciplinary dissemination patterns in the SSH disciplines: concentration in journals in the VABB-SHW (2000-2011).....	290
B.9. Inequality in number of publications (2000-2011) .....	296
POSTFACE.....	299

## List of figures

<b>Figure 1:</b> Total number of scientific journals and abstract journals founded, as a function of date, starting in 1665 with the first scientific journal .....	28
<b>Figure 2:</b> Growth of number of researchers in Flanders over 30 years.....	28
<b>Figure 3:</b> Evolution (2000-2016) of the weight in terms of percentage of the different components of the BOF-key .....	32
<b>Figure 4:</b> Relationships between the Library & Information fields of infor-/biblio-/sciento-/metrics. Sizes of the overlapping ellipses are made for sake of clarity only.....	34
<b>Figure 5:</b> Factors influencing disciplinary differences .....	41
<b>Figure 6:</b> Share of male and female researchers according to academic career stage in 2013 in Flanders .....	42
<b>Figure 7:</b> Share of female researchers in Flanders in 2012 .....	43
<b>Figure 8:</b> Share of articles GP, articles WoS, book publications (monographs, edited books and book chapters) and proceedings papers in the VABB-SHW (2000-2011) .....	50
<b>Figure 9:</b> Share of peer reviewed publications in English, Dutch and other languages per publication type for the humanities and the social sciences in Flanders (2000-2011).....	57
<b>Figure 10:</b> Number of publications per type included in the first version of the VABB-SHW (VABB-GP and VABB-WoS) (2000-2009).....	129
<b>Figure 11:</b> Proportions of VABB-GP and VABB-WoS publications in the VABB-SHW by discipline (2000-2009).....	133
<b>Figure 12:</b> Number of VABB-SHW (VABB-GP and VABB-WoS) publications per two year period. The VABB-WoS publications are further subdivided into articles that appeared in journals that have been indexed in the WoS throughout 2000-2009 (VABB-WoS continuous) and articles that appeared in proceedings or journals that have not been indexed in the WoS throughout the whole period 2000-2009 (VABB-WoS other).....	135
<b>Figure 13:</b> Evolution of the use of English, Dutch and other publication languages within the VABB-SHW (VABB-GP and VABB-WoS) for the period 2000-2009. ....	138
<b>Figure 14:</b> Percentages of publications in English, Dutch and other languages by discipline (2000-2009).....	140
<b>Figure 15:</b> Evolution of the publication type shares in the VABB-SHW (VABB-GP and VABB-WoS) for the humanities and the social sciences (2000-2009). ....	142
<b>Figure 16:</b> Percentages of publication types (journal articles and books, i.e. monographs, edited books, book chapters) by discipline (2000-2009).....	143

<b>Figure 17:</b> Nature and type of the publications included in the VABB-SHW (VABB-GP and VABB-WoS; 2000-2011). .....	148
<b>Figure 18:</b> Number of VABB-SHW (VABB-GP and VABB-WoS) publications by year (2000-2011). .....	152
<b>Figure 19:</b> Evolution of the use of English, Dutch and other publication languages within the VABB-SHW (VABB-GP and VABB-WoS) (2000-2011). .....	154
<b>Figure 20:</b> Percentages of publications in English, Dutch and other languages by discipline (VABB-GP and VABB-WoS; 2000-2011). .....	156
<b>Figure 21:</b> Trends in use of English and WoS coverage for Flanders (F) and Norway (N) (2005-2009)....	172
<b>Figure 22:</b> Proportion of multi-author articles in VABB-SHW, by social sciences and humanities (2000-2010).....	181
<b>Figure 23:</b> Proportion of multi-author articles included in VABB-WoS and VABB-GP, by discipline.....	182
<b>Figure 24:</b> Proportion of international and Flemish domestic multi-author articles, by social sciences and humanities (2000-2010).....	184
<b>Figure 25:</b> Proportion of co-authored publications, of co-authored WoS-indexed articles (@WoS), of co-authored GP-approved articles (@GP), and of co-authored GP-approved book chapters (BC GP), by Social Sciences and Humanities (2000-2010).....	195
<b>Figure 26:</b> Grouping of humanities publications per number of authors (2000-2005 and 2006-2010)....	196
<b>Figure 27:</b> Grouping of social sciences publications per number of authors (2000-2005 and 2006-2010).....	197
<b>Figure 28:</b> Proportion of classes of publications per number of authors – per discipline (2000-2005 and 2006-2010).....	204
<b>Figure 29:</b> Aspects of collaboration in edited books .....	214
<b>Figure 30:</b> Share of edited books (n=753) per publisher (2000-2011). .....	218
<b>Figure 31:</b> Number and share of edited books in the humanities and in the social sciences with or without an introduction and/or conclusion.....	220
<b>Figure 32:</b> Per discipline the Revised Collaborative Coefficient (RCC) based on authors of articles in VABB-SHW on the Y-axis and the RCC based on authors of the book chapters (BC) and the RCC of the editors of the edited books (EB) on the X-axis. ....	223
<b>Figure 33:</b> Share of edited books per number of editors per book for the Social Sciences and for the Humanities.....	224
<b>Figure 34:</b> Share and number of established and non-established, male and female editors and non-editors (2000-2011). .....	233
<b>Figure 35:</b> The proportion of collaborative and solo publications for all editors and non-editors by publication type (2000-2011). .....	235

<b>Figure 36:</b> Number and share of established and non-established editors and non-editors in the humanities and the social sciences (Flanders, 2000-2011). .....	243
<b>Figure 37:</b> Average number of articles, book chapters, edited books, monographs and proceedings papers per established editor and established non-editor for both the humanities and the social sciences (Flanders; 2000-2011). .....	245
<b>Figure 38:</b> Degree of collaboration (DC) and Degree of international collaboration (DIC) of articles, book chapters, edited books, monographs and proceedings papers; for established editors and established non-editors in the humanities and the social sciences (2000-2011).....	247
<b>Figure 39:</b> Share of editors collaborating with co-editors and book chapter authors before, i.e. old collaboration, and after, i.e. new collaboration, the publication of the edited book in 2005 or 2006. ....	249
<b>Figure 40:</b> Share of female and male researchers affiliated with one of the 5 Flemish universities, per discipline included in the VABB-SHW (2000-2011). ....	284
<b>Figure 41:</b> Share of main languages for VABB-GP and VABB-WoS (2000-2011). ....	287
<b>Figure 42:</b> Selection of book publications in 2010.....	289
<b>Figure 43:</b> Share of monographs per number of authors (VABB-SHW; 2000-2011) .....	289
<b>Figure 44:</b> Share of articles with top 10 journals within SSH disciplines (VABB-SHW; 2000-2011). .....	295
<b>Figure 45:</b> Lorenz-curve for both the humanities and the social sciences for the periods 2000-2001 and 2010-2011. ....	298
<b>Figure 46:</b> The circle of human knowledge.....	299

## List of tables

<b>Table 1:</b> Overview of some general internal continuous dimensions of the social sciences and humanities compared to the natural and biomedical sciences .	47
<b>Table 2:</b> Number of publications included in the VABB-SHW (VABB-GP and VABB-WoS) by discipline and by publication type (2000-2009).	132
<b>Table 3:</b> Growth rates of the VABB-SHW (VABB-GP and VABB-WoS) per two year period and by discipline as compared to the number of publications per discipline in 2000-2001 (2000-2009).	136
<b>Table 4:</b> Evolution of the use of English as a publication language within the VABB-GP and the VABB-WoS (2000-2009).	139
<b>Table 5:</b> Number of publications included in the VABB-SHW (VABB-GP and VABB-WoS) by discipline and by publication type (2000-2011).	150
<b>Table 6:</b> Weighted VABB-SHW (VABB-GP and VABB-WoS) publication counts and growth percentages by discipline (2000-2011).	153
<b>Table 7:</b> Evolution of the use of English as publication language within the VABB-GP and VABB-WoS (2000-2011).	155
<b>Table 8:</b> Evolution of the publication type shares in the VABB-SHW (VABB-GP and VABB-WoS; 2000-2011).	157
<b>Table 9:</b> Number of fractional articles, WoS coverage and local language publishing for Flanders (F) and Norway (N), 2005-2009.	166
<b>Table 10:</b> WoS-included journals with strong local ties, i.e. with 50% or more articles carrying an address of Belgium and/or the Netherlands; or Norway, Denmark and/or Sweden (2005-2009).	168
<b>Table 11:</b> Evolution of WoS coverage of SSH articles for both Flanders and Norway (numbers and percentages of fractional articles; 2005-2009).	169
<b>Table 12:</b> Evolution of publishing in English (number and percentages of fractional articles) for both Flanders and Norway (2005-2009).	171
<b>Table 13:</b> Average number of authors per article (Collaboration Index, CI) and Revised Collaborative Coefficient (RCC), by discipline (2000-2010).	183
<b>Table 14:</b> International fraction in multi-author articles, by discipline (2000-2010).	185
<b>Table 15:</b> Number of journal articles (@) and book chapters (BC) per discipline for VABB-WoS and VABB-GP (2000-2005 and 2006-2010).	192

<b>Table 16:</b> Collaborative Index (CI) and Revised Collaborative Coefficient (RCC) for WoS-indexed articles, GP-approved articles and GP-approved book chapters (2000-2005 and 2006-2010). .....	200
<b>Table 17:</b> Number of VABB-SHW-articles, edited books and book chapters under study (2000-2011). .	216
<b>Table 18:</b> Proportion of edited books written in Dutch, English, French and other languages for the SSH, humanities, social sciences and per place of publication. ....	219
<b>Table 19:</b> The average and median number of chapters, of authors, of unique authors and of editors per book and the Revised Collaboration Coefficient for edited books, based on editors, and for book chapters, based on chapter authors. ....	221
<b>Table 20:</b> Pearson correlation of four aspects of collaboration in edited books, i.e. number of editors, number of book chapters, number of authors and number of unique authors. ....	222
<b>Table 21:</b> Significant difference between two disciplines per collaboration aspect. ....	229
<b>Table 22:</b> The mean and median (med) number of edited books, articles, book chapters, monographs and proceedings papers for all established and non-established editors and non-editors (2000-2011). ....	234
<b>Table 23:</b> Average weighted whole publication count and average weighted fractional publication count for established editors and established non-editors editors and non-editors for both the humanities and the social sciences (2000-2011). ....	244
<b>Table 24:</b> Total number of publications, number and share of publications in collaboration and in international collaboration, for both established editors and non-editors, in the humanities and the social sciences (2000-2011). ....	246
<b>Table 25:</b> For all established editors and non-editors in both the humanities and social sciences, the mean and median number of unique co-authors; co-editors; co-authors & co-editors and book chapter authors in edited books and share (%) of international unique co-authors; co-editors; co-authors & co-editors and of unique book chapter authors (Flanders, 2000-2011). ....	248
<b>Table 26:</b> Main conclusions on book editors and their networks. ....	250
<b>Table 27:</b> The total number of researchers and number and share of established editors, non-established editors, established non-editors and non-established non-editors for each discipline under study (Flanders, 2000-2011). ....	257
<b>Table 28:</b> Average number of publications per publication type for all established editors (2000-2011). ....	258
<b>Table 29:</b> Total number of publications, number and share of publications in collaboration and in international collaboration, for both established editors and non-editors, in the different disciplines under study (2000-2011). ....	259

<b>Table 30:</b> Degree of collaboration and Degree of international collaboration of articles, book chapters, edited books, monographs and proceedings papers; for established editors and non-editors in the different disciplines under study (2000-2011). .....	260
<b>Table 31:</b> Mean and median number of unique co-authors and co-editors and book chapter authors in edited books; share (%) of international unique co-authors and co-editors and of unique book chapter authors for all established editors and non-editors; for the different disciplines under study (2000-2011). .....	262
<b>Table 32:</b> Knowledge and culture, by disciplinary grouping by Tony Becher (1994). .....	286
<b>Table 33:</b> Growth in weighted publication counts for the humanities (H) and the social sciences (SS) (2000-2011). .....	287
<b>Table 34:</b> Share and evolution of English publications for the different publication types in VABB-GP and VABB-WoS (2000-2011). .....	288
<b>Table 35:</b> Per discipline number of journals, number of articles, share of journals that cover half of the articles and share of articles in the first 10% of the journals.....	290
<b>Table 36:</b> Gini-index and coefficient of variation of the total number of publications per two years for both the humanities and the social sciences (VABB-SHW, 2000-2011). .....	296

# 1 Introduction

The goal of this study is to give more insight in publication and collaboration practices of Flemish affiliated researchers in the social sciences and the humanities, using comprehensive data. The study explores the evolution of publication and collaboration practices and the influences on and of these practices. One aspect further analysed is the role of edited books in both publication and collaboration practices. In the first part of this introduction the main objectives and research questions are defined and in the second part, the structure of the thesis is outlined. The research has been driven by societal issues, i.e. financing and evaluation of science, the availability of the data and, last but not least, the intrinsic motivation for the creation of new knowledge.

## 1.1 Main objectives and research questions

In the past decades, governments have adapted their public funding systems in order to gain more accountability of those receiving the funding. For universities, this often resulted in performance-based research funding systems (PRFSs), based on publication output and often suiting the largest, most expensive and most powerful fields (Hicks, 2013). Performing bibliometric analysis, especially with regard to PRFSs, requires an adequate bibliometric infrastructure, and this must have some claim to be comprehensive (Hicks & Wang, 2011). However, achieving full coverage of the scholarly publications in the social sciences and humanities (SSH) in bibliographic data sources is notoriously difficult (Archambault, Vignola-Gagne, Côté, Larivière, & Gingras, 2006; Hicks, 1999; Nederhof, 2006). Although commercial databases such as the Web of Science (WoS) and Scopus have made considerable advances in increasing the coverage of the journals, articles and books in these fields, they still have limited representation of the SSH (Adams & Testa, 2011; Hicks & Wang, 2009; Hicks, Wouters, Waltman, de Rijcke, & Rafols, 2015), especially of output by researchers in non-English-speaking countries (Larivière & Macaluso, 2011). Consequently, using WoS and Scopus for research funding and evaluation systems favours natural sciences and biomedical sciences over social sciences and humanities and English-language journals over journals in other languages. Therefore, empirical research on comprehensive SSH databases is indispensable in view of a more complete picture of the publication patterns of social scientists and humanities scholars.

In Flanders the research funding system (known as the BOF-key, see also section 2.2.2) installed in 2003 used WoS publications and citations only (Debackere & Glänzel, 2004). Due to the specific characteristics of the publication culture in the SSH, e.g. a large proportion of monographs, edited books, publications in national journals and the use of publication languages other than English (Engels, Ossenblok, & Spruyt, 2012; Hicks, 2004; Huang & Chang, 2008; Sivertsen, 2010), only a small part of the SSH scholarly output was included in this first version of the Flemish PRFS (Debackere & Glänzel, 2004; Spruyt & Rons, 2008). Acknowledging this mismatch for the SSH led to adaptation of the BOF-key and the instruction to build the Flemish Academic Bibliographic Database for the Social Sciences and Humanities (Vlaams Academisch

Bibliografisch Bestand voor de Sociale en Humane Wetenschappen or VABB-SHW) in 2008. The VABB-SHW gathers the bibliographic meta-data of articles, monographs, edited books, book chapters and proceedings papers, by scholars who are affiliated with Flemish universities and are active in the SSH, resulting in a comprehensive bibliographic database of SSH publications (see for a full account of the construction of the VABB-SHW section 5.1 and article 8.1). Only the peer reviewed publications among these contribute to the Flemish PRFS.

Although PRFSs are installed to influence researcher performance in terms of quality and capacity in order to enhance innovation and the knowledge society (Hicks, 2012), not all consequences are intended (Butler, 2003b, 2010; van Dalen & Henkens, 2012; Weingart, 2005). Gläser and Laudel (2007) explain that incentives given by governments to universities are often translated into incentives to departments and individuals. Besides, all people and professionals are known to react to incentives (Heywood, Wei, & Ye, 2011). Therefore, in order to continue co-evolving research evaluation and publishing in SSH, it is essential to map the disciplinary publication differences and their evolutions and to understand the changes in publication output these evaluation systems install. Until now, there is still a gap of knowledge when it comes to the question of how the new governance logic affects the work and behaviour of scholars (Frost & Brockmann, 2014). The first research question of this thesis focusses on this problem:

**1. Did Flemish affiliated researchers in the social sciences and humanities (SSH) change their publication practices in terms of number of publications, publication type and publication language in the period 2000-2011? How are the observed evolutions influenced by different factors, especially by the Flemish performance-based research funding system in place at that time?**

In order to answer this first question, an analysis of the current publication characteristics of the Flemish SSH and their evolution is essential and therefore six subordinate questions need to be addressed:

**1.1) Did the number of peer reviewed publications of Flemish SSH researchers increase in the period 2000-2011?**

**1.2) What are the disciplinary differences in choice of publication channel of Flemish SSH researchers (2000-2011)?**

**1.3) Is there a shift in choice of publication channel of Flemish SSH researchers in the period 2000-2011 towards more articles in WoS and less book publications i.e. monographs, edited books and book chapters?**

**1.4) What are the disciplinary differences in choice of publication language of Flemish SSH researchers (2000-2011)?**

**1.5) Is there a shift in choice of publication language of Flemish SSH researchers in the period 2000-2010 towards more English in both articles and book publications?**

**1.6) Which factors influence the publication patterns of Flemish affiliated researchers in the social sciences and humanities in terms of number of publications, choice of publication channel and publication language?**

Our first analysis of the current publication characteristics of the Flemish SSH and their evolution, using the comprehensive VABB-SHW database, showed a strong evolution in number of publications (see

articles 8.1 and 8.2) which might partially be explained by an increase in collaboration. Scientific collaboration is often studied by analysing co-authorship patterns (Wagner et al., 2011), in spite of some important caveats (Katz & Martin, 1997; Laudel, 2002). Different studies demonstrate that scientific collaboration in the SSH is on the rise and is increasingly international (Ardanuy, 2012; Cronin, Shaw, & La Barre, 2003; Larivière, Gingras, & Archambault, 2006). However, the generality of these results is uncertain because of the use of large international databases such as WoS and Scopus with a bias towards English international publications. Moreover, when measuring publication characteristics, the measures used need to be valid and as comprehensive as possible. Therefore, measuring collaboration in SSH requires going beyond the analysis of co-authorship (Sula, 2012), especially in the humanities disciplines where the edited book is an important scholarly publication medium (see articles 8.1 and 8.6). Edited books in our study are defined as a collection of chapters written by different authors, gathered and harmonized by one or more editors (see article 8.6). The second research question focusses on these issues:

**2. How is collaboration in SSH measured, especially in edited books? Did Flemish affiliated researchers in the social sciences and humanities (SSH) change their collaboration practices, both domestic and international, in terms of co-authorships and co-editorships in the period 2000-2010/11?**

Furthermore, we focus on three detailed subordinate research questions:

**2.1) How do we define and measure research collaboration?**

**2.2) What are the disciplinary differences in collaboration practices of Flemish SSH researchers for the different publication types (articles, book chapters, edited books and monographs)?**

**2.3) Do Flemish SSH researchers collaborate increasingly more, both domestic and international, in articles, both included and not-included in WoS, in book chapters and/or in edited books?**

A thorough literature study revealed that little is known on edited books. The literature comprised on the one hand essays, often tips on how to edit a book, and on the other hand data-driven research, based on small local databases and, more recently, the Book Citation Index (BkCI; (Adams & Testa, 2011) of WoS. Due to the limitations of the BkCI -i.e. focus on English publications, selection of publishers, etc. (Gorraiz, Purnell, & Glänzel, 2013)-, research based on a full set of edited books can add to the knowledge concerning this publication type and the collaboration therein. The third research question focusses on this knowledge gap:

**3. What are the main publication characteristics of the SSH book editors in the period 2000-2011?**

In addition, we focus on four detailed subordinate questions:

**3.1) How do we define edited books, a publisher and an editor?**

**3.2) Is the edited book in the SSH more internationally oriented than are SSH articles and monographs?**

**3.3) How do SSH book editors differ from other researchers, i.e. SSH non-book editors, in terms of gender, career stage, publication and co-authorship practices?**

**3.4) Do editors use their co-authorship networks when compounding edited books?**

## 1.2 Overview of the chapters

The thesis consists of two main parts: the first part entails the theoretical literature study (chapters 2-4) and the second part encompasses the empirical study (chapters 5-9).

### **PART I: Literature study**

To situate the previous studies and current research on which this thesis has been informed, a review of the existing literature was conducted. This literature review is divided into three broad sections: contextualizing science (chapter 2), disciplinary cultures and their publication patterns (chapter 3) and research collaboration (chapter 4). Each of these chapters, and even each of the subchapters can result in a thesis of its own as for each topic many questions remain unanswered.

The chapter on *contextualizing science*, chapter 2, describes the process of scientific communication within the context of science policy. Scientific communication is seen as the essence of science and has changed from an old social contract to a new social contract in which interaction with society gains importance. Likewise, research policy has evolved from so called 'mode 1' over 'mode 2' and a 'triple helix' towards 'science 2.0'. Also in Flanders, the new science policy is visible on the regional level with the implementation and adaptations of the performance-based research funding system. Moreover, Flanders was one of the first to adopt their funding system for inclusion of the special publication characteristics of the social sciences and humanities disciplines. Furthermore, scientometric studies bloomed due to the increasing attention of science policy makers at different levels, focussing not only on how science can be measured and valued, but also on the effects these measures and evaluations have on science itself. The studies take into account the different disciplinary cultures, as elaborated in the next chapter.

The chapter on *disciplinary cultures and their publication patterns*, chapter 3, provides a general overview of the differences between disciplines, focussing on personal factors (e.g. gender) environmental factors (e.g. research policy) and epistemological factors (e.g. delineation of paradigms). Not all factors receive equal attention in the literature and to which extent these often intertwined characteristics influence disciplinary publication practices remains open to discussion. However, the fact that publication patterns differ between and within disciplines, is indisputable. Disciplines, alongside academic institutions, are seen as the dominant unit of knowledge production, and, according to several researchers (Krishnan, 2009; Lamont & Molnár, 2002), disciplinary boundaries protect the professional autonomy against outsiders, e.g. legislators and evaluators using discipline-external quality norms, standards and goals. In contrast to disciplines in the natural and biomedical sciences, which publish predominantly articles in English journals that are mostly indexed in WoS, publication patterns in the social sciences and the humanities are more scattered. As indicated by Hicks (2004) and further explained in the next section of this chapter, literature in the social sciences and humanities involves both academic and enlightenment literature, both local and international literature, articles and book publications and both English and non-English language publications.

The final chapter of the literature study on *research collaboration*, chapter 4, structures the literature indicating research collaboration is important as it is positively related with personal productivity, citation counts and with prestige and acceptance rate in journals. However, not all collaboration seems to be equally fruitful. Like publication patterns, collaboration has been influenced by a number of factors, which are categorized under epistemological (e.g. degree of mutual dependence), cognitive (e.g. scientific credibility), economic (e.g. enhance productivity) and social factors (e.g. create network). The literature further specifies that the definition and the measurements used for collaboration have an influence on the empirical results. Co-authorship, although widely accepted as a measure of collaboration, does not capture all collaboration and, as explained in the last two sections of this chapter, better measures for international collaboration and collaboration in SSH are needed.

## **PART II: Empirical study**

To answer the research questions as outlined in this introduction (see section 1.1), the data of the VABB-SHW, CRISTin and an additional data set on edited books was analysed. The empirical study is divided in four chapters: research data and methodologies (chapter 5), overview of the main results (chapter 6), conclusion (chapter 7) and full text of included publications (chapter 8). Additional material has been gathered in the appendix.

The chapter *research data and methodologies*, chapter 5, explains the construction of the VABB-SHW, of its Nordic example CRISTin and of the additional data set on edited books. The next section in the chapter explains how these databases were processed, completed and cleaned before analysing: disciplines were assigned, author names were standardized and gender was added. How the data have been analysed has been set out in the last section of this chapter, focussing on career stage, publication counts, measuring collaboration and comparing subgroups.

The following chapter, *overview of the main results*, chapter 6, provides answers to the three main research questions and all respective subordinate questions. For each topic – publication patterns, collaboration patterns and edited books – a summary of the results has been provided. These results are based on the published articles, book chapters and proceedings papers, of which the full text is provided in the final chapter of the empirical part. The chapter concludes with an overview of the main limitations of the research in this thesis.

Chapter 7, *conclusion*, provides a short overview of the main conclusions for the field and lists several policy recommendations, possible improvements of the VABB-SHW and suggestions for future research. The focus maintains on publication and collaboration patterns, their measurements, their future evolutions, and the possible implications on and of these evolutions., topics present, not only in the literature study, but also in the full text of the articles, gathered in chapter 8.

The first two publications (8.1 and 8.2) included in the last chapter, *full text of included publications*, focus on the disciplinary differences and evolution of number of publications, language use and publication type. In order to analyse more in depth the evolutions found in the first two publications, the third publication (8.3) compares Norway and Flanders in both number of WoS articles and English as publication

language. The differences found are linked with the differences in the respective performance-based research funding systems. In the following two publications (8.4 and 8.5), the focus is on collaboration patterns, measured by co-authorship, analysing both domestic and international collaboration and comparing WoS-indexed publications and GP-selected publications. As co-authorship does not capture all forms of collaboration in the social sciences and humanities, in the next three publications, collaboration in edited book is studied. The first out of three publications (8.6) focusses on different characteristics of the edited books in general and on different aspects correlated with collaboration in this special publication type. The next two publications (8.7 and 8.8) focus on publication and collaboration patterns of the book editor, comparing book editors with other researchers and differentiate between the fields, gender and career stage.

### 1.3 Notes

- In this thesis, the term '*sciences*' refers not only to the natural and biomedical sciences (e.g. Biglan, 1973), but also to the social sciences and the humanities.
- Although terms as field and disciplines can be interpreted in various ways (e.g. Sugimoto & Weingart, 2015), in this thesis '*field*' refers to the aggregated groups of the social sciences, the humanities, the natural sciences and the biomedical sciences whereas '*discipline*' refers to groups within these fields, e.g. history (see also the introduction of sections 3, sections 5.4 and 6.4).
- The term '*country*' is in this thesis used for Flanders, albeit Flanders is no national state, but a region of Belgium (for more information on the federal state see section 2.2.2).

## **PART I: Literature study**

### **2 Contextualizing science**

#### **2.1 Science and scientific communication**

Science is commonly viewed as a formal activity that accumulates knowledge by directly confronting the natural world (Sismondo, 2009; p1). Furthermore, science is overall seen as important for society and culture as we want it to answer our most profound questions (Bucchi, 2004) and its outcomes influence our world view and the practices of daily life. Philosophers and sociologists of science are continuously looking for a clear definition of science and often differ on the interpretation of the way science is a formal activity, e.g. Popper and Merton. Common to most of these views is the idea of an ideal science where standards to judge between good and bad science are the source of science's success and authority (Sismondo, 2009). Science can be seen as the mere result of what scientists do (Kuhn, 1970) and science can be seen as a complex set of activities and institutions (Bucchi, 2004).

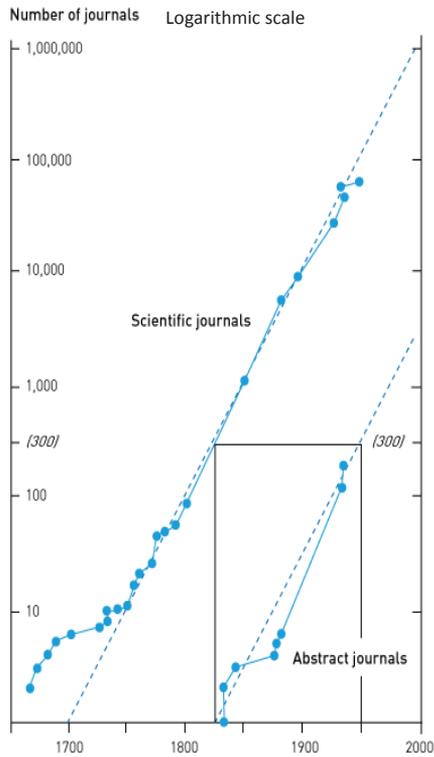
Derek J. de Solla Price (Price, 1986), found that in the past 300 years, science has grown exponentially in terms of share of the Gross National Product, the number of scientists, the number of scientific journals and the number of articles (see Figure 1). Between 80 and 90 percent of all the scientists who have ever lived, are living now and between 80 and 90 percent of all the scientific articles ever written, were written in the recent decades (Sismondo, 2009; p14). Price (1986) indicates a saturation point of science will be reached in the near future, and indeed the growth has slowed down although it is still present. In Flanders too, a rapid growth of scientists and publications has been determined. In the last 30 years, the total number of researchers affiliated with one of the five Flemish universities has tripled (see Figure 2). Figure 2 shows the growth in numbers of professorships (ZAP), research and teaching assistants (AAP) and doctoral students and postdoctoral researchers compared to the number in 1982. In addition, science is growing as it accumulates knowledge, often building on the most current work, i.e. the immediacy effect (Price, 1986).

Science is a social activity in that scientists and engineers are always members of communities, trained in those communities and working in them. Those communities are often organized around ideas and practices and play an important role as they set standards for research methods and evaluate knowledge claims (Sismondo, 2009). A striking example thereof is the call of Glanzel and Schoepflin (1994) for the scientific community of Scientometrics to feel responsible for the field as a whole, to guard the quality of the publications in the field and to draw up a code of ethics for the field. Recently, a code of ethics concerning bibliometrics and research evaluation has been discussed with and presented to the field (Hicks et al., 2015). Beside field related codes, there is an international trend of developing national codes of ethics for science which are subscribed by several (national) actors. E.g. the Belgian ethical code<sup>1</sup> was

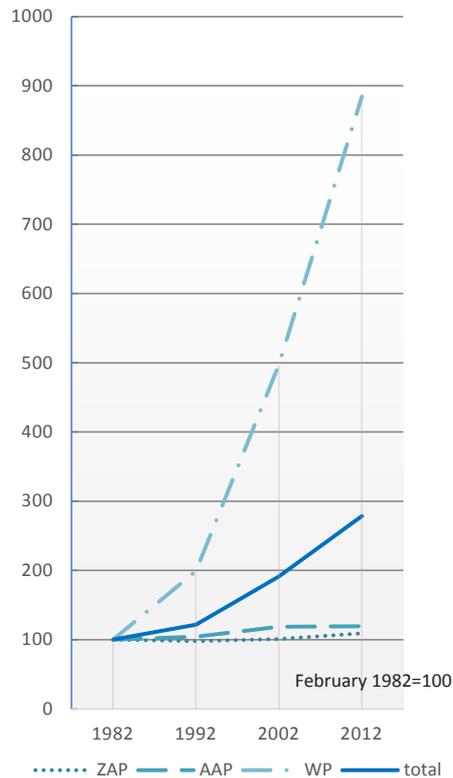
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<sup>1</sup> [http://www.belspo.be/belspo/organisation/publ/Eth\\_code\\_nl.stm](http://www.belspo.be/belspo/organisation/publ/Eth_code_nl.stm)

inspired by publications from amongst others OECD (Organisation for Economic Co-operation and Development), the European Commission and the Dutch ethical code; and focusses on three main principles of conducting scientific research: precision and prudence, reliability and verifiability, independence and impartiality.



**Figure 1:** Total number of scientific journals and abstract journals founded, as a function of date, starting in 1665 with the first scientific journal (source: Price 1986; p8)



**Figure 2:** Growth of number of researchers in Flanders over 30 years (source: VLIR-statistieken 2012).

ZAP= 'Zelfstandig Academisch Personeel' or professorships;  
 AAP= 'Assisterend Academisch Personeel' or research and teaching assistants;  
 WP = 'Wetenschappelijk Personeel', including doctoral students and post-doctoral researchers.

Between the mid-sixteenth and late seventeenth centuries, a scientific revolution took place. One of the most important changes, next to the adoption of distinctive methods, a non-hierarchical character of knowledge and the renunciation of a teleological, man-centred cosmology, was the importance given to communication and the exchange of results and hypotheses (Bucchi, 2004). Concomitantly, the scientific

community was installed and the first scientific academies and national science societies were founded. Scholars identified each other as belonging to the same homogeneous community, using a lingua franca (initially Latin, later French, German (Ammon, 2001, p10) and English) to communicate with each other (Bucchi, 2004). Due to a variety of political (e.g. the British empire, organisation of post-war world) and economic reasons (e.g. first computer programs, undamaged infrastructure of the U.S.), English became a dominant language after World War II, also in scientific communication (Ammon, 2001).

Gibbons (1999) states that science and therefore scientific communication has changed again over the last decades, going from an old social contract towards a new social contract between science and society. The old contract understood science as a search for truth and the delivery of reliable knowledge by scientists to the society. The new contract is one where science is a more pragmatic aim of providing a provisional understanding of the empirical world, constructed in joint production with society and therefore having society 'speaking back' to science. Science and society are co-evolving, with science having an impact on society (e.g. technology based on scientific discoveries) and society having an impact on science (e.g. focus of research on military and safety during the Cold War). Scientific communication changed as the experts addressed both expert and non-expert audiences and responded in addition to content related issues, also to technical or methodological issues.

Scientific communication is seen as the essence of science; it is a complex social system consisting of formal (e.g. articles) and informal (e.g. discussions) communication towards scientists<sup>2</sup> (Garvey, 1979). In order for science to make progress, new theories and experiments must be communicated as such that other scientist can understand and verify the work and use it for new research. Publications, in general considered to be the basic units of scientific communication (Garvey, 1979; Glanzel & Schoepflin, 1994), provide a system of formal, publicly accessible and orderly communication among scientists (Garvey, 1979). A whole range of different practices of peer review of scientific publications often serves as a gatekeeper for the quality. Publications, and especially peer reviewed publications, are often used in quantitative indicators when measuring and evaluating science.

## **2.2 Science policy**

### **2.2.1 Recent evolution**

In the last decades, the capacity and quality of research at universities is regarded as of great importance for innovation (European Commission, 2010; Etzkowitz & Leydesdorff, 2000) and as a strategically important activity for national and regional development that can and should be managed (Debackere & Glanzel, 2004; Etzkowitz, Webster, Gebhardt, & Cantisano Terra, 2000; Whitley, 2007). Concomitantly, new public management has been gradually implemented in the Academic world, introducing strategies and values of the private sector into the public sector, including the universities (Frost & Brockmann,

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<sup>2</sup> Communication towards a non-scientific audience is commonly known as science communication.

2014), resulting in emerging entrepreneurial universities (Etzkowitz et al., 2000). Where the old governance of universities, also called *mode 1*, focused on self-management by academic professionals and qualitative performance evaluations with implicit standards (Townley, 1997), the new governance of universities, also called *mode 2*, focussed on efficiency, effectiveness, external visibility and accountability of evaluation systems (Gibbons et al., 1994; Nowotny, Scott, & Gibbons, 2003; Whitley, 2011). Economic development was introduced as a third mission of the universities, i.e. the socio-economic role, next to teaching and research (Etzkowitz et al., 2000; Nelles & Vorley, 2010), and a *triple helix* model emerged with ever changing relations between universities, industry and governments (Etzkowitz & Leydesdorff, 2000; Etzkowitz et al., 2000).

The new science policy is visible at the level of national and regional governments, universities, faculties, research units and of the individual scientists. National and regional governments establish ministries of science and technology, policy objectives and specific agencies and (funding) programs to steer research in the desired direction (Whitley, 2007). Research evaluation systems and performance monitoring of universities are installed (Hicks, 2010; Whitley, 2007). Simultaneously, universities all over the world created decentralized, quasi-autonomous departments and units, stronger internal competition for resources, both material and intellectual (Whitley, 2011) and evaluations with outcome related quantitative performance indicators with explicit standards (Frost & Brockmann, 2014). Incentives given to universities are often implemented in the faculties and research units and/or at the individual level (Butler, 2003b; Gläser, 2007; Gläser & Laudel, 2007; Hicks, 2012) and have an effect on all these levels as all people and professionals are known to react to incentives (Armstrong, 2013; Heywood et al., 2011).

The dynamics of science and the entire research cycle keep on changing. Due to digital technology and driven by the globalisation of the scientific community and the big challenges of our time, in the last decade *science 2.0*<sup>3</sup> has set in (European Commission, 2015). Science 2.0 refers to the use of Web 2.0, the user-generated content on the web with possibilities to interact, in the scientific process, and indicates a new way of doing science, namely “*post[ing] raw experimental results, nascent theories, claims of discovery and draft papers on the Web for others to see and comment on*”(Waldrop, 2008; p1). As a result, in addition to the three known actors in the triple helix model (university, industry and government), a fourth actor has been introduced, namely a diverse intelligencia participating via online platforms.

## **2.2.2 Characteristics and recent development of the Flemish performance-based research funding model**

Belgium is a complex federal state comprising three Regions, i.e. the Flemish, Walloon and Brussels-Capital region, and three Communities, i.e. the Dutch-, French- and German-speaking Communities, each having their own authorities, and hence governments. As the Flemish Region and the Dutch-speaking Community largely overlap, Flanders has created one government comprising both the Regional, i.e.

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<sup>3</sup> Other suggestions made by questionnaire respondents to the European Commission (2015) included ‘participatory science’, ‘science highway’, ‘better science’, ‘open research’ and ‘open scholarship’.

territory-related authorities (e.g. economics, environment, etc.), and the Communal, i.e. personal-related authorities (e.g. culture, education, etc.). From 1980 onwards, the political authority of science and technology has been gradually decentralized from the Federal state towards the Regions and the Communities. Nowadays, the Regions, Communities and the Federal state are responsible for the research policy of their respective policy jurisdictions<sup>4</sup>. In 2002, 67% of the total Belgian public R&D budget resided under the umbrella of the regional policy level (Debackere & Glänzel, 2004). Furthermore, in 2013, the Flemish Gross Expenditures on R&D (GERD) amounts to 2,4% of the Gross Domestic Product in Flanders, indicating Flanders is spending relatively more on R&D than the EU-28-average but less than the Scandinavian countries and Germany (Debackere & Veugelers, 2015). The activity of the universities amounts to about 20% of the Flemish GERD, that of the industrial sector to about 67% (Andries, Debackere, Hoskens, Dengis, & Viaene, 2013).

Currently, Flanders counts five universities: KULeuven, UAntwerpen, UGent, UHasselt and VUBrussel, all varying in scale, focus on specific research domains and, consequently, received budget. Various financing channels provide universities, projects and individual researchers with the available budget. Besides a variety of smaller public R&D funding, structural support of major strategic research centres (e.g. the Flemish Institute for Biotechnology or VIB) and support to policy related institutions, departments and open calls (Debackere & Glänzel, 2004), four structural yet variable funding flows of the five Flemish universities are installed (Debackere & Glänzel, 2004; Engels, Spruyt, Glänzel, & Debackere, 2009; Spruyt & Engels, 2013b) :

- 1) A block grant issued by the government (partly variable based on output indicators) to carry out their three-fold mission: academic education, scientific research and scientific, economic and social service.
- 2) Basic and applied research grants issued by the government (variable and largely based on output indicators) including the University Research Fund in Flanders (BOF) and the Industrial Research Fund (IOF). The block grants distribute money to universities based on the respective relative share in the inter-university distribution keys: the BOF-key (see below) and the IOF-key, which re-uses some of the parameters of the BOF-key .
- 3) Funds issued by financing agencies such as the Research Foundation Flanders (Fonds Wetenschappelijk Onderzoek or FWO) which supports a large portfolio of basic research grants and projects to individual researchers<sup>5</sup>, the Flemish Agency for Innovation by Science and Technology (Agentschap voor Innovatie door Wetenschap en Technologie or IWT) which supports strategic and applied R&D activities in Flanders<sup>6</sup>, the Hercules foundation, which provides funding for investments in research infrastructure for basic and strategic research in all scientific disciplines<sup>7</sup> and the EU framework programmes.
- 4) Third party contract research.

The BOF-key was introduced in 1994 (Spruyt & Engels, 2013b) and was, up to 2002, based on three inputs measured per university in the preceding four academic years: the number of PhD's, weighted per

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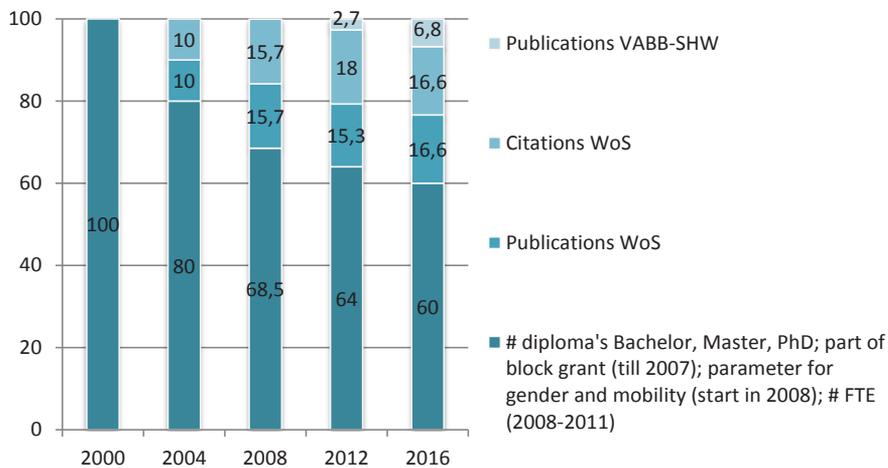
<sup>4</sup> <http://www.ejustice.just.fgov.be>

<sup>5</sup> [www.fwo.be/en](http://www.fwo.be/en)

<sup>6</sup> [www.iwt.be/english](http://www.iwt.be/english)

<sup>7</sup> [http://www.herculesstichting.be/in\\_English/](http://www.herculesstichting.be/in_English/)

discipline related with the estimated cost of the average PhD in the discipline (50%), number of graduates (35%) and the amount of public operational and investment money (15%) (for a full account see Debackere & Glänzel, 2004). In 2000, the Flemish government asked the Flemish Inter-University Council (Vlaamse Interuniversitaire Raad, or VLIR), consisting of representatives of all Flemish Universities, to discuss the refinement of the BOF-key and to advise the Government concerning this policy issue. Henceforth, all changes to the BOF-key were preparatorily discussed at the VLIR. From 2003 onwards, the BOF-key additionally included output-related performance data from the preceding 10 calendar years, based on publication and citation data from the largest Web of Science (WoS) database, i.e. the Science Citation Index Expanded (SCIE) (Debackere & Glänzel, 2004). Debackere and Glänzel (2004) stated that refinement of the BOF-key would be needed given the many controversies concerning the use of WoS data to measure the scientific output in the social sciences and humanities. The search for more valid data sources to monitor the output in these fields had started.



**Figure 3:** Evolution (2000-2016) of the weight in terms of percentage of the different components of the BOF-key (Source: Spruyt & Engels, 2013b)

In 2008, the Flemish university financing decree and the amended BOF-resolution constituted, next to the inclusion of the Social Science Citation Index (SSCI), the Arts & Humanities Scientation Index (AHCI) and the ISI-proceedings (Conference Proceeding Citation Index – Science or CPCI-S and Conference Proceeding Citation Index- Social Sciences and Humanities or CPCI-SSH) the framework for the construction of the Flemish Academic Bibliographic Database for the Social Sciences and Humanities (Vlaams Academisch Bibliografisch Bestand voor de Sociale en Humane Wetenschappen, or VABB-SHW, see section 1.4.1 and article 8.1). In doing so, the Flemish government meets the demands of researchers, civil society actors and universities to take into account the specific characteristics of the social sciences and humanities when allocating research funds among the universities, in particular the fact that often SSH related publications appear in books and/or in Dutch, whereas the WoS mostly focuses on English-language publications and has started to index scholarly books written in English only very recently in 2011 (Adams

& Testa, 2011; Engels et al., 2009). The introduction of the VABB-SHW has led to the evolution that also the non-WoS-indexed SSH publications of researchers affiliated with Flemish universities, contribute to the distribution of the BOF funds. The weight of these publications in the BOF key was restricted to 2.6% (2011), but would augment every year (see Figure 3), which was further approved in the new BOF-resolution of 2012 (for a full account see Spruyt & Engels, 2013a, 2013b). In spite of its low initial weight as a parameter in the BOF-key, the VABB-SHW probably has a larger impact than assumed, considering the partial use of the BOF-key in the distribution of the university operating budgets and other research funds (Industrial Research Fund, Hercules funding, Odysseus funding, Methusalem funding and the Interuniversity Poles of Attraction).

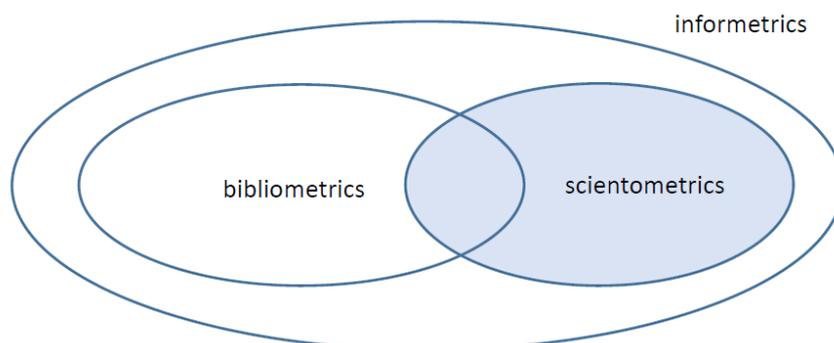
## 2.3 Measuring science with bibliometric indicators

Bibliometric indicators are used in science policies on different levels (e.g. the individual researcher, the journal, the department, the faculty, the university and the region or country), in different institutions (e.g. universities, governments or independent funding institutions) and for different purposes (e.g. distributing funding or for promotion). Furthermore, both input (e.g. financing) and output indicators (e.g. number of publications) are used. The *quality of the research* is important to science policy and is often indicated by peer review, the prestige of the journal (e.g. *Nature*) and the number of citations. *Productivity*, often measured by number of publications, be it fractionalised or not, and the *visibility/impact*, often measured by citations and acceptance rates, are also important factors to science policy. However, the debate on how to measure these multidimensional issues is still ongoing (e.g. Glänzel, 2010; Hicks et al., 2015; Kaufmann & Kasztler, 2009; Osterloh, Wollersheim, Ringelhan, & Welpel, 2015; Rousseau, 2015), especially as the science policies increasingly incorporate bibliometric indicators for the purpose of dividing funding or evaluating (groups of) researchers. Research evaluation should not be based on a single criterion alone as research quality is complex and multidimensional (Butler, 2007; Kaufmann & Kasztler, 2009). Some governments are focussing on input indicators (e.g. Wallonia, i.e. dividing funding using input-indicator & output-indicator, i.e. number of PhD's; Académie Royale de Belgique, 2011), whereas others focus more on output indicators. The latter approach is getting more and more implemented on the level of the country or region and is commonly known as performance-based research funding systems (PRFSs).

### 2.3.1 Scientometrics

*Scientometrics*, a term introduced by Nalimov and Mulchenko (cited in Braun, Glänzel, & Schubert, 1985), has been defined in a variation of ways, such as “*The study of the quantitative aspects of science as a discipline or economic activity*” (Tague-Sutcliffe, 1992; p1), or “*the application of quantitative methods which are dealing with the analysis of science viewed as an information process*” (Nalimov & Mulchenko, 1969 cited in Glänzel, 2003; p6). As shown in Figure 4, Scientometrics is part of the big field of informetrics (Glänzel & Schubert, 2003; Tague-Sutcliffe, 1992). *Informetrics* is defined as “*the study of the quantitative*

aspects of information in any form, not just records or bibliographies, and in any social group, not just scientists” (Tague-Sutcliffe, 1992; p.1). The Siamese twin of scientometrics, *bibliometrics*, is defined as: “The study of the quantitative aspects of the production, dissemination and use of recorded information”(Tague-Sutcliffe, 1992; p.1). The term bibliometrics was used for the first time in 1934 by Paul Otlet referring to “the measurement of all aspects related to the publication and reading of books and documents” (Rousseau, 2014; p.218). In addition, along with the evolutions in society, new subfields of Informetrics, bibliometrics and scientometrics emerged: e.g. webometrics (Björneborn & Ingwersen, 2004) and later altmetrics (e.g. Holmberg, 2016).



**Figure 4:** Relationships between the Library & Information fields of infor-/biblio-/sciento-/metrics. Sizes of the overlapping ellipses are made for sake of clarity only. (source: Björneborn & Ingwersen, 2004)

Measuring science has become an independent research field in the beginning of the 20<sup>th</sup> century, with bibliometric studies of Cole and Eales (1917) who compared scientific productivity of countries using the number of published papers (Braun et al., 1985). In 1926 the famous study of Alfred J. Lotka (1926) was published, who measured the frequency of publications by authors, later known as Lotka’s Law. With the development of the Science Citation Index (SCI) by Eugene Garfield in 1963 (Egghe & Rousseau, 2009), the development of scientometrics and bibliometrics received an upsurge in practice as SCI enabled, amongst others, analyses of citation networks in science. In 1963 (Price, 1986), Derek J. de Solla Price, historian of science, presented in *Little science, big science* the exponential evolution of science while measuring the number of scientists and publications (see section 2.1 and Figure 1) and thus applying quantitative scientific methods to science itself. Price is therefore often regarded as one of the founders of scientometrics and bibliometrics (Bucchi, 2004; Glanzel & Schoepflin, 1994). Since about 1960, there has been a sharp rise of metrics of science and bibliometrics became widely accepted (Glanzel & Schoepflin, 1994) and, at the same time, questioned and discussed (e.g. the Journal Impact Factor, the h-index, etc.). The fields of bibliometrics and scientometrics (see Figure 4) have several audiences: bibliometricians, scientometricians, other scientific disciplines, business and science policy, of which the latter has been the most dominant already for several years (Glanzel & Schoepflin, 1994). As a consequence, a dramatic increase has taken place since 1990’s of the need for methods and instruments to evaluate, to select and to monitor public R&D spending (Debackere & Glänzel, 2004). As stated by Debackere and Glänzel (2004);

p.261): “Bibliometrics can be used to develop and to provide tools to be applied to research evaluation but is not designed to evaluate research results. Moreover, bibliometrics does not aim at replacing qualitative methods by quantitative approaches. Bibliometrics is not designed to correct or even substitute peer reviews or evaluation by experts. Hence, qualitative and quantitative methods in science studies should complement each other.” More recently, after researchers started using the web for scholarly communication purposes, the fields of webometrics and later altmetrics emerged (Holmberg, 2016). Whereas the first analyses scholarly communication taking place on the web in general, the latter analyses scholarly communication using social media such as mendeley, twitter and facebook (Holmberg, 2016). The term altmetrics used to refer to ‘alternative metrics’, as in alternative to traditional measures. However, several researchers agree altmetrics are not to be used as alternative metrics (e.g. Haustein, Costas & Larivière, 2015; Holmberg, 2016; Rousseau & Ye, 2013). All in all, the debate about what are good indicators and measures, both old and new, and, especially, how to use them in science policy remains a topical subject and has repeatedly been indicated as one of the responsibilities of the field (e.g. Butler, 2007; Frost & Brockmann, 2014; Hicks et al., 2015).

### **2.3.2 Performance-based research funding systems**

Performance-based research funding systems (PRFSs) have two main objectives: on the one hand distribution of the research funds and on the other hand the steering of particular behaviour of researchers into the direction of increased research quality, enhancing accountability of public research and/or promoting greater alignment of research to societal and economic needs (Aagaard, Bloch, & Schneider, 2015; Butler, 2010; Frølich, 2008; Hicks, 2012; Whitley & Gläser, 2007). Generally speaking, two basic PRFSs exist: those based primarily on peer review (e.g. UK (Wang & Hicks, 2013)) and those based on performance indicators (Gläser, Laudel, Hinze, & Butler, 2002). The latter can be divided in publication-based models (e.g. previously Australia (Butler, 2008), Norway (see section 5.2; (Aagaard, 2015; Schneider, 2009; Sivertsen, 2010) and Denmark (Ingwersen & Larsen, 2014; Schneider, 2009; Vesterager Pedersen, 2010)) and citation-based models (e.g. Poland and Slovakia (Aagaard et al., 2015)), although a combination of publication and citation indicators is also possible (e.g. Flanders; see section 2.2.2). All models have their own strengths and weaknesses in terms of cost and organization, evaluation methods, transparency and legitimacy, extent of allocation of resources, and (estimated) impact on research and academic publications (Aagaard et al., 2015; Auranen & Nieminen, 2010; Zuijdam, Ploeg, Mostert, & Boekholt, 2013). As it is not within the scope of this thesis to explain all performance-based research funding models in detail, a more detailed overview of the models can be found in e.g. (Auranen & Nieminen, 2010; Geuna & Martin, 2003; Hicks, 2010, 2012).

Although PRFSs are among the most widely discussed topics concerning research policy (Aagaard et al., 2015), research into the impact of the systems is a challenging exercise and broad authoritative texts on the subject are still limited (Aagaard et al., 2015; Butler, 2010; Whitley & Gläser, 2007). PRFSs seem to have been influencing research practices on at least two levels: both the management and the individual adapt their practices (Gläser et al., 2002). Therefore, PRFSs have an impact on human resource issues, teaching, institutional management practices, publication practices (see section 3.2.2), etc. (for a full

overview see Butler, 2010). PRFSs are mechanisms for allocating resources that relate funding to some measure of university research output or performance. PRFSs are, therefore, a form of research evaluation systems on the level of the universities. Research evaluation systems are installed to influence researcher performance in terms of quality and capacity (Hicks, 2012; Whitley, 2007) and as stated by Gläser et al. (2002; p.1): *“One general effect of evaluation-based funding is that it increases the pressure on researches and research organisations to meet performance criteria”*. As mentioned earlier, criteria used in PRFSs are often used in research evaluation models on other levels (e.g. Faculty and the individual), despite the fact that PRFSs are usually not developed for these practices (e.g. Aagaard, 2015; Zuijdam et al., 2013). The cumulative effects of PRFSs on science appear to be bigger than the sum of the parts and the debate on intended and unintended influences flourishes (Box, 2010; Butler, 2003b, 2010; Debackere & Glänzel, 2004; van Dalen & Henkens, 2012; Weingart, 2005).

Proponents of PRFSs cherish the increase of transparency and quality and the improvement of the information management systems of universities (Luwel, 2010) whereas opponents fear the undermining of the scientific creativity (Heinze, Shapira, Rogers, & Senker, 2009) and the change from Homo Academicus (Bourdieu, 2002) towards Homo Strategicus (Frost & Brockmann, 2014). The Homo Strategicus games the system by increasing his productivity, playing safe and acquiring a gaming strategy including slicing articles into the smallest publication output and a tendency towards scientific misconduct (Osterloh et al., 2015). However, as stated by Hammarfelt and de Rijcke (2015; p.18): *“it would be naïve to think that publication strategies did not exist before the implementation of various bibliometric measures and evaluations, although this might have led to a surfacing of such strategies”*. Furthermore, several critics fear the decrease of the intrinsic motivation (Frost & Brockmann, 2014; Osterloh et al., 2015; Weibel, Rost, & Osterloh, 2009). In addition, PRFSs might nourish over-publishing, risk avoidance, clinging to the mainstream with a bias in favour of short-term research as a consequence (Gläser et al., 2002). In her famous research, Butler (2003a, 2003b, 2004) shows the effect of the former Australian funding formula based on publication counts. As the funding formula paid little attention to the impact or quality of that output, the number of publications in journals indexed in WoS had increased for 25% in 10 years' time, yet, the citation impact had declined compared to other countries. Several countries, e.g. Norway and Flanders, have taken the Australian example as a warning to make their PRFSs more complex and to include some sort of quality incentive. However, the effects of research evaluation systems differ per country as they depend greatly on the various practices and social structures, e.g. allocation of funding, organization of scientific elites and of the employment and careers of researchers (Gläser, 2007; Whitley, 2007). According to a peer evaluation of the VABB-SHW in 2012 by the *Technopolis Group (Zuijdam et al., 2013)*, the VABB-SHW not only influences the publication practices (e.g. protection of certain publication types and a boost towards peer-reviewed journal publications), it also led to a greater emphasis on using peer-review procedures in journals and with publishers, increased the visibility and recognition of SSH publications and contributed to an increased quality of the bibliographic university repositories. All in all, though, little empirical research has demonstrated the effects of the research evaluation systems and the new governance (Frost & Brockmann, 2014; Gläser, 2007; Hansen, 2010; see also section 3.2.2) and rumours can still prosper (Butler, 2010).

### 3 Disciplinary cultures and their publication patterns

In general, the social sciences include those disciplines that study humans in their social context, whereas the humanities comprehend disciplines studying human culture. Of course, researchers in the social sciences and humanities do not form a homogeneous category and differ noticeably in the modes of both research and teaching (Becher, 1994; Biglan, 1973a; Kaufmann & Kaszler, 2009; Knorr Cetina, 1999; Nederhof & Noyons, 1992) but, still, they are joined together in scientific communities. In our study (see section 8) we include 16 disciplines based on institutional affiliation (see section 5.1), of which 7 in the social sciences and 9 disciplines in the humanities.

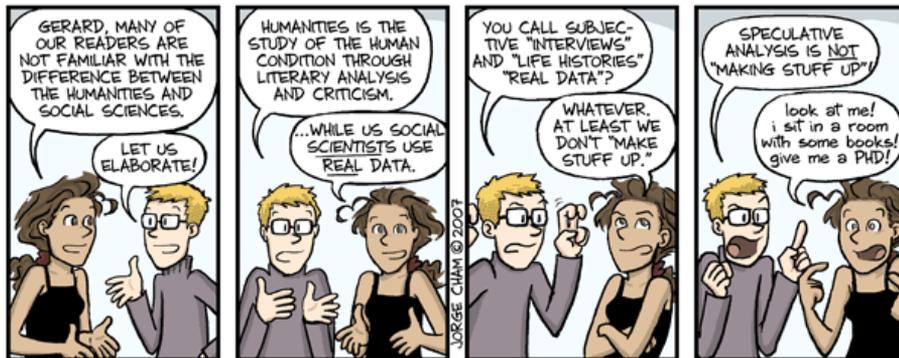
#### Social sciences

- criminology
- economics & business (including library & information science)
- educational sciences;
- political science
- psychology
- sociology
- social health sciences

#### Humanities

- archaeology
- art history (including architecture and arts)
- communication studies
- history
- law
- linguistics
- literature
- philosophy (including history of ideas)
- theology (including religious studies)

#### 3.1 Disciplines and academic cultures



### 3.1.1 Defining disciplines

Although Aristotle was the first scholar known to make a division in the sciences, namely between theoretical and practical enquiry, the true birth of disciplines dates from the late middle-ages (Thompson Klein, 1990, 2005 cited in Krishnan, 2009). However, it lasted until the end of the 19<sup>th</sup> century, due to the professionalization of knowledge (see section 2.1), before the social sciences appeared. Besides, the term humanities “*is a twentieth century term of convenience for those disciplines excluded from the natural and social sciences*” (Shumway & Messer-Davidow, 1991; p.204 cited in Sugimoto & Weingart, 2015; p.776). According to Whitley (2000) training, employment and the urge for national and international reputations in universities created the academic disciplines. Whereas Bucchi (2004) emphasises the influence of the establishment of permanent laboratories which reinforced the differentiation among the scientific disciplines and sub-disciplines. The map of the academic disciplines is constantly evolving because of a continuously changing political and societal environment. The often narrow and artificial (Krishnan, 2009) disciplinary boundaries are shaped by affinity, necessity (Knorr Cetina, 1999) and are co-evolving with and (re)structured by history (Knorr Cetina, 1999; Krishnan, 2009; Lamont & Molnár, 2002). New disciplines appear (e.g. information science, gender studies), other disciplines disappear (e.g. colonial studies) and some disciplines adopt their names (e.g. theology became religious studies) (Krishnan, 2009). Furthermore, the construct of disciplines in itself is under ‘attack’ as more and more interdisciplinary and transdisciplinary research questions appear, answering the increasing societal demands of accountability, validation and complex research problems (Krishnan, 2009; see also section 2.2.1. ).

Academic disciplines are often formally organised and formed around taught subjects, academic departments, professional associations or scientific journals (Jacobs, 2014; Krishnan, 2009). Furthermore, disciplines are often defined as sociocultural entities within which researchers share common norms, values, work practices and modes of interaction (Becher, 1994; Whitley, 2000). All in all, defining a discipline is rather challenging and a common definition is hard to find, especially as the differences between and within them are rather large (Becher & Trowler, 2001; Krishnan, 2009). Disciplines differ not only in topic, but also in scientific methods, scientific claims, theories, terminologies, etc. In order to define a discipline, formal boundaries are needed. Lamont and Molnár (2002; p.186) define [symbolic] boundaries as “*the conceptual distinctions made by social actors to categorize objects, people, practices and even time and space*”. Furthermore, formal disciplinary boundaries are the outcome of an historical process of cognitive and social structuring and this process has had an influence on the disciplinary epistemic cultures (Knorr Cetina, 1999; Whitley, 2000). Disciplinary boundaries can be strong when there is a general agreement over the method and the content of research and if there is a dense network (Krishnan, 2009). In contrast, boundaries will be more permeable when there is a lack of consensus on methods and content, and when the members are loosely connected, as is often the case for disciplines in the humanities (Stone, 1982; Watson-Boone, 1994).

Academic disciplines within universities are seen as the dominant unit of knowledge production (Whitley, 2000; p.56) and important for the organisation of learning and teaching (Becher, 1994; Biglan, 1973a; Krishnan, 2009). However, disciplines also go beyond institutional and national borders (Bucchi, 2004; Lamont & Molnár, 2002) thereby transcending differences of national disciplinary cultures, all with their

own emphasis on topics, methods and theories (Krishnan, 2009). By separating people into groups, disciplines create membership and feelings of similarity (Lamont & Molnár, 2002). Moreover, disciplinary boundaries are needed not only for separation and inclusion, but also for communication, both internal and external (Lamont & Molnár, 2002). Disciplines have their own communities, journals and fora (Bucchi, 2004) which are essential to acquiring status within a discipline (Lamont & Molnár, 2002). In addition, disciplinary boundaries are needed to protect the professional autonomy against outsiders, e.g. legislators who install disciplinary-external quality norms, standards and goals (Krishnan, 2009; Lamont & Molnár, 2002). However, Foucault (cited in Krishnan, 2009) states that disciplines are (also) limiting freedom and constraining discourses. An example could be found in a study of Benda and Engels (2011) and of Fang (2011) indicating the tension between (disciplinary) peer review and innovative ideas, where peer review (be it individual or grouped) can bias towards mainstream work. Krishnan (2009) states that from a management perspective disciplines are not necessary anymore as research has transformed with the mode 2 management perspective (Gibbons et al., 1994; Nowotny et al., 2003; see also section 2.2.1). However, especially in this changed context it is important to (try to) understand the different (changing) disciplinary cultures, a development which has been described in the next section.

### **3.1.2 Analysing disciplinary cultures**

During the last 50 years, a variety of methods have been applied to identify and characterise disciplinary cultures, where a culture is seen as a set of values taken for granted, attitudes and ways of behaving (Becher & Trowler, 2001). In his book *Productivity in academia*, Kyvik (1991) gives an overview of the history of the rather recent study of disciplinary cultures. He states that in earlier times little attention was given to the analysis of disciplinary cultures, as this might have seemed unnecessary as long as the natural and biomedical sciences were the main focus of historians and philosophers of science. In addition, a lack of a conceptual framework might have obstructed a possible analysis. The latter changed with the famous works *The structure of scientific revolutions* of Kuhn in 1970 and *The intellectual and social organization of the sciences* by Richard Whitley in 1984 (and a second edition in 2000).

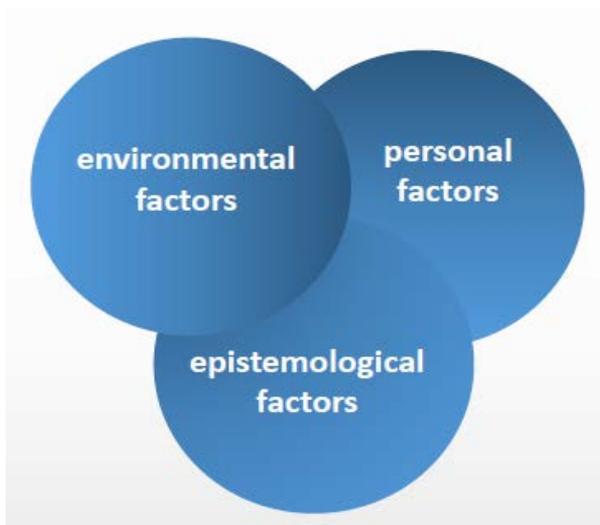
Several studies have analysed disciplines and disciplinary cultures on different levels, from different perspectives, using different conceptualizations and definitions and different measurements (Sugimoto & Weingart, 2015). First, the level of the analysis goes from the research area over the field and disciplines to subdisciplines and specialities, however, these concepts have been used interchangeably (Sugimoto & Weingart, 2015). Second, differences in disciplinary cultures have been analysed from an epistemological point of view (e.g. Becher, 1994; Becher & Trowler, 2001; Biglan, 1973a; Kyvik, 1991; see also point 3.2.3) and from an organisational management perspective (e.g. Whitley, 2000). For a recent summary of the history of these theories, I refer to the thesis of Hanna-Mari Puuska (2014, p25-30). Third, defining disciplines is an ongoing complex process, as mentioned earlier, and might be discipline-dependent (Sugimoto & Weingart, 2015). A discipline claims its own legitimacy based on a certain set of criteria, but other disciplines might reject this claim based on another set of criteria (e.g.: a shared body of content, theories and methods; a defined community; own language with specific terminologies; separate identity; tradition and institutionalization (for a an overview of the literature see Sugimoto & Weingart, 2015).

Finally, when analysing disciplines in quantitative studies, disciplines are often operationalized with the use of implicit definitions: In general, three categories are used to operationalize disciplinaryity: publications (i.e. journals, subject categories and citations), people (i.e. authors, mentors and affiliations), and ideas (language, topics and methods) (Sugimoto & Weingart, 2015). These categories are then used to define each other. E.g. in the VABB-SHW, publications are linked with one or more disciplines, according to the affiliation of the authors (see section 5.1).

Analysing different disciplinary cultures is important, especially as disciplines are valued differently due to the perceived degree of difficulty, importance to society, popularity and influence, the latter also correlated with size (Krishnan, 2009). Becher (1994) emphasises the importance of this knowledge on different levels: First, knowledge of disciplinary cultures is important when doing research evaluation. An example can be found in counting the number of publications for staff promotions or the inclusion in expert panels. Researchers from chemistry, a discipline where it is common to publish several short papers a year, would be favoured against those in history, where it is more common to publish substantial books often in greater time intervals. In addition, when providing training, it is important to distinguish between disciplines working in team and those working alone. Furthermore, disciplinary knowledge can help when problems occur with doctoral students. E.g. in the sciences, when topics are often specified by the supervisor(s), problems are more likely due to not working machinery or because a particular technique doesn't work. However, in the humanities, there is a strong insistence on students making their own choice, and failings are more likely due to a lack of adequate definitions or wrongly delimited research questions. Complaints from humanities PhD students are loneliness, a lack of adequate supervisory support whereas the main source of dissatisfaction of their colleagues in the sciences is being used as 'general dogsbody'. Lastly, disciplinary differences are important in relation to teaching practices as learning styles differ (Kolb, 1981): e.g. active-reflective in the soft sciences versus abstract-concrete in the hard sciences and heavily didactic teaching (e.g. law) to participative (e.g. modern languages) (Becher, 1994).

### **3.2 Factors influencing disciplinary differences**

Three different interwoven and interdependent categories can be distinguished when analysing influences on disciplinary publication patterns (see Figure 5): personal factors, factors external to science, or environmental factors and factors internal to science, or epistemological factors (inspired by Eisend & Schmidt, 2014; Luukkonen, Persson, & Sivertsen, 1992). Though, to which extent these factors actually have an influence, is subject of academic debate (Becher & Trowler, 2001), and the relative influence of these factors might vary for all research projects. E.g. Gläser (2007) emphasises that scientific communities with their own distinct social order, extending across all science policy institutions and organisation, have overall a larger impact on academics than the governance practices within universities.



**Figure 5:** Factors influencing disciplinary differences

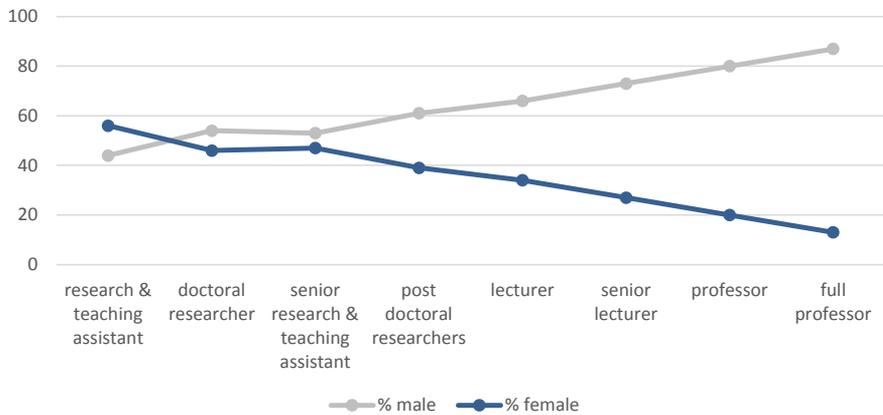
### **3.2.1 Personal factors**

The first category, personal factors, includes not only the researcher as an individual but also the social characteristics of the researcher. As stated by Becher and Trowler (2001; p.24: *“The academic, like all other social actors, is not [merely] a victim of circumstance [...] completely driven by external forces, but is at least partly empowered to reconstruct the cultural environment, both consciously and (more often) unconsciously.”* However, to which extent the individual has the power to choose freely, is subject to an academic philosophical debate, on which we will not elaborate further in this doctoral thesis. In addition to this personal choice, the individual intellectual and practical capacities (Hemlin & Gustafsson, 1996) as well as motivation also have an influence on the publication patterns. Furthermore, previous research has indicated social characteristics such as gender, position and (scientific) age are influencing the academic work. These three intertwined social characteristics have been extensively investigated with regard to publication practices. As gender is a major influencing factor and has only briefly been introduced in the research in this doctoral thesis (see section 8), the following part will focus on gender differences in relation to position and scientific age and their influences on disciplinary cultures.

#### *Gender*

Several studies have indicated that female scientists have different publication patterns than their male colleagues, also in the social sciences and humanities (Hemlin & Gustafsson, 1996; Puuska, 2010). Women tend to publish less articles, monographs and book chapters (Mathews & Andersen, 2001; Puuska, 2010) than men, with a ratio of two to one, although differences between disciplines remain (Kyvik & Teigen, 1996; Larivière, Ni, Gingras, Cronin, & Sugimoto, 2013; Prpic, 2002; Puuska, 2010). Furthermore, women have fewer co-authored papers than men do (Larivière et al., 2013; West, Jackquet, King, Corell, &

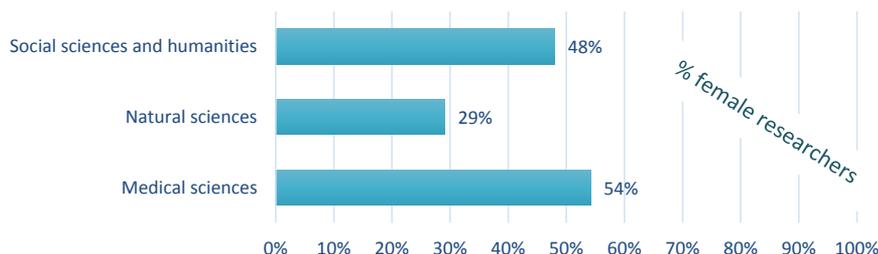
Bergstrom, 2013), have fewer leading author positions, i.e. sole, first or last authorship (Larivière et al., 2013; West et al., 2013) (note that authorship practices vary between fields, see section 4.4) and receive less citations in WoS (Aksnes, Rorstad, Piro, & Sivertsen, 2011; Larivière et al., 2013). However, when looking at social media recognition, the gender disparity fades (Paul-Hus, Sugimoto, Haustein, & Larivière, 2015). Furthermore, women tend to publish more locally than men do (Larivière et al., 2013). In 1993, Rossiter (1993) introduced the concept: ‘the Matilda-effect’, representing the systematic under-recognition of female scholars in the academic world (in response to the well-known Matthew-effect introduced by Robert Merton, indicating the systematic over-recognition of already recognized researchers). For example, Young (1995) states that many women first experience gender-based professional inequality in graduate school as developing meaningful mentor relationships with senior scholars is perceived more difficult by women than by men and they may receive less credit for collaborative research. The development of a network in graduate school has an important impact on the rest of their careers (Mathews & Andersen, 2001).



**Figure 6:** Share of male and female researchers according to academic career stage in 2013 in Flanders (source: VLIR Gelijke Kansen en Diversiteit 2015, p 22)

Explanations are manifold and so far no consensus has been found. However, a general accepted explanation is found in the differences in age and position between female and male researchers. As female undergraduate students globally often outnumber their male counterparts, this is no longer the case for professorships (West et al., 2013). Also in Flanders, this trend has been found, see Figure 6: where in 2013 the percentage of female research & teaching assistant is 56%, only 13% of the full professors is a woman. Age, career stage, productivity, citations and collaborations are highly interlinked variables (Gingras, Larivière, Macaluso, & Robitaille, 2008; Larivière et al., 2013). Researchers in the highest professional positions tend to be the most productive (e.g. Carayol & Matt, 2006). There is a cumulative advantage effect of recognition on publication output with increasing age (Hemlin & Gustafsson, 1996; Kyvik, 1991) and of increasing publication output and citation rates (Aksnes et al., 2011). Furthermore, productivity is positively related with collaboration, and collaboration is positively correlated with citation counts and prestige and acceptance rates (see section 4.2). A second explanation is to be found in the

family status and different gender roles. Research states that especially women with small children appear to be less productive than their male colleagues (Kyvik & Teigen, 1996), however, these results have been countered by Fox (2005) who state this social group of scientists appear to be even more productive. Fox (2005) considers three possible explanations for this anomalous pattern: First there might be a selection mechanism in that family demands take their toll along the way and that a proportion of women are eliminated from scientific careers and hence were not included in her study. Second, productivity for women was positively correlated with the time spent on research-related activities in contrast with non-research-related activities. Female researchers are often more involved in non-research activities such as teaching (Larivière et al., 2013), advising and administrative work (Mathews & Andersen, 2001), but this might get more important in a later phase of their careers. Third, Fox (2005) points towards the possible influence on flexible-time policies or programs of parental leave and child-care. The discrepancy in authorship positions could be explained by women being less likely involved with collaborative research projects or that men are more successful in informal negotiations for author position order (West et al., 2013). The difference in collaboration practices might be due to women not having easily access in male-dominated research networks (e.g. Young, 1995). In addition, a bias against women and their research styles and topics might be present in peer review processes (West et al., 2013; Young, 1995). Finally, Reskin (1978 cited in Kyvik & Teigen, 1996) suggests women are less confident professionally and Stolte-Heiskanen (1983); cited in Kyvik & Teigen, 1996) found contact with the group leader was perceived of greater importance for their work by women than by men. All in all, as indicated by Larivière et al. (2013) different subtle local and historical forces lie behind this global gender imbalance in research.



**Figure 7:** Share of female researchers in Flanders in 2012 (source: VLIR-statistieken 2012)

Women are said to have different perspectives, research styles and topic choices than men (Mathews & Andersen, 2001; Young, 1995). Fields associated with care, e.g. nursing, language, social work, education are typically dominated by women, whereas male dominated fields include engineering, computer science, philosophy and economics (Larivière et al., 2013), a trend also shown in Figure 7 and Figure 40. A previous study based on WoS demonstrated disciplines from social sciences showed a larger proportion of female authors, whereas the humanities are still heavily dominated by men (Larivière et al., 2013). However, more research into gender differences in WoS publishing is needed as WoS might be biased towards male researchers (see section 7.2.3). In Flanders, (see Figure 40) most social sciences disciplines have indeed more (active, i.e. having minimum one peer reviewed publication indexed in the VABB-SHW between 2000 and 2011) female researchers than the humanities disciplines. However, on average these

differences are rather small when using the VABB-data, as the social sciences have on average 42% and the humanities 38% (active) female researchers. Criminology, educational sciences and psychology are the three disciplines with the most female researchers in this data set, all around 50%, whereas history and history of arts, philosophy and theology are male dominated disciplines with around 70% male researchers.

### 3.2.2 Environmental factors

The second category of influencing factors on disciplinary cultures concerns environmental factors or factors external to science (Luukkonen et al., 1992), such as science policy and evaluation practices (see below), funding incentives, geography, university structure, technology, the internet, group characteristics (e.g. size), leadership, communication, etc. (e.g. Bernardes & Albuquerque, 2003; Duque, 2005; Gläser et al., 2002; Hicks, 2004, 2013; Kyvik, 1991; Langfeldt, 2001; Rowlands & Nicholas, 2005). Some examples: As mentioned before, research increasingly needs to give account to society and more and more research contributes to solutions of societal problems (Gläser et al., 2002), also in the social sciences and humanities. Strong social welfare states are connected with a strength in health sciences (Hicks, 2004). Strong industry has more influence on applied research than on basic research, the latter being in principle self-regulating (Becher & Trowler, 2001). Furthermore, organisational factors are less important in disciplines with more individual research, e.g. department size affects individual productivity in the natural sciences but not in the humanities (Hemlin & Gustafsson, 1996). The rise of digital technology, both computer and the internet, has affected science in all its aspects, going from data availability and processing (e.g. data-intensive science; European Commission, 2015, Burgelman, Osimo, & Bogdanowicz, 2010) over subject of study (e.g. cyber bullying) towards science 2.0 (e.g. interaction with peers via fora, i.e. an increased number of actors; European Commission, 2015). Digitalization has facilitated the developments of “*global flows of information and resources along networks transcending nation-states’ influence and disturbing nationally-organized systems and practice*” (Becher & Trowler, 2001; p.2). Digitization further influenced the growth of co-authorship (an indicator of collaboration –see section 4.4) and a growth of scientific publications (Burgelman et al., 2010). Again, academics debate to which extent external factors influence disciplinary cultures and publication practices. E.g. the assumption that research production and simple input factors such as funding and staff are linearly correlated is criticized by several authors (Auranen & Nieminen, 2010; Hemlin & Gustafsson, 1996; Hicks & Skea, 1989). In the following part, the possible impact of research policies on disciplinary differences are discussed more in detail.

#### *Research policy*

The effects of research policy vary due to different country-specific funding environments (Whitley & Gläser, 2007), specific reputation and promotion mechanisms (Auranen & Nieminen, 2010; Butler, 2004; Hammarfelt & de Rijcke, 2015) and to disciplinary publication traditions and career stage or academic age (Hammarfelt & de Rijcke, 2015). Furthermore, Whitley (2007) suggests the effect of systematic evaluation differs per disciplines: e.g. disciplines in which scientists are highly dependent on funding based on the judgement of the performance-based research funding systems (PRFSs) are more likely to be influenced

by the respective PRFS than their colleagues who obtain research funds from diverse organisations (e.g. industry, government, etc.). In addition, the cohesion and strength of current elites in a field co-determines the possible influence of evaluation systems (Whitley, 2007). Whitley (2007) further reasons research evaluation systems have an impact on the standardization of research styles, on the publication practices and on the organization of scientific work. As mentioned earlier, little quantitative research has indicated the impact of PRFSs on publication practices and disciplinary cultures. One of the main reasons would be that indicating causality is difficult to establish as one needs to isolate potential effects of other national and international factors (Bloch & Schneider, 2015). Hammarfelt and de Rijcke (2015) found that when disciplinary traditions in terms of publishing clash with incentives in evaluation models, the stronger the tradition, the smaller the effect on actual practice. This finding confirms the reasoning of Gläser et al. (2002; p.19) stating *“it is common knowledge in sociology of science that the field a scientist works in is an important source of intervening factors that may modify the impact of funding mechanisms”*. All in all, there is still a gap of knowledge when it comes to the question of how the new governance logic affects the work and behaviour of scholars and more research is needed (see section 7.2.3).

### 3.2.3 Epistemological factors

The third category includes the epistemological factors, or all factors more or less intrinsically connected with science. As mentioned earlier, analysing disciplinary cultures is important for understanding differences in publication patterns. Using the works of Biglan (1973a), Becher and Trowler (2001) and Kyvik (1991), Table 1 presents an overview of seven different characteristics of on the one hand the social sciences and humanities and on the other hand the natural and biomedical sciences. The different disciplines belonging to these not mutually exclusive groups differ in their publication output (Biglan, 1973b; Creswell & Bean, 1981), and these differences in publication cultures increase with the socialization of faculty into subject areas (Creswell & Bean, 1981).

A first study used in Table 1 is that of Biglan (1973a) who used the judgements of 168 scholars to study different dimensions of subject fields and their correlations. Disciplines were scaled on the different dimensions and some general conclusion were drawn for the different fields (see also Table 1). First respondents were asked to categorize subject matters on the basis of their in-between similarity and these categories were scaled on different characteristics afterwards. Biglan distinguishes three major characteristics: the soft – hard sciences, the pure (i.e. basic) and applied sciences and the study of life and non-life science, which later inspired Becher for his knowledge and disciplinary grouping system. Becher (1994) identifies disciplines based on the way academics engage with their subject matter, and the narratives they develop about this. Inspired by Biglan, Becher (1994) differentiates between applied and pure (i.e. basic) research in both the hard and the soft sciences (see appendix Table 32; Table 1 does not include this differentiation). Becher (1994) used interviews conducted with 221 academics in 12 disciplines and in the follow-up study (Becher & Trowler, 2001) data were added from a study of a single university and interviews with 24 newly appointed academics in England and Canada. Becher and Trowler (2001) differentiate between social aspects of knowledge and the epistemic properties of knowledge forms, which are intertwined and influencing each other. In addition, they point towards the structural

factors such as changes in availability of funding and declines in resources which have brought changes in what faculty members do and how they allocate their time. A last study used in Table 1 is that of Kyvik. In his book *Productivity in academia*, Kyvik (1991) provides a framework of structural characteristics of the different disciplines and analyses their influences on publication patterns. Kyvik used a questionnaire conducted in 1982 at four Norwegian universities and 56 structured interviews performed in 1982-83. In his search of explaining different publication patterns between fields, Kyvik (1991) concentrated on 6 internal scientific variables, all of which are to be regarded as continuums and not as distinct categories. Hard sciences are at one end of the dimension, social sciences towards the middle and humanities at the other end of the dimension (see Table 1).

The **delineation of paradigms** refers to Kuhn's (1970) paradigm shift in his famous book *The structure of scientific revolutions*. Kuhn differentiates between paradigmatic and pre-paradigmatic whereas Kyvik divides between one- or single-paradigmatic and multi-paradigmatic domains. As (Kuhn, 1970 p.175) cited in Kyvik (1991; p.63) "[Paradigm] on the one hand stands for the entire constellation of beliefs, values, techniques, and so on shared by the members of a given community. On the other hand, it denotes one sort of element in that constellation, the concrete puzzle-solutions which, employed as models or examples, can replace explicit rules as a basis for the solution of the remaining puzzles of normal science". "The paradigm serves important organizing functions; it provides a consistent account of most of the phenomena of interest in the area and, at the same time, defines problems which require further study." (Biglan, 1973b; p.210). Therefore, fields that are single-paradigmatic, mostly fields of the natural and biomedical sciences, are characterized by a greater consensus about content and method than multi-paradigmatic fields. In multi-paradigmatic fields, mostly fields from the social sciences and humanities, several competing paradigms exist instead of a single dominant one and consensus on methods and results is lower.

Biglan (1973a) differentiates between the different **natures of research methods and goals** of a field indicating the greater independence of research methods and goals of the humanities and the social sciences compared to the natural and biomedical sciences (NMS). Fields in the SSH emphasize creative approaches to their subject matter, whereas fields in the NMS sciences emphasize empirical approaches. Furthermore, inspired by Whitley (1984, 2000) *degree of dependence between scientists*, Kyvik (1991) indicates the degree of mutual dependence which refers to the necessity in a particular field of using similar methods and techniques as well as other scientists' research results and perspectives in order to perform useful quality research.

**Table 1:** Overview of some general internal continuous dimensions of the social sciences and humanities compared to the natural and biomedical sciences .

<b>General characteristics of the field</b>	<b>humanities</b>	<b>social sciences</b>	<b>natural &amp; biomedical sciences</b>	<b>Source</b>
Dispersion of the characteristics				(Becher & Trowler, 2001; Kyvik, 1991)
Classification	Soft sciences		Hard sciences	(Kyvik, 1991) (Biglan, 1973a) (Becher, 1994; Becher & Trowler, 2001)
Paradigmatic status	multi-paradigmatic		Single-paradigmatic	(Biglan, 1973a; Kyvik, 1991)
Nature of research methods and goals	aim to understand & interpret phenomena		cumulative and atomistic nature of knowledge	(Biglan, 1973a)
	Low degree of mutual dependence		High degree of mutual dependence	(Kyvik, 1991)
Social cohesion of communities	Rural		Urban	(Becher & Trowler, 2001)
	Loosely connected		Tightly-knit	(Biglan, 1973a)
Nature of research subjects	Local		Global	(Becher, 1994; Kyvik, 1991)
	Explore particularities		Concerned with the universals	(Biglan, 1973a)
Degree of competition for priority	Low		high	(Kyvik, 1991)
Communication language	Literary		Codified	(Kyvik, 1991)
Audience structure	General		Specialised	(Kyvik, 1991)

Closely related to the degree of mutual dependence is the structure of **social cohesion of the communities**. Fields where little consensus on research methods is present, are more likely to have a low degree of mutual dependence and to have a loosely connected or rural network. In rural fields, researchers work by themselves and the research work is slower and less competitive, whereas in urban fields, researchers prefer group work and the research work is fast-moving, competitive and densely populated (Becher, 1994). Furthermore, communities are tightly-knit if the smaller networks within that community are bound with a strong cultural affinity, communities that are loosely-knit have weaker bonds of historical or social circumstances (Becher & Trowler, 2001).

Fields differ in **the nature of the research subject**. In so called rural fields the research topics are more diverse whereas researchers in urban fields focus on a limited number of central problems. In addition, some research results are influenced by the country or region where the research is conducted (Kyvik, 1991), e.g. the study of national law is often country specific.

Furthermore, as recognition is awarded to the researcher who publishes an original result first (Merton, 1973 cited in Kyvik, 1991), the **degree of competition for priority** is distinguished for various fields. Urban disciplines have a higher number of researchers engaged at one time on a particular problem, whereas rural disciplines are largely explored by only a few researchers (Becher & Trowler, 2001). The number of researchers on one topic, influence the degree of competition for priority. Kyvik (1991; p.68) states: *“While the competition for priority is a reality in rapidly changing disciplines like physics and molecular biology, competition in the human and social sciences is low as the probability of being anticipated in these fields is small”*.

Kyvik (1991) further looks at the cohesion of **communication language** used within the disciplines. The division is inspired by the work of Zuckerman and Merton (1972) who presented the concept of *degree of codification*. Codification refers to cohesion in language use and the expression of research results in an unambiguous theoretical form and can be measured by amongst others the use of mathematics in written communication. Kyvik (1991) distinguishes between codified language fields, often fields in the biomedical and natural sciences, and literary communication, often present in social sciences and humanities fields. Literary communication indicates the reporting of research results in a more literary and essayistic manner.

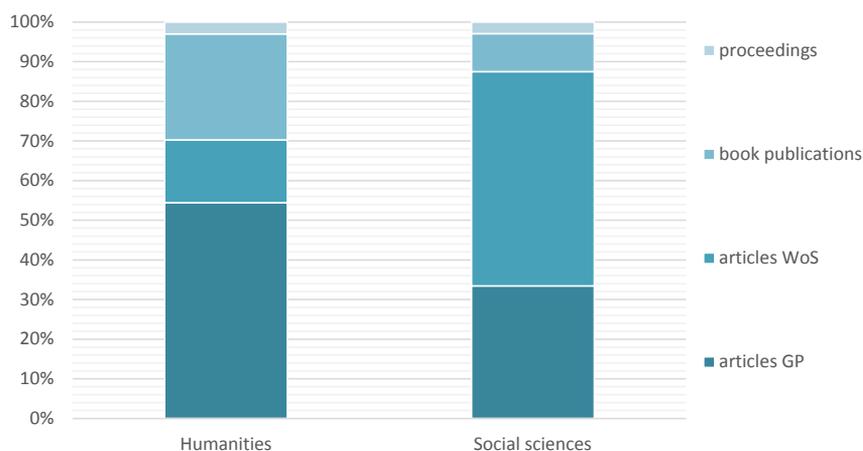
Finally, Kyvik (1991), inspired by Whitley (1984), identifies differences in **the audience structure**. All researchers, irrespective of their communication language have as their main audience specialist colleagues who give them recognition for their work. However, in some fields, mostly fields with less codified languages, also a more general audience is addressed and gives recognition to the researchers (Kyvik, 1991). This literature is often called enlightenment literature (see section 3.3.1).

All these characteristics internal to disciplines structure the basic disciplinary publication patterns (Kyvik, 1991), including productivity, citation patterns, publication types, publication language, publication place and collaboration patterns. All but the first two are discussed in the following sections of this doctoral thesis (see section 3.3 and 4.5).

### 3.3 Publication patterns in the SSH

The question arises how disciplinary cultures differ and how this is correlated with their respective publication and collaboration practices. However, before answering that question, we need to take into account that large differences exist within disciplines. When describing disciplinary publication patterns, we describe the predominance of characteristics of the different specialities within that discipline (Becher & Trowler, 2001). E.g. some parts of linguistics, a discipline traditionally classified in the field of humanities, resemble publication patterns of the social sciences (Nederhof & Zwaan, 1991). Furthermore, the more these different specialities differ in research practices and publication patterns, the more diverse this discipline is. A study of Ochsner, Hug, and Daniel (2013) identified four types of research based on the dimensions quality, time and success within German literature studies, English literature studies and arts history. A cluster analysis of individual senior authors using Flemish SSH data, reveals diversity within the aforementioned Flemish social sciences and humanities disciplines with researchers in psychology and social health sciences on the one hand of the spectrum and criminology and law on the other hand of the spectrum, resembling, respectively, the most in publication and collaboration patterns (Verleysen & Weeren, 2016). Finally, one should keep in mind that research practices and publication patterns change over time and space (Becher & Trowler, 2001).

Publication patterns in the social sciences and humanities differ to a considerable extent from those in the natural & biomedical sciences. Where the latter publish predominantly articles in English journals mostly indexed in WoS and reference recent publications in a set of core journals, the social sciences and the humanities have a more dispersed publication and citation behaviour (Hicks, 2004). The humanities and the social sciences publish and reference a mingling of articles in English journals indexed in WoS, book publications, national literature and non-scholarly literature (e.g. Aksnes, Schneider, & Gunnarsson, 2012; Biglan, 1973a; Billiet et al., 2004; Clemens, Powell, McIlwaine, & Okamoto, 1996; De Mul, 2008; Dyachenko, 2014; Engels et al., 2012; Glänzel & Schoepflin, 1999; Hicks, 1999, 2004; Huang & Chang, 2008; Katz, 1999; Kyvik, 1991; Nederhof, 2011; Nederhof, Zwaan, Debruin, & Dekker, 1989; Ochsner et al., 2013; Puuska, 2014; Thompson, 2002; Willaert, 2007). Figure 8 demonstrates the difference between Flemish social sciences and humanities in publication types: where the largest publication output in the social sciences is articles in journals indexed in WoS (54%), articles in journals selected by the GP, i.e. mostly national peer reviewed journals, dominate the publication output of the humanities (54%). Articles in GP-selected journals hold the second place in the social sciences (33%) whereas book publications do in the humanities (20%). However, the dominant disciplinary publication patterns might not match with the predominant patterns found in the field (see article 8.1 and 8.2). E.g. psychology and economics literature are found to be more resembling publication practices of the natural sciences, in contrast with e.g. the literature of sociology (Hicks, 2004). Research into publication patterns in the social sciences and humanities is of great importance, especially when linked with the possible effects of performance-based research funding systems (PRFSs) and other research evaluation systems.



**Figure 8:** Share of articles GP, articles WoS, book publications (monographs, edited books and book chapters) and proceedings papers in the VABB-SHW (2000-2011)

### 3.3.1 Audience

#### Academic and enlightenment literature

Academic literature can be seen as that literature which aims at an academic audience, whereas enlightenment literature aims at a more general audience (Hicks, 2004). As mentioned by several authors (e.g. Hicks, 2004; Kyvik, 1991; Whitley, 1984; see also section 2.2.1) disciplines in the social sciences and humanities, in contrast with these in the natural and biomedical sciences, communicate their research not only to a scientific and specialist audience, but also regularly towards a more general non-specialist public (e.g. books with a general appeal, blogs, articles in popular science journals<sup>8</sup>). In contrast with academic literature, enlightenment literature is less frequently peer reviewed. Peer review is commonly used as an indication of scientific quality (see section 2.3) and peer reviewed publications are often equated with academic literature. Verleysen and Engels (2014b) found the distance between peer reviewed and non-peer reviewed SSH book literature is growing in Flanders. Whereas peer reviewed books are increasingly published abroad and in English, non-peer reviewed book literature remains firmly domestic and published in the Dutch language. Academics in the humanities, e.g. in the field of history, reference both peer reviewed and non-peer reviewed publications (Verleysen & Engels, 2012), thus, non-peer reviewed publications have a diverse audience, both academic and non-academic, (Stieg Dalton,

<sup>8</sup> Reports are often regarded as 'grey literature' as it often has a specific audience, i.e. policy makers. Kyvik (1991) states "the growing existence of institute reports particularly in social science publishing is partly related to the need and wish to produce more comprehensive presentations, but is also related to the lack of alternative publishing channels. Manuscripts are often too long for an article or the potential readers are too few to justify publishing in a book form".

2008; Stieg Dalton & Charnigo, 2004; Verleysen & Engels, 2012, 2014b) and borders between scientific and popular publishing are not clear cut. A relation exists between the degree of codification and the degree of enlightenment literature: researchers in more codified fields, often using a more mathematical language, publish their research results less frequently towards a more general public, and vice versa. Furthermore, Kyvik (1991; p.74) states *“research in the humanities is partly justified because of its value as a cultural activity where the main object is to disseminate knowledge about history, art, literature and philosophy to a lay public. Research in the social sciences not only aims to produce knowledge about social processes and structures, but also to stimulate general understanding among the lay public of complex social phenomena. Popular science publishing for a general audience in these fields are thus a legitimate activity which in turn give recognition to the author”*.

Academic literature oriented towards an academic audience is in all disciplines the most important publication output, and its share is increasing even in the humanities (Hammarfelt & de Rijcke, 2015). Nevertheless, nowadays, more emphasis is put on enlightenment literature as it bridges the gap between research and the general public (e.g. KNAW, 2005). As an incentive, popular science prizes are awarded in different universities (Kyvik, 1991). Furthermore, knowledge is moved into application through non-scholarly journals (Hicks, 2004). Nevertheless, popularization of research is not always conducted. Kyvik (1991) lists several reasons given by academics explaining this: it is not always meaningful or possible, it is not rewarded by scientific credits, it is difficult to communicate with journalists as they simplify and distort the research results.

### **Local and international literature**

Academics in the social sciences and humanities publish both local and international literature, although the rate of international publishing differs between the disciplines and between the individuals. The degree of internationality of the literature can be identified by amongst others the publication channel (e.g. international journals versus national journals or local versus international publishers), collaboration with international researchers (see section 4.6) and the internationality of the audience.

Kyvik (1991) explains the difference in internationality of the research by referring to the nature of the research subject, the paradigmatic status of a field, the nature of the research methods and goals, i.e. the degree of degree of mutual dependence between researchers, and the degree of competition for priority. In the social sciences and humanities, research subjects are often somewhat local in nature, and, hence, are aimed at a more local audience, both academic and general. Besides enlightenment literature (see above), national journals, i.e. journals that publish primarily articles in the native language and that have a national author- and readership (Hicks, 2004), are of great importance as a publication output and reference source. However, some researchers debate whether research results on local topics need to be primarily communicated towards a local public (e.g. Nederhof et al., 1989). In disciplines with universal research subjects and a high degree of mutual dependence (i.e. dependence on the research results and perspectives of other researchers globally), it is necessary to make a contribution to the international research scene, and the principal audience is the international scientific community. Research is therefore often published in international journals, i.e. English language journals whose authors and readers work

in many countries, irrespective of the country of publication (Buéla-Casal, Perakakis, Taylor, & Checa, 2006). These disciplines or sub-disciplines are often single-paradigmatic, i.e. having shared methodologies and techniques; and have a codified communication language, both characteristics facilitating internationality (e.g. international collaboration; see section 4.5). Due to the high number of researchers working on these global subjects, the degree of competition for priority is higher than in disciplines where research subjects are less concentrated and researchers working on these topics will publish their results as quickly as possible through international journals in order to claim ownership. Furthermore, geographical context (e.g. top-down collaboration agreements) and social factors such as research traditions and the reward systems both internal (e.g. disciplinary norms) and external (e.g. performance-based research funding systems) also have their impact, although it is difficult to untangle their relative effects (Kyvik, 1991; see section 3.2.2).

### 3.3.2 Publication type

#### Journal articles

Among journal articles, we can distinguish between articles in journals indexed in large international databases such as WoS or Scopus which are often peer reviewed English journals, articles in peer reviewed journals not indexed in large international databases and articles in non-peer reviewed journals often not indexed in large international databases. As mentioned earlier, the latter are in general not counted as pure academic work, but rather as enlightenment literature. As the social sciences and humanities focus on society and culture, they are more embedded in and influenced by their social context than the natural and biomedical sciences (Hicks, 2004), and publish therefore substantially more in national journals (see above; see article 8.1). Journals are often concentrated with only a few publishers, however, differences between disciplines are prominent. A recent study into the share of scientific output in the journals of major publishing houses, showed that 50% of all papers in WoS between 1973-2013 were published with the top five most prolific publishers (Larivière, Haustein, & Mongeon, 2015). Journals within the social sciences have the highest level of concentration (70%), while the humanities journals have remained relatively independent (20%). In addition, journal articles in the SSH are less concentrated in a core set of journals than in the natural and biomedical sciences, however, differences between disciplines are prominent. In Flanders (see appendix Table 35), for most disciplines, about half of the peer reviewed articles appear in the first 10% of the journals. The concentration of articles is lowest in history of arts (39%) and sociology (44%) and is highest in criminology (69%) and law (74%). Further research into the concentration of these journals can give more insight in the publication characteristics of SSH researchers (see section 7.2.3)

Different factors are influencing the choice of a journal: reputation of the journal within a discipline, peer review status, quality of peer review, demands from funding agency, counts in evaluation schemes, speed of publication, open access, whether it is indexed in international databases (WoS or Scopus) (Hammarfelt & de Rijcke, 2015). Large international databases are indexing primarily international journals (see above) and, despite the efforts of WoS to index several national non-English journals in and since 2007, the latter

are still underrepresented in the WoS databases. This phenomenon has an impact on the coverage of disciplines from the social sciences and humanities (see article 8.1). In addition to the above listed influencing factors, incentives given on the individual level are also steering the choices of the researchers. E.g. since 1989, incentives on the individual level in Spain have taken the form of salary bonuses for publishing in prestigious journals (Butler, 2004). Jimenez-Contreras, Anegon, and Lopez-Cozar (2003) argue this system is one of the several different causes which have successively influenced Spanish research productivity. Also some universities of Denmark (Henriksen, 2015) are using this money-driven personal incentive to steer publication output towards WoS.

### **Book publications**

Book publications, i.e. monographs, book chapters and edited books, are and remain common in the social sciences, and even more in the humanities, both as references and as publication output (see article 8.1 and 8.2; see Figure 8; Adams & Testa, 2011; Nederhof, Van Leeuwen, & van Raan, 2010; Piro, Aksnes, & Rorstad, 2013). Butler (1998, cited in Hicks, 2004 as personal communication) found that the more books in a field, the smaller the share of its Australian journal literature covered by the SSCI. Book publications differ from journal articles in different aspects e.g. scientific role, length of publication, publishing delay, peer review system and nature of research. Hicks (2004; p.483) states: "*journal articles may reflect a more scientific and books a more humanities type of approach to scholarship*". Likewise, a study of Clemens et al. (1996) found books are often based upon qualitative evidence whereas journal articles were mostly based upon quantitative evidence. However, books based on quantitative evidence were the most cited of all. Clemens et al. (1996) found that journal article publishing is found to be more competitive with respect to its entry than book publishing as the first is using (double blind) peer review and the latter relies more on patronage, recommendations and reputation. In addition, both monograph and book chapter authors were often more senior and more experienced researchers, especially in the humanities (Díaz-Faes, Bordons, van Leeuwen, & Galindo, 2015; Verleysen & Ossenblok, *Forthcoming*). In contrast, proceedings papers are often authored by junior researchers as these researchers can gain experience in conferences (Puuska, 2010). As knowledge accumulates with time, the further researchers have progressed in their career, the more likely they are to have published a monograph (OAPEN-UK, 2014). Finally, book publications differ from journal articles in citation patterns, both citing and cited. Books too can be very highly cited (e.g. Kousha, Thelwall, & Somayeh, 2011; Nederhof et al., 2010; Torres-Salinas, Robinson-Garcia, Cabezas-Clavijo, & Jiménez-Contreras, 2013; Torres-Salinas, Rodriguez-Sanchez, Robinson-Garcia, & Fdez-Valdivia, 2013), and are often cited more than journal articles in some disciplines of SSH. E.g. Clemens et al. (1996) found a ratio of 3 over 1 citations in favour of book publications in sociology and Must (2012) found that single-authored monographs of eminent historians receive more citations than articles in history. Moreover, Nederhof and Noyons (1992) found the impact of some departments of general linguistics and general literature, was largely dependent on their books and book chapters, while other departments received most citations from their journal articles. Furthermore, citation rates to books and journal articles are different, and low correlations between the two have been found (Cronin, Snyder, & Atkins, 1997; Hicks, 2004). Book publications appear to be more transdisciplinary than journal articles indexed in WoS. A study of Clemens et al. (1996) reported that sociology book publications received between 54% and 79% of their citations from outside the discipline whereas this for

sociology articles varied respectively between 16% and 55%. Additionally, monographs reference proportionally fewer journal articles and more monographs and other types of literature (Hicks, 2004).

Several aspects influence the choice of the researcher to publish in book form. First, due to a lower degree of codification and a lack of a uniform symbol system, researchers from the social sciences and humanities need to elaborately explain their research questions, methodology and discussion of the results in order to persuade their colleagues of the importance and correct interpretation of the data (Kyvik, 1991; Whitley, 2000). Therefore, short(er) articles are less suitable than book publications. Second, as research is more internationally oriented, the degree of competition for priority is bigger in the natural and biomedical sciences than in the social sciences and humanities (Kyvik, 1991). In the latter, especially in the humanities, there is traditionally less need to publish quickly and more time can be devoted to writing coherent and comprehensive research. Therefore, the role of books in the natural and biomedical sciences is that of an overview of the state of knowledge around a topic in a field (Kyvik, 1991). Third, as Whitley (2000) already indicated, the social sciences and humanities have a different audience structure than the natural and biomedical sciences. Especially in the humanities, some research is also for the general public (see section 3.3.1), which again requires more comprehensive publications, resulting in book publishing or elaborate reports and non-scholarly publication outputs. Finally, humanities researchers are more likely to publish a monograph, which increases professional prestige (Kyvik, 1991) as the monograph is valued very highly by their peers (OAPEN-UK, 2014). Unfortunately, the monograph is not always included in external incentives such as the performance-based research funding systems (PRFSs). One of the practical reasons is that these PRFSs often use large international databases such as WoS, which only recently started to index monographs, edited books and their respective book chapters (Adams & Testa, 2011; Hicks, 2004; Leydesdorff & Felt, 2012). In 2011 Thomson Reuters proclaimed the making of the Book Citation index (Adams & Testa, 2011) and in 2013 Scopus announced the start of the Book Titles Expansion Program<sup>9</sup>. When book publications are included in PRFSs this is often via a local comprehensive database, e.g. the Norwegian Current Research Information System in Norway (CRISTin)-database included book publications from 2005 onwards since its start (see section 5.2) and the Flemish VABB-SHW from 2000 onwards since its start (see section 5.1). In those PRFSs a monograph is often estimated to equal 4 articles (e.g. Finland; Puuska, 2014 and Flanders; see section 5.1). Due to the changing scientific landscape (e.g. digitalization of the humanities), researchers are concerned about the sustainability of the monograph (OAPEN-UK, 2014).

### **Edited books**

Edited books, although being important publications both for referencing and as output, especially in the social sciences and even more so in the humanities, are often undervalued in databases, evaluation systems and scientometric and bibliometric research. Even though, as mentioned above, local databases include book publications among which edited books, they are not always included in the respective PRFSs. E.g. whereas edited books were included as a valid publication count in the PRFS in Flanders, they are not in the Norwegian Publication Indicator. In Flanders, the edited book was equated with 2 articles

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<sup>9</sup> <http://www.elsevier.com/>

in the first two years of the funding formula, yet, the weight was changed to equal 1 article in the BOF-key 2013 (Ossenblok, Verleysen, Spruyt, & Engels, 2013), and the weight of a book chapter remains equal to that of 1 article. As the edited book is often overlooked in evaluation systems, it might be that editing is not regarded entirely as academic work. E.g. Thomas and Hrebenar (1993) state the edited book is 25% communication, 25% management and 50% academic work. However, editing a book is also seen as 100% academic work (Larivière, 2014).

The value of edited books is difficult to determine as the reasons for editing are manifold, depending strongly on the type of edited books (original works or previously published papers), on the initiator (the publisher or the researcher), and on the occasion (e.g. as a result of a(n) (in)formal meeting or conference, as a support of a course, to pay tribute to a colleague, etc. (Hartley, 2015). Furthermore, some edited books are at the initiative of the editors, whereas others come into being at the initiative of the publisher. The choice of contributors is essential for the quality and the chances of finishing the book, as contributors who do not follow the deadlines can make the project fail (Edwards, 2012; Galanter, 2008; Leal, 2013; Lewis, 1996; Nederman, 2005; Thomas & Hrebenar, 1993). In addition, the composition of edited books varies between the different scientific fields. Puuska and Miettinen (2008 cited in Puuska, 2010) find that in the natural and biomedical sciences, edited books are often extensive reviews of a research area. In the social sciences and humanities collections of already published papers by different authors co-exist with collections of original contributions. In our research we found several types of edited books (see also section 5.3): e.g. books of abstracts, collection of short texts, anthologies, annotated books and loose-leaf volumes, etc. Additionally, different editor roles exist: e.g. book series editor, editor of the book, publisher editor etc. Therefore, a clear definition is needed in order to exclude the boundary cases and to focus the debate and research on what is commonly understood as an edited book. In our research we propose such a definition: *An edited book is a collection of chapters written by different authors, gathered and harmonized by one or more editors* (see article 8.6). However, even within this definition, a large variation in edited books remains. Furthermore, hitherto, little quantitative and qualitative research has focussed on the edited book and its contributors (for a full account of the literature on edited books see article 8.6).

All in all, despite edited books being undervalued externally, researchers keep on using them to communicate their research, and further research into the reasons for publishing edited books is required (see future research section 7.2.38.6). The main advantages of edited books is the possibility of combining different perspectives on a broad theme, irrespective of place and researchers' disciplines (Edwards, 2012; Leal, 2013; Lewis, 1996; Nederman, 2005). Therefore, one might expect interdisciplinary and international research questions, which are more prominent in the natural and biomedical sciences, are more suitable for this special publication type, yet, most edited books are published in the social sciences and especially the humanities, disciplines with often more domestic research topics (see section 3.3.1). In addition, edited books might also be of interest for publications that can be presented as a chapter, but are not of interest for an article, e.g. explain a methodological issue in detail (e.g. (Cronin & Sugimoto, 2015; Ding, Rousseau, & Wolfram, 2014). Disciplinary traditions might influence the choice of a researcher to publish a book publication and it might be believed editing a book is less time-consuming than writing a monograph, (Edwards, 2012; Nederman, 2005). Though, as publishing an edited book is still time-consuming (Edwards, 2012; Hartley, 2015; Nederman, 2005), especially when collecting unpublished

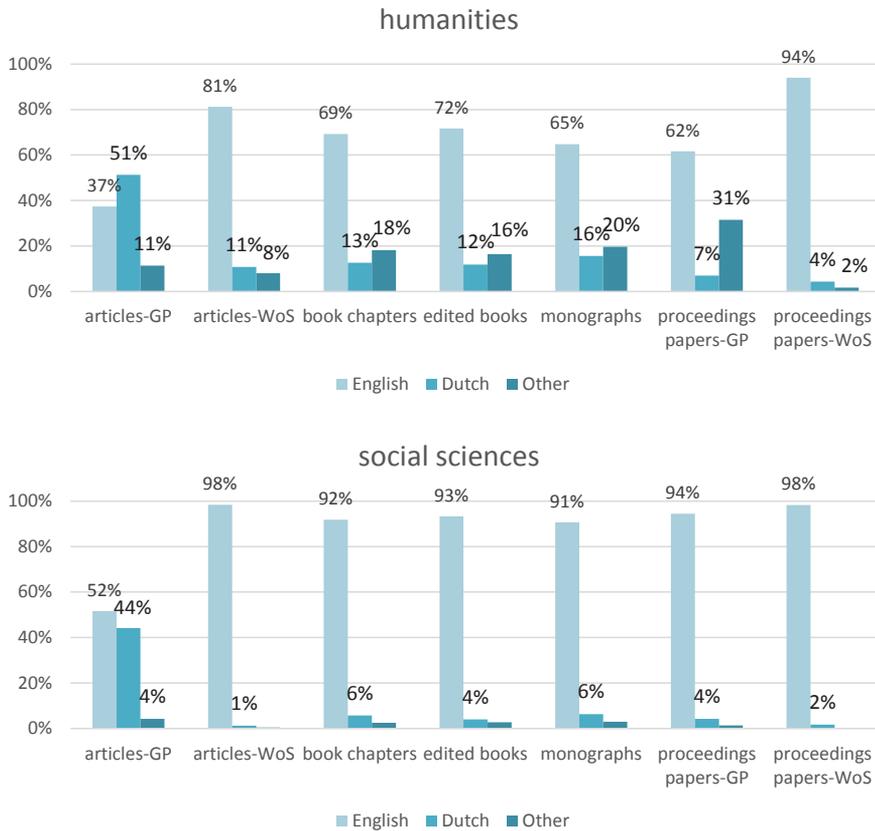
research, the degree of competition for priority in a field might be influencing the number of edited books in the respective field. However, due to competition for ownership claims, also in the social sciences and humanities, new works might be better published separately on the internet rather than in book form. In addition, due to the internet and the faster and greater accessibility of publications, collections of previously published papers might be less necessary nowadays (Hartley, 2015). Therefore, one might expect edited books, both collection of new and already published work, will diminish over time. Yet, in Flanders, this appears not to be true in the social sciences and humanities (see article 8.1).

### 3.3.3 Publication language

When communicating research to the international scientific community, a common language or lingua franca is a valuable asset fostering both spoken and written communication between researchers with a different native-tongue. The publication language affects linguistic accessibility and therefore the distribution of a publication to its readers. In that sense, publication language can also be seen as an indicator of internationality, especially when looking at the percentage of the world's population speaking the language, the number of countries where the language is official and the academic impact of the language (Buela-Casal et al., 2006). In addition, language plays a crucial role in the transformation of knowledge and the development of interdependence (John-Steiner & Meehan, 2000) and it is a key barrier to interdisciplinary research (Sugimoto & Weingart, 2015). English is nowadays seen as the most important scientific publication language (see also section 2.1), and science has been identified as one of the main fields cultivating English as a global language (Ammon, 2001). Nevertheless, other scientific publication languages are still common practice. The large Chinese and Spanish language scientific communities, having both their own immense databases (Buela-Casal et al., 2006; Jin & Wang, 1999; Wu, et al., 2004), allow researchers to publish and access research in one of these two languages. In addition, less universal languages are frequently used in the communication processes of the social sciences and humanities.

Research on the under-explored topic of English for research publication purposes is ongoing and focusses on the disadvantages of using English as an additional language for non-English native speakers and the factors influencing the language choice of the researchers (Lopez-Navarro, Moreno, Angel Quintanilla, & Rey-Rocha, 2015). The use of a lingua franca in science not only has advantages and the debate is not always value free (Ammon, 2001). One of its main disadvantages can be found in the benefit of the native English speaking scientists, publishing companies and firms using science over their non-native English counterparts. As pointed out by Ammon (2001; p.vii) *"It seems almost self-evident that the native speakers of the prevalent scientific language have less difficulty using it passively (in reading, oral understanding) and actively (in writing or speaking) than do non-native of foreign-language speakers, and therefore, have advantages over the latter in communicative situations which require the use of English"*. E.g. Burgess, Gea-Valor, Moreno, and Rey-Rocha (2014) found that historians are redirecting the limited resources in their faculties towards training in English instead of training other useful research skills. Furthermore, as a study of Baldauf's (2001) on Australia indicates native speakers become less inclined to learning foreign

languages and are therefore hindered in reading scientific publications published in other than English languages.



**Figure 9:** Share of peer reviewed publications in English, Dutch and other languages per publication type for the humanities and the social sciences in Flanders (2000-2011). (GP indicates the selection of the Authoritative panel, for a full explanation see section 5.1)

Several aspects influence the language choice of researchers for their publications. Researchers working on topics with local relevance, are more likely to publish in the local language (e.g. Lillis & Curry, 2010). The research of SSH researchers is often locally oriented, addresses a mixed audience of specialists and non-specialists and is often published in a local language (see sections 3.3.1 and 3.3.2). Conversely, the emphasis of evaluation and promotion systems in many countries on publications in WoS stimulates publishing in English. Journals included in WoS are predominantly English language journals and only a small number of non-English speaking journals have been included (e.g. Dyachenko, 2014). Interestingly, more and more local journals in Flanders are changing their publication language towards English or are

giving their authors a choice (e.g. *Journal of Belgian History*<sup>10</sup>), which also influences the upward trend towards English publications. In addition, a general trend towards international mobility has taken place. In Flanders, this trend is especially apparent at the level of the doctoral and postdoctoral researcher, with an increase of respectively 18% and 20% between 2003 and 2012 (De Kock, Viaene, Levecque, Stassen & Gilliot, 2015), going hand in hand with an vast increase in number of doctoral and postdoctoral researchers (see Figure 2). In 2012, 29% of all doctoral researchers, 33% of all postdoctoral researchers are international researchers compared to 8% of all professorships and 5% of all research and teaching assistants (De Kock, et al., 2015). Although 20% of all international researchers come from the Netherlands (De Kock, et al., 2015), and therefore are probably familiar with the Dutch language. The other 80% of all foreign researchers are probably not familiar with the Dutch language. The increasing trend towards more English publications, is therefore also influenced by the increasing share of international researchers working at the Flemish universities.

Overall, the share of English publications is on the rise in both the social sciences and the humanities (e.g. Engels et al., 2012; Hammarfelt & de Rijcke, 2015; Kellsey & Knieval, 2004), although differences between disciplines are present. In Flanders, (see Figure 9) English is more common as a publication language in the social sciences than in the humanities, and this for all peer reviewed publications and for all publication types. Moreover, in the social sciences, Dutch and other languages are only common in the articles in GP-selected peer reviewed non-indexed journals (see section 5.1). In the humanities, Dutch and other languages are customary, i.e. in more than one in four publications, for all but WoS-indexed articles (one in five) and proceedings papers (less than one in ten). All in all, for all publications types but one, English remains the most used language, and an upward trend has been found (see Table 34). In addition, Verleysen and Engels (2014b) showed that in Flanders peer reviewed book publications are increasingly published abroad and in English, whereas non-peer reviewed book publications remain domestic and published in Dutch. Moreover, as knowledge accumulates and local topics are more often locally published than international topics, researchers working on those local topics can be expected to cite more locally published research. E.g. a study of Yitzhaki (1998) showed that sociologists over cite publications in their own language. As English language sociology publications count for about 70% of the world literature and French and German count for 10%, 99% of the references of American and British authors were in English whereas this was 60% for the French and German authors.

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<sup>10</sup> <http://www.journalbelgianhistory.be/nl>

## 4 Research collaboration

*“I’d collaborate with my clones, because I’m a team player who wants all the credit.”* — Jarod Kintz in *This book is not for sale*.

### 4.1 Definition of research collaboration

Research collaboration has been studied by numerous authors during the past 50 years and more (for an overview see Beaver, 2001; Bukvova, 2010; Sonnenwald, 2007; Subramanyam, 1983). However, hitherto, no common definition has been agreed upon and the concept of research collaboration has been defined in a variety of ways. One might argue that science, building new knowledge using previous knowledge, is in itself a collaborative activity (Subramanyam, 1983) or, one might see collaborators solely as the researchers that have participated actively in every aspect of the research project (Katz & Martin, 1997). In their search for a common definition Katz and Martin (1997) conclude that defining research collaboration is subject to social conventions as a wide spectrum of activities can be seen as necessary for research collaboration or not, e.g. exchange of ideas, resources, data and results; the management of research projects; active participation in research projects, co-authorships (e.g. Katz & Martin, 1997; Laudel, 2002). Although different definitions exist, in this study (see also article 8.6), we focus on the definition of Sonnenwald (2007; p.645): *“research collaboration is the interaction taking place within a social context among two or more scientists that facilitates the sharing of meaning and completion of tasks with respect to a mutually shared, superordinate goal”*. Furthermore, Shapin (1994 cited in Wray, 2002) differentiates between collective and collaborative research. In collective research, credit and responsibility rest with one person, although other researchers or technicians have helped with the project, whereas in collaborative research credit and responsibility are shared. Building on these two approaches, collaboration practices comprise all interactions between scientists that fructify a scientific publication and all collaborators have a shared credit and responsibility for that publication.

### 4.2 Importance of research collaboration

There is a consensus on the growing importance of collaborative research (Wray, 2006), especially as governments and researchers assume research collaboration has a positive effect on productivity, quality and impact, the latter two often measured by citation counts and acceptance rate of publications in journals and conferences (see section 2.3). However, due to the difficulties of measuring collaboration (see section 4.4), studies on these effects seem to have (partly) conflicting findings.

First, several studies state research collaboration appears to be positively related to personal productivity (e.g. Haslam et al., 2008; Katz & Martin, 1997). However, Lee and Bozeman (2005) found this was true for

whole publication counts but not for fractionalized publication counts. Also, they found a great deal of variance, indicating not all collaborations are created equal and not all collaborations are equally fruitful in terms of personal productivity. One reason of higher individual productivity when collaborating, is the decrease of time spent on a publication. Furthermore, Egghe and Rousseau (1996) found that parallel collaboration decreases the time spent on a publication, but serial collaboration increased the quality gain.

Secondly, collaboration in journal articles appears to be positively related to citation counts, also in the social sciences and humanities (Beaver, 2004; Franceschet & Costantini, 2010; Gazni & Didegah, 2011; Hsu & Huang, 2011; Katz & Hicks, 1997; Wuchty, Jones, & Uzzi, 2007), however, the strength of the correlation depends largely on the type of collaboration, the disciplines, the publication type, the geographical location and the type of research. Several studies found that international collaboration does make a difference in citation counts, whereas inter-institutional or intra-institutional does not, or to a lesser extent (Didegah & Thelwall, 2013; Goldfinch, Dale, & DeRouen Jr., 2003; Katz & Martin, 1997; Narin, Stevens, & Whitlow, 1991). Yet, Puuska, Muhonnen, and Leino (2014) found no differences for the Finish humanities in citation impacts for domestic and international publications. Besides, Thelwall and Sud (2014) found that although the citation advantage for collaboratively produced journal articles is often true within different disciplines, no evidence of a citation advantage for collaboration on monographs was noted. In addition, the number of co-authors per paper appears to be significantly positively related with the number of citations (Gazni & Didegah, 2011; Levitt, 2015; Persson, Glänzel, & Danell, 2004; Puuska et al., 2014). The correlation between collaboration and citation counts is stronger in the natural and biomedical sciences than in the social sciences and humanities, especially when looking at the number of authors per publication (Levitt, 2015). Several studies focussed on the optimal number of co-authors in terms of increasing citation counts. Whereas the optimal number of co-authors for publications in the natural sciences (using the Science Citation Index) is set on 12 (Persson et al., 2004) or even 20 (Costas & Bockhove, 2012), the optimal number on average for the social sciences (using the social science citation index) is set on 2 (Levitt, 2015). Levitt and Thelwall (2010) found the extent to which collaborative articles were more highly cited varied considerably from region to region and van Raan and van Leeuwen (2002) point towards the differences in citations between basic versus applied science. Although citation counts are often related to impact and even quality (e.g. Franceschet & Costantini, 2010), the question arises whether this positive correlation between citation counts and collaboration is due to self-citation and its related higher visibility (Fowler & Aksnes, 2007) and not necessarily higher quality.

Thirdly, collaboration is positively related with prestige and acceptance rate in journals (Gordon, 1980), which is visible through the number of co-authored papers in core journals (Beaver, 2001). Bridgstock (1991) found multiple authored papers in the sciences are valued higher than single authored papers, although strong evidence is still lacking. The reason might be found in the intersubjective verification of the work by the individual collaborators as the collective judgement of a work is trusted more than that of a single person (Beaver, 2004). However, Franceschet and Costantini (2010) found that in Italy, in all disciplines, single authored papers not only receive a good share of citations from other researchers but are also generally positively judged by peer experts. Furthermore, the more complex the research problem, the more advanced and specialized the knowledge of the researchers need to be. Therefore,

when different brains work on the same question, extra authority is given to the different parts and to the research as a whole. Several psychological studies (Surowiecki, 2004) concerning creativity in group also state that groups are more creative than individuals. However, breakthrough inventions seem to have disproportionately been obtained by individual researchers instead of mass industrial laboratories, which have a greater share of innovations based on already existing technology (Beaver, 2004).

Although collaboration is generally seen as a beneficial research practice, not all collaborations are equally fruitful (Lee & Bozeman, 2005) and it equally entails a number of potential risks, here grouped in four main points. First when several researchers collaborate on a project, the epistemic responsibility of the outcome is scattered (Wray, 2002) and collaborative work might be used to hide unethical conduct (Sonnenwald, 2007). In addition, not only responsibility, but also the credits for a collaborative work are claimed and thus shared by all collaborators (Wray, 2002). Therefore, some individual contributions might be undervalued which creates possible tension (Sonnenwald, 2007) and the motivation of the scientists might erode (Wray, 2002). Single-authored papers give the opportunity, especially to young researchers, to prove themselves to themselves and to the scientific community, which is essential to keep themselves highly motivated (Wray, 2002). Secondly, due to the nature of their research or other more individual reasons, some researchers are less able to collaborate. Therefore, in systems where collaboration is favoured in terms of funding, the growth rate of scientific knowledge in some areas might be diminished (Wray, 2002). In addition, collaboration networks can become powerful lobby groups with direct influence on policy and funding mechanism and enhance their own research at the expense of other research (Wray, 2002). Thirdly, large research groups have the risk of fragmenting their research and coordination and focus on several spearheads is necessary. Finally, collaboration does not only decrease research cost (see 4.3), it also takes a bigger bite from the research budget and the research time as there is increased administration, travel costs of people and equipment and time consuming joint proposals, planning of the research and discussion (Katz & Martin, 1997).

### **4.3 Factors influencing research collaboration**

The first collaborative scientific paper dates from 1665 (Beaver & Rosen, 1978), and the number of collaborative papers has increased ever since, starting a rapid growth after World War I. Between 1920 and 1950's, science has become a collaborative, as opposed to individual, enterprise (Bucchi, 2004) going hand in hand with the growing professionalization of science (Beaver & Rosen, 1978), entailing more permanent paid scientific positions and the creation of academic professional associations which evaluated and disseminated scientific work through academic journals (Krishnan, 2009). Furthermore, more recent developments of new technologies not only result in large and more complex practicalities, but also in new transportation modes and electronic communication systems which can bridge the geographical distance between researchers (Katz & Martin, 1997). In addition, geopolitical factors (e.g. diplomatic ties between nations) also can have a facilitating role (Luukkonen et al., 1992), although these factors can also hinder research collaboration (Debruin, Braam, & Moed, 1991). Finally, as mentioned before, research collaboration has been perceived by both national and international governments (e.g.

The European commission: Horizon 2020<sup>11</sup> and Framework Programs<sup>12</sup>) as a good practice and, therefore, has been stimulated by financial incentives (Heffner, 1981; Katz & Martin, 1997), favouring collaborative research. National performance-based research funding systems (PRFSs) can be used to stimulate collaboration, be it local or international, by using whole counting of publications, as is the case in Flanders (see article 8.3). However, some PRFSs are using fractional counting (e.g. Norway, see section 5.5), which might reduce collaboration (Schneider, 2009; Sivertsen, 2010). Preliminary research into this difference in incentive mechanism by whole and fractional counting concludes the effects are present, be it reduced by disciplinary standards and norms (Sivertsen, Deschacht, Aldberg, & Engels, 2013). Furthermore, national incentives stimulate research mobility by funding participation in conferences, short or long research stays for both starting and established researchers. All in all, these factors, to most extent external to science itself, nurture an environment where collaboration can prosper.

The reasons to collaborate are manifold since collaboration is a complex social interaction and every list given will be incomplete. Melin (2000) emphasizes that scientists should always choose themselves with whom and how they would like to collaborate. However, several factors, more or less intrinsically connected with science itself, influence the scientists' choice therein. Most factors can be grouped under epistemological, cognitive, economic and social factors (inspired by Luukkonen et al., 1992).

### **Epistemological factors**

Science itself stimulates collaboration practices. Several philosophers of science have investigated in which way the social structure of science contributes to the success of science. Wray (2002; p.2) points out "*collaborative research plays a significant causal role in ensuring that scientific communities are able to realize their epistemic goals*". Furthermore, van Rijnsoever and Hessels (2011; p.464) state that "*if the scientific system is regarded as a social structure that enables and constrains the behaviour of individual researchers, then it either stimulates or inhibits particular collaborations*". Kyvik (1991) finds that the mutual dependence of researchers is increasing due to more complex research tasks and more expensive research equipment. In fields with a low degree of dependence, researchers do not have to collaborate with colleagues to produce qualitative work, nor do they have to use the same research methods and perspectives (Kyvik, 1991). Furthermore, communication and decision making play an important role in collaboration processes. Therefore, in fields where scientists share the same paradigm scientists can agree easier on many decisions in the collaborative process than in fields where scientists share different paradigms. "*If the collaboration process becomes too difficult and conflict-ridden, collaboration may no longer offer advantages to scientists*" (Lodahl & Gordon, 1972 cited in Kyvik, 1991; p.70). Moody (2004) claims collaboration is more likely in research that can more easily incorporate a division of labour and quantitative work is more likely to be co-authored than non-quantitative work. In addition, the more codified a field, the easier collaboration can be conducted and especially essayistic publication often have an individual character as it can be difficult to agree not only on content but also on style (Kyvik, 1991). Kyvik (1991) further reasons independence is often regarded as fruitful in the SSH in order to develop new

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<sup>11</sup><http://ec.europa.eu/programmes/horizon2020/>

<sup>12</sup> [http://ec.europa.eu/research/fp7/index\\_en.cfm](http://ec.europa.eu/research/fp7/index_en.cfm)

scientific paradigms. However, research in the SSH has changed in the past few decades, and data-science is growing, also in the humanities (e.g. digital humanities (Svensson, 2010)).

### **Cognitive factors**

As research questions become more and more interdisciplinary and more and more complex, collaborating can help the researcher tackle these problems (Katz & Martin, 1997; van Rijnsoever & Hessels, 2011) as it gives access to expertise (Beaver, 2001; Katz & Martin, 1997; Melin, 2000) and fosters combining and transferring skills (Beaver, 2001; Katz & Martin, 1997; Luukkonen et al., 1992). Furthermore, as discussed earlier, collaboration can increase scientific credibility (Sonnenwald, 2007), especially when a research question can only be solved with advanced knowledge in different specializations. Collaboration can also foster the diffusion of knowledge (Sonnenwald, 2007), e.g. when more researchers use their professional and personal networks while announcing the new research. Research collaboration can keep the researcher more focused on the work at hand (Beaver, 2001), as more researchers are counting on finishing the work. Moreover, collaboration provides intellectual companionship (Beaver, 2001; Katz & Martin, 1997) and might reduce errors and mistakes (Beaver, 2001). Finally, collaboration creates new ideas and enhances creativity (Katz & Martin, 1997; Sonnenwald, 2007; Surowiecki, 2004).

### **Economic factors**

In order to answer the increasingly complex research questions, research infrastructure is getting progressively complex and expensive and an increase in both formal and informal collaboration is asked for (Cronin et al., 2003; De Haan, 1997). Sharing this expensive research equipment reduces costs (Beaver, 2001; Luukkonen et al., 1992). In addition, in answer to the aforementioned funding mechanisms promoting collaboration, collaboration also gives researchers access to financial resources (Beaver, 2001; Melin, 2000). Furthermore, research collaboration can increase efficiency (Beaver, 2001; Luukkonen et al., 1992) and enhance productivity (Luukkonen et al., 1992), which provides researchers with an answer to the increasing trend of evaluation based on number of publications. Lastly, as mentioned above, collaborations can help to acquire recognition which will help to obtain additional funding, which is the basis for new research (van Rijnsoever & Hessels, 2011).

### **Social factors**

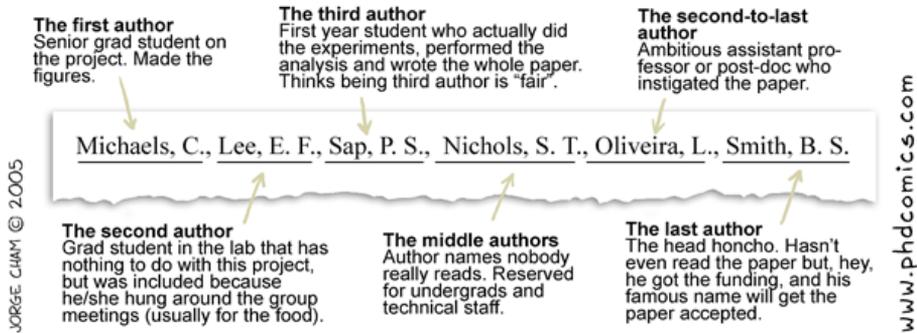
Researchers may collaborate just because they enjoy the social contact (Beaver, 2001; van Rijnsoever & Hessels, 2011), want to create a network or reduce isolation (Beaver, 2001). Moreover, most collaboration begins informally and is often the result of informal conversations (Price & Beaver, 1966; Jeong, Choi, & Kim, 2011). Therefore, spatial proximity seems to encourage collaboration (Katz, 1994; Larivière et al., 2006) as well as teamwork (Kyvik, 1991). Invisible colleges, i.e. the informal affiliation of scientists with common interests who are formally based in different institutions (Crane, 1969; Price & Beaver, 1966; Lievrouw, 1989; Zuccala, 2006) are a good source of potential collaborators (Katz & Martin, 1997). In addition, as mentioned earlier (see section 3.2.1), female researchers are less likely to co-author their

publications which might be due to women having more difficulties to access male-dominated research networks. Furthermore, scientists aim to build a reputation and to earn peer recognition (Whitley, 2000) and collaboration may help to increase the visibility and the prestige of the work (Beaver, 2001; Katz & Martin, 1997; Luukkonen et al., 1992), especially when working together with highly valued researchers. However, the social distance between highly valued researchers and e.g. apprentices, can also hinder the collaboration process (Katz & Martin, 1997). Finally, as junior researchers and graduate students are often collaborating with their mentors, the increase in mentorship is influencing the number of collaborations (De Haan, 1997).

#### **4.4 Measuring research collaboration through co-authorship**

Measuring research collaboration is particularly difficult as it is a complex social interaction with different definitions depending on social convention (see section 4.1). Previous research on collaboration practices has used different methods such as interviews, questionnaires, case studies, the measurement of acknowledgments and co-authorship, with the latter being the most common and widely used one. Measuring co-authorship has several advantages as it is easy to calculate and can be used in several collaboration measures and in network analysis. Furthermore it is inexpensive and practical, invariant and verifiable (Katz & Martin, 1997; Subramanyam, 1983). Besides, co-authorship calculations are said to be non-intrusive and non-reactive as the measurement itself does not affect the collaboration process (Subramanyam, 1983). However, when using co-authorships in policy incentives, a long-term effect might be possible (Sivertsen et al., 2013). Measuring collaboration through co-authorship also asks for some circumspection because it is only a partial indicator of collaboration as it only counts the collaboration where the collaborators have put their name on the paper (Katz & Martin, 1997). Laudel (2002) notes that only half of the collaborations are visible in formal communication channels, such as co-authorship relations and one third of the collaborations are rewarded by acknowledgments, also known as subauthorships (Bukvova, 2010; Cronin et al., 2003). She further indicates that of all different sorts of collaboration, only collaboration involving a division of labour is generally agreed upon to be rewarded with co-authorship, whereas service collaboration, provision of access to investigate equipment, transmission of knowhow, mutual stimulation and trusted assessorship, are not (Laudel, 2002). However, Kyvik (1991) indicates that co-authorship practices differ between disciplines: Whereas some collaboration may be automatically rewarded with co-authorship in the natural and biomedical sciences, this might not be true for the social sciences and humanities. These practices are evolving, also in humanities fields where single-authored publications are highly valued (Kyvik, 1991; Watson-Boone, 1994) and where collaborations are often put in a footnote rather than in co-authorship (Kyvik, 1991). Under the pressure of the new evaluation systems, it has become necessary, especially for young scientists to document their participation in research by co-authorships (Kyvik, 1991).

## THE AUTHOR LIST: GIVING CREDIT WHERE CREDIT IS DUE



Authorship is a construct that is used to give credit for the work and, hence, intellectual property (e.g. Ede & Lunsford, 2001; Endersby, 1996; Greene, 2007). Whether or not all other collaborations will be rewarded with co-authorship is subject to negotiations influenced by the type of collaboration (see above), the rules of the scientific community (Endersby, 1996), the departmental rules, the individual interest of the researcher and the journal's editor rules (e.g. Learned Publishing<sup>13</sup>). In response to hyper-authorship (Cronin, 2001) or mega-authorship (Kretschmer & Rousseau, 2001) several scientific associations and communities have set a series of guidelines concerning responsible authorships (e.g. the Publication practices and responsible authorship of the American Psychological Association<sup>14</sup> and the Vancouver guidelines of the International Committee of Medical Journal Editors<sup>15</sup>). Several researchers have proposed to score a person's contribution (e.g. Hunt, 1991), in order to decide if a person deserves the status of co-author or not. Despite these guidelines, misconduct of authorship is still present (Katz & Martin, 1997; Laudel, 2002), be it in ghost authorship, i.e. an author complies with the author criteria but is not rewarded an authorship, or honorary authorships, i.e. an author does not comply with the author criteria but is still rewarded an authorship (Katz & Martin, 1997). However, as publication output is increasingly important in evaluation and funding systems, ghost authorships are likely to decrease, despite the disciplinary customs. All in all, views on what it means to be an author or co-author vary across fields (Cronin, Shaw, & La Barre, 2003; Birnholtz, 2006) and will reflect in different research and collaboration patterns (Biagioli & Galison, 2003). Nonetheless, co-authorship is commonly used and broadly accepted as a measure for collaboration.

<sup>13</sup> Learned publishing refers in their guidelines for authors (source:

[http://alpsp.org/Ebusiness/Libraries/LP\\_Stuff/Guidelines\\_for\\_Authors\\_July\\_2015.sflb.ashx](http://alpsp.org/Ebusiness/Libraries/LP_Stuff/Guidelines_for_Authors_July_2015.sflb.ashx)) to a statement needed from the authors indicating all named authors comply with the author criteria of the International Committee of Medical Journal Editors (source: <http://www.icmje.org/recommendations/browse/roles-and-responsibilities/defining-the-role-of-authors-and-contributors.html>).

<sup>14</sup> <http://www.apa.org/research/responsible/publication/>

<sup>15</sup> <http://www.research.mq.edu.au/documents/policies/Vancouver.pdf>

Measuring collaboration through co-authorship is not a novelty as in the 50's and 60's Smith (1958), Merton and Price (cited in Kyvik, 1991) already showed a rise in multiple authorship. However, authorship, collaboration practices and the associated reward system are still topical issues. Several studies using co-authorships focus on different aspects of the collaboration process, the actors and the context in which the collaboration takes place. Other studies focus on the interaction level of the collaboration process, as it can take place between or within nations, institutions, departments, research groups or at the interpersonal level (Katz & Martin, 1997, Laudel, 2002; Subramanyam, 1983). Co-authorship is also studied in order to indicate the amount of effort that each co-author put into the work (Hu, 2009). In addition, several studies focussed on the differences in co-authorship practices between different disciplines by focussing on the author place. In many fields, the first authors is considered the leading author, having the highest contribution to the paper, however, in some fields, e.g. economics, mathematics and high energy physics, alphabetical order is a common practice (Birnholtz, 2006; Egghe & Rousseau, 1996; Endersby, 1996; Laband & Tollison, 2000; Levitt & Thelwall, 2013), which might be interpreted as equal levels of contribution to the work. Equal authorship is on the rise and the interpretation in terms of importance of the authors depends on the disciplinary culture (Hu, 2009). As equal collaboration efforts are not common, some researchers suggest weighted authorship, where weights are distributed according to input (e.g. Hagen, 2009, 2010). Finally, co-authorship is used in popular network studies, indicating who collaborates with whom, predicting future collaboration patterns (e.g. Guns & Rousseau, 2014; Liben-Nowell & Kleinberg, 2007), etc. All these studies contribute to the knowledge on scientific collaboration practices and co-authorships, and studies will continue as many knowledge gaps still exist.

#### **4.5 International collaboration**

Scientific internationalisation encompasses various items, not all equally visible nor measurable, such as the mobility of researchers, both incoming as outgoing, competing for international funding, attendance to conferences, formal and informal networks at the level of the researcher, the department, the institute or the country and international publications. International publishing, as discussed in this study, involves international co-authorships, publication language (see section 3.3.3) and publishing in international journals and with international publishers (see section 3.3.1). In addition international publishing enhances the internationality of the topic and the geographical distribution of the publications which can be measured by addresses of citing publications, of lib citations (White et al., 2009), etc. Several studies have investigated the internationality of journals and an Internationality Index of journals is proposed, constructed from weighted combination of all relevant and quantifiable criteria for internationalisation (Buela-Casal et al., 2006). All in all, both absolute and relative measures need to be used (Luukkonen, Tijssen, & Sivertsen, 1993).

International collaboration is encouraged by governments as it is related to productivity and citation rates of the individual researcher (Abramo, D'Angelo, & Solazzi, 2011; Glanzel, 2001; Kato & Ando, 2013). However, the correlation between productivity and internationalisation varies substantially between disciplines (Abramo, D'Angelo, & Di Costa, 2009) and not all highly cited papers are international (Persson,

2010). Policy influences and foreign research funding are only a minor part of the general phenomenon of research internationalisation which is influenced by a complex set of factors (Aksnes, Frølich, & Slipersaeter, 2008; Aksnes, Rorstad, Piro, & Sivertsen, 2013). Research specialization is seen as a driving force governing international contacts (Persson, Melin, Danell, & Kaloudis, 1997). In addition, new forms of communication, increased and cheaper travel possibilities, formation of global scientific communities and universal research questions have influenced the internationality of the researchers network (Aksnes et al., 2008). Furthermore, an increased knowledge of language skills, research experience and foreign market knowledge have a positive influence on international collaboration. Also, due to more complex research questions and the need of greater instrumental resources (degree of dependence), strategic and applied research appear to stimulate international collaboration more than basic research (Abramo et al., 2009). Besides, research directed to an international public on an international topic, is more likely to be internationally co-authored than research directed to a local public on a local topic (Kyvik, 1991). As mentioned before, paradigmatic status and degree of codification have an influence on collaboration practices (see section 4.3), and likewise, they influence international collaboration practices. International co-authorship is easier to achieve in fields with a common research paradigm and a codified communication language than in fields with multi-paradigms and a literary communication language. Finally, the degree of international organization of the disciplines also plays a role in international collaboration practices (Kyvik, 1991). During international conferences, researchers meet and informal and new collaboration networks can sprout.

Beaver and Rosen (1978) identified cross-national research collaboration as early as the nineteenth century. Ever since, and especially by the end of the last century (Luukkonen et al., 1992), international collaboration measured by the number of addresses per publication (King, 2012) and the number of internationally co-authored publications, i.e. publications with authors from more than one country, is on the rise (Abramo et al., 2011; King, 2012; Puuska et al., 2014), also in the social sciences and humanities (see article 8.4). Though, pronounced differences have been found between different disciplines. High proportions of international co-authorship have been found in natural science disciplines and lower proportions in social science disciplines and almost none in the humanities. (Aksnes et al., 2008; Larivière et al., 2006; Must, 2012). In the social sciences and humanities, beside international co-authorship in articles, also book publications are internationally oriented. Verleysen and Engels (2014b) indicate that peer reviewed books are increasingly published abroad and in English, whereas non-peer reviewed books remain domestic and published in Dutch. In our research we focussed on the differences in international collaboration between the different publication types (WoS-indexed journal articles, GP-selected journal articles, monographs, edited books, book chapters and proceedings papers; see articles 8.4 and 8.8).

## 4.6 Collaboration in the SSH

Research collaboration is growing in all fields, albeit varying over time, between countries and between disciplines. Several studies indicated that the natural and biomedical sciences are highly collaborative whereas the social sciences and especially the humanities have less collaborative publications (e.g. Franceschet & Costantini, 2010; Laband & Tollison, 2000; Larivière et al., 2006; Moody, 2004; Wray, 2002). However, differences within all fields are prominent, also in the sciences: e.g. whereas physics and medicine are highly collaborative, mathematics, computer science and engineering are moderately collaborative (Franceschet & Costantini, 2010). Differences are due to the type of research that is done, the methods that are used (e.g. digital humanities) and the budget that is provided (Wray, 2002) and can be interpreted as a *“rational balance between advantages and disadvantages of collaboration in each discipline”* (Franceschet & Costantini, 2010; p.552). Wray (2002) states: *“Philosophy of science is becoming more responsive to empirical research about science. They find themselves needing the assistance of researchers in other disciplines as the field has become less satisfied with rational reconstruction.”* Nevertheless, due to the differences in format, research questions and research methodology (see also sections 3.1.2 and 4.3), large differences remain in collaboration practices between and within the social sciences and humanities disciplines

Several studies on collaboration practices of social sciences and humanities disciplines, focus on the level of the journal, the discipline, the institute or the region/country. Furthermore, as mentioned earlier, social sciences and humanities are underrepresented in known databases such as WoS and Scopus (see sections 1.1. and 2.2.2.), therefore bibliometric studies on these disciplines using these databases are incomplete. Furthermore, WoS and Scopus focus mainly on indexing English language articles in international journals at the expense of publications in other languages and of other types (e.g. Hicks, 2004; Sivertsen & Larsen, 2012). As a result, the observed frequency of co-authorship in WoS is positively biased (Mali, Kronegger, Doreian, & Ferligoj, 2012; see article 8.5). In answer to this problem, several studies were conducted by gathering complete data from interviews, curricula vitae (e.g. de Souza & Azevedo Ferreira, 2013; Díaz-Faes et al., 2015) or academic repositories (e.g. Aksnes & Mikki, 2012). The results of these often local studies might not be representative of the whole of the social sciences and humanities disciplines, although, combined, they fill in some of the knowledge gaps about collaboration practices in these disciplines (see also section 7.2.3). Overall, disciplines in the social sciences are more collaborative than those in the humanities. Whereas teamwork is more prominent in the social sciences, researchers in humanities disciplines are seen to be ‘loners’ or to ‘bowl alone’, and a popular image of humanists emerges that they work, or at least write alone (Cronin, Shaw, & La Barre, 2003; Must, 2012; Wuchty et al., 2007).

However, some studies state that, due to the specific characteristics of the social sciences, and especially the humanities, collaboration cannot solely be measured by co-authorship (Sula, 2012; see article 8.8). Laband and Tollison (2000) indicate that intellectual collaboration includes formal co-authorship as well as presentations of papers at workshops, seminar and professional meetings and informal commentary from colleagues, journal referees and editors. As mentioned before (see section 4.1) defining collaboration is difficult and subject to social conventions. Using Sonnenwald’s definition (see section 4.1)

collaboration practices are not only present in articles, book chapters, proceedings papers and monographs but also in edited books. The latter comprises the collaboration between the editors, measured by co-editorships, between the authors of one book chapter, measured by co-authorship, and between the editors and their book's chapter authors (see articles 8.6, 8.7 and 8.8). All in all, more research into collaboration practices of the humanities is needed (see section 7.2.3).

## **PART II: Empirical study**

### **5 Research data and methodologies**

The data used for this research consist of three data sets: the Flemish Academic Bibliographic database for the Social Sciences and Humanities (Vlaams Academisch Bestand voor de Sociale en Humane Wetenschappen or VABB-SHW), the Current Research Information System in Norway (CRISTin)-database and an additional, manually collected data set of edited books and their respective editors, book chapters and book chapter authors.

#### **5.1 The VABB-SHW**

The Flemish university financing decree of 14 March 2008<sup>16</sup> and the amended Resolution of 12 December 2008<sup>17</sup> on the financing of the University Research Funds (Bijzonder Onderzoeksfonds, or BOF) constitute the framework for the construction of the Flemish Academic Bibliographic Database for the Social Sciences and Humanities (Vlaams Academisch Bibliografisch Bestand voor de Sociale en Humane Wetenschappen, or VABB-SHW). In addition, the new Resolution of 21 December 2012<sup>18</sup> changed amongst others the timing of the publication of the VABB-SHW and a switch of responsibility in feeding the VABB-SHW with data from the associations (including universities and university colleges) to the universities (Spruyt & Engels, 2013b). This change also implies that only publications by university-affiliated scholars can be submitted by the universities for inclusion in the VABB-SHW. For the first two versions only 6 out of 19 university colleges submitted data for possible inclusion in the VABB-SHW (explained subsequently). This resulted for these versions of the VABB-SHW in 0.5% publications in the Science Citation Index Expanded with authors only affiliated with one of the Flemish university colleges (Spruyt, Tan, & Van Dyck, 2006). Given the incompleteness of the data supplied by the university colleges (Spruyt et al., 2006), we limit our analysis based on the VABB-SHW to the publications written by scholars affiliated with a Flemish university.

Following two years of preparations and construction, the first version of the VABB-SHW, comprising bibliographic data from the years 2000-2009, was officially launched at the University of Antwerp on 22 December 2010. The second (2001-2010) and third version (2002-2011) of the VABB-SHW were published online on 1 December 2011 and 1 December 2012, respectively. Due to the change in timing, as mentioned above, the third version received a 'bis'-version (2002-2011) which was published online on 30 June 2013. The fourth (2003-2012) and the fifth (2004-2013) version were published online on 30 June

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<sup>16</sup> <http://data-onderwijs.vlaanderen.be/edulex/document.aspx?docid=13988>

<sup>17</sup> <http://data-onderwijs.vlaanderen.be/edulex/document.aspx?docid=13054>

<sup>18</sup> <http://data-onderwijs.vlaanderen.be/edulex/document.aspx?docid=14492>

2014 and 30 June 2015, respectively. The sixth version, including data from 2005-2014, is therefore expected to be published online on 30 June 2016<sup>19</sup>.

When constructing the VABB-SHW, the objective was to create a database that gathers the bibliographic references of research outputs in the social sciences and humanities written by scholars who are affiliated with Flemish universities. In accordance with the regulations stipulated in the BOF resolution (see section 2.3.2. and see BOF-resolution<sup>20</sup>), eligible outputs need to meet a number of basic criteria. They are:

- (a) to be publicly accessible;
- (b) to be unambiguously identifiable by ISBN or ISSN;
- (c) to make a contribution to the development of new insights or to applications resulting from these insights;
- (d) to have been subjected - prior to publication - to a demonstrable peer review process by independent scholars who are experts in the (sub)field to which the publication belongs. Peer review should be done by an editorial board, a permanent reading committee, external referees or else by a combination of these. Peer review should further be external (to the research group) and independent (of the author(s)), and must not be organized by the author.

The BOF resolution further lists the following five publication types eligible for inclusion in the VABB-SHW: journal articles, monographs, edited books, book chapters and proceedings papers that are not part of special issues of journals or edited books.

The Flemish government decided to entrust the interuniversity Centre for Research and Development Monitoring (ECCOM) with the construction of the VABB-SHW and the executive committee of ECCOM, in turn, instructed the team of the University of Antwerp to implement the actual construction of the database. The ECCOM-Antwerp team was given the responsibility for the technical development of the database and as such coordinated the different stages of the database construction in close collaboration with colleagues of other universities, in particular the ECCOM-Leuven team.

The Flemish government simultaneously decided to establish an authoritative panel ('Gezaghebbende Panel' or GP), whose task it was to evaluate the content and ensure the scientific quality of the VABB-SHW. The GP, as stipulated in the BOF resolutions<sup>21</sup>, is composed of 18 members recruited from the five Flemish universities, and represents a cross-section of the main SSH disciplines (for further information, see Ghesquière, Van Bendegem, Gillis, Willems, & Cornelissen, 2011). The Flemish Ministry of Education and Training, the Flemish Department of Economy, Science and Innovation and the Flemish universities further provided ad hoc financial support to the initiative by bearing the costs of the administrative and secretarial activities related to the creation of the database, which were undertaken by the Flemish Interuniversity Council (VLIR).

To facilitate the activities of the GP, the publication outputs included in the VABB-SHW were assigned as much as possible to one or multiple disciplines based on the author(s) affiliation(s), resulting in the

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<sup>19</sup> <http://www.ecoom.be/vabb>

<sup>20</sup> article 1quarter; <http://data-onderwijs.vlaanderen.be/edulex/document.aspx?docid=13054>

<sup>21</sup> article 1 quinques; <http://data-onderwijs.vlaanderen.be/edulex/document.aspx?docid=13054>

following 16 disciplines and 3 general categories: archaeology; art history (including architecture and arts); communication studies; criminology; economics & business (including library and information science); educational sciences; history; law; linguistics; literature; philosophy (including history of ideas); political science; psychology; social health sciences; sociology; theology (including religious studies). Scholarly outputs that could not (unambiguously) be classified into one or several of the above-mentioned disciplines (for instance, publications of anthropologists) were assigned to one of the following categories: humanities – general; social sciences – general; other. The latter category is not included in our studies as this category contains often unclear disciplinary affiliations. Furthermore, the universities decided to dispense with this category from the fifth version of the VABB-SHW onwards. This approach of linking publications to disciplines resulted in the so-called '*disciplinary lists*', which were checked by the GP members for compliance with the criteria put forward in the BOF resolution. In addition to the BOF criteria, the GP further decided to consider only scholarly outputs of at least four pages for inclusion in the VABB-SHW.

The lists of journals, publishers and proceedings papers, annually (i.e., on 1 August –previously 1 June) handed over by ECOOM to the GP, also indicated which journals and proceedings were partially or completely indexed in the WoS. The GP decided that all publications in these journals and proceedings automatically fulfilled the BOF criteria if they were already included in the distribution of the BOF funds, i.e. provided they are indeed indexed in the WoS, have a Flemish university affiliation and can be classified into one of the following types: article, letter, note or review. This GP decision, however, did have important consequences in that all articles and proceeding papers from the SSH that have minimum one Flemish affiliated author, which were indexed in WoS during (part of) the period, were likewise included in the VABB-SHW. The selection for WoS was made based on the Science Citation Index Expanded (SCIE), the Social Science Citation Index (SSCI), the Arts and Humanities Citation Index (AHCI), the Conference Proceedings Citations Index - Sciences (CPCI-S) and the Conference Proceedings Citations Index – Social Sciences & Humanities (CPCI-SSH).

Each year, on 1 March (previously on 1 October), the chairman of the GP supplied ECOOM with the lists of journals, publishers, individually selected book publications and since 2013 also book series eligible for inclusion in the respective version of the VABB-SHW. The ECOOM-Antwerp team subsequently used these data and criteria to narrow down the set of initially submitted publication outputs. Afterwards, the universities were requested each year, to check the available survey lists of publications that qualified for inclusion in the VABB-SHW version in question, and, whenever necessary, to submit substantiated additions within four months' time. This approach enabled ECOOM to annually forward the results of that year's version of the VABB-SHW to the authorities on 30 June (previously 1 December) and publish the lists of journals and publishers together with the public version of the database on the ECOOM website<sup>22</sup>.

The Flemish BOF-key uses a whole counting method that attributes the whole publication to each university whose address is mentioned on the paper (Debackere & Glänzel, 2004; Debackere & Glänzel, 2008). Yet, as not all publication types require the same amount of time to produce, the Flemish government agreed that publications need to be weighted accordingly. The weight factors for each

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<sup>22</sup> [www.ecoom.be/vabb](http://www.ecoom.be/vabb)

publication type were determined in the BOF resolution 08 as follows: non-WoS-indexed journal articles and book chapters: 1, monographs: 4, edited books: 2 and proceedings papers: 0.5. The GP submitted a proposal to decrease the weight factor of edited books from 2 to 1, which was accepted and included in the BOF resolution 12 and is applicable from VABB-SHW III onwards (2002-2011; BOF key 2013). WoS-indexed journals are weighted according to impact factor or are given a weight factor of 1.0 in case no impact factor is available for a given journal, i.e. for all non-WoS-indexed journals selected by the GP. The GP is allowed by BOF resolution 12 to put forward proposals to change and/or differentiate the weight factors of the publication types again in the future taking into account the quality of the journals and publishers. A similar approach, for example, is pursued in Norway, where all eligible journals and publishers are categorized into two levels, with level 2 reserved for the most prestigious and selective international journals and publishers (Sivertsen, 2010; see also section 5.2).

Due to time constraints, the GP decided to consider only publishers appearing on the level 2 list of the Norwegian model for inclusion in the first version of the VABB-SHW (Ghesquière et al., 2011). The following criteria were taken into consideration when drawing up the Norwegian level 2 list of publishers. Publishers are:

- a) to address a scientific readership;
- b) to subject their publications to an external, independent peer review process;
- c) to publish outputs that are written in the internationally recognized publication language of the relevant research domain;
- d) to publish outputs of international scholars with no more than two thirds of the scholars being of the same nationality

The list of publishers for VABB-SHW II was extended with 1) three additional publishers (Springer, Wiley and Kluwer Academic), 2) publishers of 2010 book outputs that were individually selected by the GP, and 3) publishers of Guaranteed Peer Review Content (GPRC)-labelled books published in 2010 (Verleysen & Engels, 2013a; Verleysen, Ossenblok, & Engels, 2012). The VABB-SHW III list of publishers was further expanded with another 33 publishers (Verleysen & Engels, 2013a), individually selected book publications from 2009 and 2011 and GPRC-labelled books from 2011. These successive extensions have resulted in an increase in the proportion of book outputs in the VABB-SHW from 14.9% in the first version to 17.6% in the third version (Verleysen et al., 2012). The expansion of the publishers list continues with 23 new publishers accepted in the fourth version of the VABB-SHW. However, in the fifth version, no new publishers have been added.

## 5.2 CRISTin database

The Current Research Information System in Norway<sup>23</sup> *“aims to increase the social value of research by making it possible for research from several sectors to be viewed in the same context”*. Norway’s shared database of scholarly publications from the higher education sector, CRISTin, has complete data since 2005

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<sup>23</sup> <http://www.cristin.no/english/>

from all fields of research, not only in the SSH and this for all universities and university colleges (Schneider, 2009; Sivertsen, 2010). CRISTin is used in the Norwegian Publication Indicator which measures publication activity and allocates research funding according to publishing performance (Schneider, 2009). The data are defined, delimited and structured in almost exactly the same way as in the VABB-SHW database, which was in fact inspired by CRISTin (see above). The Norwegian database includes journal articles, book publications such as monographs and edited books and proceedings papers.

In Norway, all universities and university colleges contribute to CRISTin by providing references from their local institutional repositories, with as goal the distribution of research funds over universities and university colleges through a performance-based research funding system (PRFS). The responsibility for selecting peer reviewed publications lies primarily with the university departments, and not, as is the case in Flanders, with an external expert panel. Furthermore, from the start of the Norwegian Publication Indicator, the Norwegian government decided to include all peer reviewed publications from 2005 onwards in the PRFS, i.e. both publications in WoS-indexed journals as well as articles in journals not indexed in WoS and book publications (Sivertsen, 2010). The result is a dynamic authority file of approved scholarly journals and publishers using peer review. Any issues that arise are discussed at gradually more distant levels, i.e. the level of the faculty, the university or the national publishing board (Sivertsen, 2010). In Norway the PRFS uses a fractional counting method that attributes equal share to each author and then accumulates shares per institution (Schneider, 2009).

All  $\pm$  20.000 journals included in CRISTin have been classified by disciplinary panels organized by the Norwegian Association of Higher Education Institutions (the rector's conference) into 80 mutually disjunctive subfields which are subordinated to 5 disciplinary categories: 11 engineering subfields, 29 health sciences subfields (including psychology and social work), 21 humanities subfields, 7 natural sciences subfields, and 12 social sciences subfields. In addition, CRISTin divides all disciplines into two levels: level 1, including national journals and level 2, including only *"the leading and most selective international journals, series and book publishers, and they may not account for more than about 20 per cent of the world's publications in each field of research"* (Sivertsen, 2010). Therefore, in subfields that are well represented in WoS, such as economics, no non-WoS journals and only a small proportion of the WoS journals will be allowed on level 2, while in subfields with few journals indexed in WoS, such as media & communication, there may even be non-WoS journals on level 2 (see article 8.3).

### 5.3 Edited books

The third data set consists of bibliographic information (such as author and editor names, book title, inclusion of introduction and conclusion, number of book chapters etc.) on the 12.913 book chapters in the 753 selected edited books included in the VABB-SHW. The selection was made based on the following definition: *An edited book is a collection of chapters written by different authors, gathered and harmonized by one or more editors* (see article 8.6). Edited books can come into being at the initiative of the editor(s) or publisher and edited books can be composed of original work or/and already published chapters (see

section 3.3.2). In February and March 2013, the data were manually harvested by the author of this doctoral thesis and three ad hoc assistant researchers.

The information about 951 collections present in the third version of the VABB-SHW was gathered online and/or in the libraries of the University of Antwerp, KU Leuven and Ghent University, with a small proportion of the edited books requested via interlibrary loan. Data regarding the number of book chapters and the authors per chapter were entered in different Excel files and afterwards combined in one database. All book chapters were included under the condition that the author(s) name(s) was(were) mentioned and regardless of the number of pages the book chapter has. Introductions, conclusions, analyses and/or reviews were included if they had a minimum of 4 pages, i.e. conform the GP-criteria (see 5.1); prefaces, post scripts, epilogues, and abstracts were not included in the data set. Furthermore, missing bibliographic information (e.g. missing editor names, ISBN, places of publication) of the edited books was added manually. This quest resulted in a selection of 753 books meeting the postulated definition of edited books, 164 books that did not meet this definition and 34 books that were not available for loan or were not unambiguously identifiable due to a mismatch of ISBN and book title. The 164 rejected edited books consist of: (1) 57 books that are a collection of short texts, i.e. encyclopaedia, dictionaries, books of abstracts and collection of lemma; (2) 52 text editions, i.e. collection of letters, annotated books, anthologies (i.e. collection of republished short literary works by different authors), collected edition (i.e. already published works by one author and edited by a publisher); (3) 25 online catalogues and databases (having an ISBN); (4) 16 loose-leaf volumes (with a yearly update); (5) 4 books as series editor, i.e. the editor of a series of books written by one or more authors; (6) 2 music scores (having an ISBN). In addition 8 books could not be added to the study as not all information was available, e.g. missing author information. Our selection of 753 edited books contains 38 (5%) edited books which are the result of a proceeding conference or congress. All in all, the 753 selected books in this data set were published by 1241 unique editors of which 676 (54%) were affiliated to one of the Flemish universities at the time of publishing the book (see articles 8.7 and 8.8).

## **5.4 Processing and completion of the data**

The VABB-SHW data, coming from Brocade, i.e. the library information system which includes the main database and is maintained by the Library of the University of Antwerp and ECOOM Antwerp, were transferred into a yearly updated workable Access database and different smaller Excel and SPSS files. The edited book data, manually harvested, was similarly transferred into Access, Excel and SPSS databases. In the build up to the different studies (see section 8), the data was each time further cleaned, completed, standardized, linked and rearranged with regard to the research at hand.

### **Disciplines**

With regard to the comparison of some aspects of the VABB-SHW data with the Norwegian CRISin data in 2011 the data from the first version of the VABB-SHW were further processed. The journals in the VABB-

SHW in which Flemish researchers published between 2005 and 2009 (N = 4398) have been classified into one of the 80 subfields in CRISTin. This task was facilitated by the fact that over two thirds (71.8%) of the journals in the VABB-SHW, representing 61.2% of all journal articles, had already been assigned to one of the 80 disciplines in CRISTin. Hence only 1240 (28.2%) journals needed to be classified. This was done in a cyclic process whereby two researchers each classified the journals while checking consistency of decisions, using the Universal Decimal Classification<sup>24</sup> as a guideline. (see article 8.3)

In 2014, the Access database (2000-2011), including both the VABB-SHW and the additional data on edited books, was restructured using Excel. The Access database which was originally structured based on the unique publication numbers, was now additionally structured based on unique Flemish Author number. All unique authors were assigned to one of the 16 disciplines or three general categories registered in the VABB-SHW as mentioned above (see section 5.1). All publications in the database are assigned to one or more SSH disciplines, according to the affiliation(s) of all the co-authors or co-editors with one or more departments or research groups at one of the five Flemish universities. Unfortunately, the authors' affiliation(s) in the VABB-SHW are not easy to track as they are assigned when importing the records. Therefore, we counted the number of times a discipline appeared in a publication with one of the Flemish author names. When multiple disciplines were linked to an author name, the discipline that occurred most often was chosen. In 6.2% (n=564) of all cases two disciplines were equal in number and the first discipline according to alphabetical order was chosen. Another possibility could have been to assign the 564 cases randomly to one of its respective disciplines. This method would give less bias compared to alphabetical order. However, during a manual search on the internet for the discipline of 750 researchers (8%; N=8970) 3 researchers were found with a possibly conflicting discipline, indicating that the error rate of the method used is rather small. (see article 8.7 and 8.8)

### **Author names**

In principle, all Flemish affiliated authors of SSH publications have a unique author identifier in Brocade (e.g. a::920.128352:1). However, some of the Flemish researchers in the VABB-SHW had more than one unique author number as they have more than one affiliation with different research groups, departments or/and universities. Furthermore, not all Flemish affiliated researchers were always identified as being Flemish affiliated, and hence did not have a unique author number. Therefore, all Flemish affiliated authors were identified and standardized where possible in 2012 and 2013. Additionally in 2014, all book chapter authors in the additional data set were standardized and where possible matched with one of the Flemish affiliated researchers who had already been standardized. Non-Flemish affiliated researchers who collaborated with a Flemish affiliated researcher included in the study at hand were also standardized semi-automatically. (see article 8.7 and 8.8)

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<sup>24</sup> <http://www.udcc.org/>

## **Gender**

The gender of all 8970 unique identified researchers affiliated with Flemish universities and included in the VABB-SHW (not in the category others) were added. For this, two researchers independently divided all unambiguous first names into two groups: male names and female names. The remaining author names, including all author names for which no consensus was found, were looked up on the internet manually, resulting in an additional 1462 gender matches. (see Figure 40 and articles 8.7 and 8.8)

## **5.5 Analysis of the data**

### **Career stage**

We differentiated between established and non-established researchers. Established researchers are defined as having a total of 12 whole counted weighted publications or more and at least one publication in a minimum of 6 different years in the period 2000-2011. These heuristics were chosen after inspection of typical properties of authors in the database. Of course, non-established researchers may have many publications within up to five years, may have a prolific consistent set of outputs before or after the period analysed, or may have many outputs of a type not recorded in the database (e.g., book reviews, performances). An alternative selection criteria could be to use weighted whole counts or weighted fractional counts in order to control for collaboration patterns and publication type. Using the weighted whole counting method, a researcher with 4 monographs and 2 proceedings papers in 6 different years, would be identified as an established researcher, whereas in the selection method used in our studies (s)he would not. This could imply that more researchers in the humanities, where book publishing is more customary than in the social sciences, could have been identified as established. Furthermore, using the fractional counting method, less researchers would have been identified as established, especially in the social sciences, where collaboration is more common practice than in the humanities. Nevertheless, the criteria used in our research, i.e. non-weighted whole counting, allow us to compare both collaboration and publication patterns of two sets of researchers, the first of which contains researchers that can reasonably be thought of as being established and the second of which probably contains a much lower proportion of established researchers. (see article 8.7 and 8.8)

### **Publication counts**

#### *Whole and fractional counting*

For each author, two publication counts were calculated: the whole publication count, i.e. all publications are counted as 1 irrespective of the number of authors, and the fractional publication count, i.e. all publications are fractionalized according to the number of authors per publication (e.g. a paper with 4 authors gives a fractional count of 0.25 to each author). As the maximum number of authors per

publication registered in the database is 20, the fractional count varies between 0.05 (publications with 20 co-authors) and 1 (single authored publications). (see articles 8.4 and 8.8)

In the comparison with the Norwegian CRISTin database, the number of fractional articles is counted as the sum of the fractions per university based on its share of authors on a paper, with a minimum fraction of 0.1 per paper for the SSH (see article 8.3).

#### *Weighting of publication counts*

Both the whole and fractionalized publication count were then weighted using the weights used in the Flemish performance-based research funding model, the BOF-key, where articles, book chapters and edited books receive a weight of 1, whereas monographs have a weight of 4 and proceedings papers have a weight of 0.5. (see articles 8.1 and 8.8)

### **Measuring collaboration**

#### *Collaborative index*

The *Collaborative Index* (CI) is fairly basic and easily interpretable as it is calculated as follows:

$$CI = \frac{\sum_{j=1}^q j f_j}{N}$$

where N= total number of papers, j= number of authors per paper and  $f_j$ = number of papers having j authors in the collection and q= the max number of authors in a single paper. This comes down to the average number of authors per publication, which makes the CI sensitive to outliers. Another drawback of the CI is its limited interpretability and comparability between disciplines as there is no upper limit. (Ajiferuke, Burrell, & Tague, 1988; Liao & Yan, 2012) (see articles 8.4, 8.5 and 8.8)

#### *Revised collaborative coefficient*

In order to measure collaboration we apply a measure of co-authorship, namely the Revised Collaborative Coefficient (RCC). This measure of collaboration leads to values between 0 and 1, where 1 represents maximal collaboration and 0 no collaboration. This makes it a good measure to compare different units, such as disciplines. The RCC takes into account the total number of papers, the total number of authors as well as the total numbers of papers having a certain number of authors. The RCC is calculated as

$$RCC = \left( \frac{n}{n-1} \right) \left\{ 1 - \frac{\sum_{j=1}^q (1/j) f_j}{N} \right\}$$

where N= total number of publications, n= total number of unique authors in the collection, j= number of authors per publication and  $f_j$ = number of publications having j authors in the collection and q= the max number of authors in a single publication. In addition, in the RCC the number of authors per publication (j) is fractionalized (1/j) in order to give gradually less weight as publications have more co-authors. By

subtracting this weighted average from 1, an inverse effect occurs, i.e. more (fractionalised) weight is given to each collaborative publication, resulting in a value between 0 and 1 to represent a low respectively high degree of collaboration. By multiplying the result of the second part of the formula by  $\frac{n}{n-1}$  we obtain a value of 1 when there is maximal collaboration, i.e. all co-authored publications have the same number of authors as there are co-authored publications. When all publications have 1 author, we obtain a value of 0, i.e. minimal or no collaboration (Egghe, 1991; Liao & Yan, 2012; Rousseau, 2011). The RCC also correlates significantly with aspects of 'research quality' frequently associated with collaboration (Bukvova, 2010; Katz & Martin, 1997). For example, RCC values have been found to correlate with journal impact factors and citation scores (Liao & Yan, 2012). (see articles 8.4, 8.5 and 8.6)

#### *Degree of collaboration*

Additionally, the Degree of Collaboration was calculated,

$$DC = 1 - \frac{f_1}{N}$$

where  $f_1$  is the number of publications having 1 author and  $N$  is the total number of publications. This formula could also be interpreted as the ratio of number of publications with minimum 2 authors over the total number of publications. (see article 8.8)

#### *Degree of international collaboration*

Analogously, the Degree of International collaboration was calculated,

$$DIC = \frac{N_1}{N_c}$$

where  $N_1$  is the number of publications having at least one non-Flemish co-author and  $N_c$  is the total number of publications with two or more authors. (see article 8.8)

#### *S\**

The  $s^*$  measure, as applied to our data takes into account the co-occurrence of editors and authors in a book. More precisely, the  $s^*$  is a measure of collaboration which takes into account the total number of items (here the number of chapters in the edited books)  $N$ , the total number of unique authors and the times two authors (here an editor and an author) co-occur in a book.

$$S^* = \frac{1}{n^2(n-1)^2N} \left( \sum_{\substack{i,i'=1 \\ i \neq i'}}^n \sqrt{X_{i,i'}} \right)^2$$

With  $0 \leq S^* \leq 1$ , with 0 = no collaboration and 1 = maximal collaboration, i.e. all authors have been collaborating in all publications under study.

In the formula  $N$  = the total number of papers,  $n$  = the total number of different authors and  $X_{i,i'}$  = the number of times that author  $i$  and author  $i'$  have co-authored a paper. For the further mathematical underpinning of this indicator, we refer to Egghe (1991).

$S^*$  was used experimentally in this thesis as a measure for collaboration in edited books and was presented at the Nordforsk workshop on Bibliometrics for the social sciences and humanities in 2012 (see appendix). However, as the calculations resulted in very small numbers, it did not seem to be a workable tool for measuring collaboration within edited books in the SSH.

### *h-index*

The h-index is best known as an indicator of publication activity and citation impact (Hirsch, 2005), but can be defined more generally as a source-item relationship. The h-index was used experimentally to give an indication of the collaboration network of the discipline history, using 50 edited books. The method was presented in a poster presentation at the ISSI-conference in 2013 (see appendix). We defined the h-index as the largest number  $n$  such that you have  $n$  edited books (traditionally papers) with  $n$  or more book chapters (traditionally citations), respectively unique authors. The h-index results in a number between 1 and  $+\infty$ .

Although the h-index is easy to calculate, there are several disadvantages to the method, e.g. the h-index takes no account of the total number of papers nor of the papers with really high or low number of citations. Costas and Bordons (2007; p.202) state *“for the purpose of obtaining a high h-index, publishing 10 medium-impact documents with 10 citations each one is better than having 5 high-impact documents with 200 citations each one”*. Bornmann and Daniel (2009; p.3) give another example: *“two scientists, one has exactly 10 papers of 10 citations and the other exactly 10 papers with 100 citations”*. Both researcher have an h-index 10, but obviously do not have an equal number of citations. Due to this disadvantages of the h-index, it did not seem to be a workable tool for measuring collaboration within edited books in the SSH.

### *Network measures*

In order to analyse the role played by book editors in SSH collaboration networks, we compared three types of networks with density and centrality metrics: 1) the article, monographs and book chapter co-authorship network; 2) network 1 with co-editors relations added as extra connections; 3) network 2 with additional links for collaborations between editors and their contributing chapter authors. For each of these three networks, a comparison was made between: a) the aggregated social sciences and humanities, respectively, b) individual disciplines belonging to the SSH, c) two subperiods, 2000-2005 and 2006-2012 and d) weighted and unweighted networks.

The networks, created by Mike Thelwall and Raf Guns, were analysed in Pajek. We looked at the number of links, the number of weighted links, the number of components, the number of isolate nodes and the density of the network. Furthermore, degree centrality, degree centralization, betweenness centrality and

betweenness centralization were calculated for the three networks for 3 different authors (de Nooy, Mrvar, & Batagelj, 2011).

**Degree centrality** is the degree of an author-editor, i.e. the number of neighbours.

**Degree centralization** of a network is the variation in the degrees of all authors-editors divided by the maximum degree variation that is possible in a network of the same size.

**Betweenness centrality** is the proportion of all shortest paths between pairs of other nodes that include this node/author/editor. Betweenness centrality looks at how important a node is to establish a connection between others. This is mostly used when talking about passing on information.

**Betweenness centralization** is the variation in the betweenness centrality of nodes divided by the maximum variation in betweenness centrality scores possible in a network of the same size.

The analysis was presented at the Nordic Workshop in 2014. However, due to time constraints and the high complexity of network analysis, the research has not (yet; see section 7.2.3) been elaborated.

### Comparing subgroups

#### *Independent-samples Kruskal-Wallis test*

We used the independent-samples Kruskal-Wallis Test, a non-parametric test to show if there is a statistically significant difference in the distribution for four of the collaboration aspects between the different disciplines (see article 8.6).

#### *Pearson correlation*

The Pearson correlation indicates the correlation between four of the collaboration aspects for the social sciences and the humanities. Here 1 indicates a perfect positive correlation, 0 no correlation and -1 a perfect negative correlation. (see article 8.6)

#### *Chi-square goodness of fit*

We calculated the chi-square ( $\chi^2$ ) goodness of fit to show if there is a statistically significant difference between the distribution of the number of authors per publication and editors per book. We compared different periods under study and different fields, i.e. the humanities and the social sciences. (see articles 8.5 and 8.6)

For the first comparison we calculated the  $\chi^2$  based on the observed number of publications per number of authors for the second period (2006-2010) and the expected number for this period based upon the proportion of publications per number of authors for the first period (2000-2005). Whenever the expected values were less than 5 or the total of the expected values was less than 50, we did not calculate  $\chi^2$  as in those cases  $\chi^2$  is not reliable. Because of the limited occurrence of co-authorship in the humanities, the publications were grouped as single authored, duo authored, trio authored and multiple authored in view of the analyses at the discipline level. Hence in these analyses there are three degrees of freedom (DF)

and  $\chi^2$  is significant when it exceeds 7.8147. For the social sciences co-authorship was more frequent and hence the occurrence of publications authored with four and with five could also be studied. Hence there are five DF and the observed evolution is statistically significant when  $\chi^2$  exceeds 11.0705 (Welkenhuyse-Gybels and Loosveldt, 2002 p.507). (see article 8.5)

In a following analysis we compared the humanities with the social sciences. However, 25 edited books were assigned to both the humanities and the social sciences and therefore were left out of the chi-square calculation. One (8.3%) of the expected values was less than 5 but more than 1, hence the chi-square calculation is valid. Because of the limited occurrence of multiple co-editorship in both humanities and social sciences, the analysis was conducted using six categories, i.e. single editor, two editors, three editors, four editors, five editors and six or more editors. Hence in these analyses there are five degrees of freedom (DF) and the distribution among categories of two sets is significantly different when  $\chi^2$  exceeds 11.0705. (see article 8.6)

#### *Cramer's V*

Cramer's V was used to measure the strength of the correlation between the different subsets, resulting in a number between 0 (no association) and 1 (maximum association). (see articles 8.7 and 8.8)

#### *Shapiro-Wilk test*

The normality of the distributions of all our subgroups was ascertained visually through histograms as well as numerically, using the Shapiro-Wilk test with  $p < 0.05$  as the threshold for normality. As most of our distributions were not normally distributed, we used the Mann-Whitney U test for comparing subgroups. (see article 8.8)

#### *Mann-Whitney U Test*

In addition the Mann-Whitney U test, a rank-based nonparametric test, was used to determine whether there were differences between the subsets on the different characteristics under study, using  $p = 0.05$  as the threshold for statistical significance. (see articles 8.7 and 8.8)

#### *The Wilcoxon signed-rank test*

We used the Wilcoxon signed-rank test, also a rank-based nonparametric test, to determine whether there was a median difference between paired observations, i.e. the number of collaborations of the same group of editors before and after the publication of the edited book. (see article 8.8)

## 6 Overview of the results

The main empirical findings can be found in the published articles gathered in chapter 8. This section will summarize and synthesize the empirical findings to answer the study's three research questions, outlined in section 1.2.

### 6.1 Publication patterns

**Did Flemish affiliated researchers in the social sciences and humanities (SSH) change their publication practices in terms of number of publications, publication type and publication language in the period 2000-2011? How are the observed evolutions influenced by different factors, especially by the Flemish performance-based research funding system in place at that time?**

In a first step an analysis of the VABB-SHW database (2000-2009 and 2000-2011) was made of the publication output and its evolution of the social sciences and humanities and their respective disciplines in order to answer the first research question (see article 8.1 and 8.2). In addition, a comparison with the Norwegian database CRISTin has been made in order to further explain the results found in the first analysis (see article 8.3).

#### **1.1) Did the number of peer reviewed publications of Flemish SSH researchers increase in the period 2000-2011?**

In the VABB-SHW only peer reviewed publications are indexed, which can be classified into two subsets: the VABB-GP and the VABB-WoS (see Figure 10 and Figure 17). The VABB-GP set, which holds 61% of all publications included in the VABB-SHW (2000-2011), includes all articles, monographs, edited books, book chapters and proceedings papers published in a journal or with a publisher selected by the Authoritative Panel (Gezaghebbende Panel; GP). The VABB-WoS set, containing 39% of all publications, includes all articles and proceedings papers indexed in WoS within the period under study (2000-2011) of Flemish affiliated researchers. (see also section 5.1)

A rapid increase of the number of publications is apparent, with an overall increase of 110% between 2000-2001 and 2010-2011 (see Figure 18). This growth in the number of publications per year can mainly be ascribed to the more than tripling (+ 248%) of the number of publications comprised in the VABB-WoS, in contrast with the smaller growth of VABB-GP publications (+56%). The number of publications has been growing in all disciplines, although large differences between disciplines can be observed. When using weighted publication counts<sup>25</sup> (see also section 5.5), the overall increase for all publications between the

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<sup>25</sup> Publications are weighted in accordance with the weights used in the Flemish performance-based funding model, the BOF-key: articles, book chapters and edited books receive a weight of 1, monographs have a weight of 4 and proceedings papers have a weight of 0.5.

periods 2000-2002 and 2009-2011 is 94% and most disciplines double their number of publications, except law (+45%), philosophy (+74%), linguistics (+86%), economics (+92%) and theology (+94%) (see Table 6). Political science (+223%) and communication studies (+256%) even more than triple their number of weighted counted publications. In total (See Table 33), the humanities show an average increase of 86% and the social sciences of 151% in weighted publication types.

### **1.2) What are the disciplinary differences in choice of publication channel of Flemish SSH researchers (2000-2011)?**

In the period 2000-2009, about half of the publications belong to researchers in the humanities (51.2%) and the other half belongs to their colleagues in the social sciences (51.9%) and 3.3% of all publications belong to both the social sciences and the humanities (publications are appointed to a discipline according to their respective author(s) affiliation(s); see also section 5.4).

A clear distinction between the two fields under study was found regarding the presence of different publication types. Whereas the dominant publication type in the humanities is GP-selected articles (60%), followed by book publications (23%) and WoS-indexed articles (14%), publication patterns in the social sciences are dominated by WoS-indexed articles (52%), followed by GP-selected articles (39%) and book publications (7%) (see Table 2). Additionally, both fields count for 3% proceedings papers, a VABB-SHW publication type that needs further investigation (see section 7.2.3). These publication practices are in line with the literature (see section 3.4) stating that book publications and national literature (GP-selected articles are often written in Dutch, see Figure 9 and RQ 1.4) are important in the social sciences and especially in the humanities. However, large differences between (and within, Verleysen & Weeren, 2016) disciplines remain.

In all disciplines (2000-2011; see Table 5), more than half of the publications included in the VABB-SHW are journal articles. This predominance is most pronounced in the disciplines sociology (87%), psychology (94%) and social health sciences (97%). The disciplines with the highest percentages of book publications are linguistics (34%), literature (41%) and theology (44%). The disciplines with the lowest share of book publications are social health sciences (2%) and psychology (4%). The proportion of proceedings papers is relatively small in all disciplines. In addition, for most disciplines the share of VABB-GP publications is higher than that of VABB-WoS publications. Disciplines with over 80% of VABB-GP publications are history (83%), criminology (88%), literature (88%), theology (92%) and law (95%). The disciplines social health sciences (23%), psychology (24%) and economics (43%) on the other hand, display a lower percentage of publications in the VABB-GP compared to the VABB-WoS. All other disciplines vary between 11% (economics & business and criminology) and 29% (history of arts). In all disciplines the number of book chapters is higher than the number of monographs and edited books. Furthermore, in all disciplines but archaeology and economics, edited books are slightly more present than monographs, varying between 0.1% (social health sciences) and 7% (literature).

### **1.3) Is there a shift in choice of publication channel of Flemish SSH researchers in the period 2000-2011 towards more articles in WoS and less book publications i.e. monographs, edited books and book chapters?**

Studies have reported an increased use of the journal article as a medium of dissemination, not only in the social sciences (Adams & Testa, 2011) but also in the humanities (Thompson, 2002). Several reasons have been put forward to explain this finding. First, the pressure to publish is increasing as several evaluation systems and most performance-based research funding systems are emphasising the number of publications, also in the social sciences and humanities. Book publications, especially monographs and edited books, can be very time consuming and, additionally, the latter are often not credited in evaluations and funding systems. Besides, the internet allows for quicker publications of articles due to fewer printing delays and smaller limitations in number of papers in an online issue. Second, the literature agrees upon the expertise needed for monographs and the large networks needed for editing books. As the number of junior research staff is increasing at a higher rate than that of senior research staff, less monographs and edited books could be published compared to journal articles and especially conference proceedings papers, as conferences often provide a learning place for junior researchers (Puuska, 2010). All in all, the odds seem against book publications and in favour of articles, and the fear that in the end book publications might even disappear seems to be widespread (Hicks, 2013; Johnston et al., 2009; Williams, Stevenson, Nicholas, Watkinson, & Rowlands, 2009).

Nonetheless, analysing VABB-SHW data (2000-2011), no overall shift away from book publishing is observed. In the humanities, the share of book publications even seems to be increasing (see Table 8). However, the slight increase in book publications (+3%) in the SSH in Flanders in the period 2000-2011 is largely attributable to the last 3-year period (2009-2011) and can virtually entirely be explained by the incorporation of GPRC-labelled book publications since 2009 (7% of all book publications in 2009-2011) and the individual book selection (14% of all book publications in 2009-2011) (see also Verleysen & Engels, 2013a and Verleysen, Ossenblok & Engels, 2012). Different evolutions in publication types for the social sciences and humanities are shown in our study (see Figure 15<sup>26</sup>). Whereas in the social sciences journal articles gain in number and proportion from 90% to 93%, in the humanities the share of journal articles slightly declined from 78% in 2000-2001 to 73% in 2008-2009. Contrary to the evolutions with regard to language use, these evolutions appear to be slow and barely detectable at the level of the individual disciplines.

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<sup>26</sup> In contrast with Table 8, Figure 15 shows a flattening of the increase in book publications in the humanities from 2006-2007 onwards. Figure 15 was based on the first version of the VABB-SHW comprising data from 2000 to 2009. Table 8 has been based on the third version of the VABB-SHW and is therefore seen as more complete. Not only could Universities update the submitted data, the GP had also decided to include GPRC-labelled book publications and a selection of individual book publications that meet the BOF-criteria. All in all, data used in Table 8 are mirroring better the situation in Flanders concerning the evolution of book publications.

#### **1.4) What are the disciplinary differences in choice of publication language of Flemish SSH researchers (2000-2011)?**

In the period 2000-2011 68% of all publications in the VABB-SHW were written in English, 25% in Dutch, 5% in French and 2% in other languages such as German, Italian, Spanish and Chinese. However, large differences between publication types and between fields and disciplines are notable.

Overall, in both the social sciences and humanities English is most prominent in publications included in WoS, both proceedings papers (97%) and articles (95%), followed by book publications (75%) and non-WoS proceedings papers (73%). GP-selected articles are on average mostly written in non-English languages (English: 44%) (see Table 4). Within the book publications (see Table 34), monographs are on average slightly less likely to be published in English (69%) than edited books (77%) and book chapters (76%) are. However, when looking at the two fields separately, this difference is only true for the humanities but not for the social sciences. In addition, English is more prominent in the social sciences than in the humanities and this for all publication types (see Figure 9). In the social sciences, of all publication types but GP-selected articles, 90% or more are in English and even within the GP-selected articles English (52%) remains, be it just, the dominant language followed by Dutch (44%). In the humanities the dominance of English is less pronounced than in the social sciences. For all publication types but GP-selected articles the share of English lies between 62% (GP-selected proceedings papers) and 94% (WoS-selected proceedings papers). Remarkably, Dutch (51%) is more used than English for GP-selected articles, although in book publications other languages seem to be more present than Dutch. In addition, in both social sciences and humanities French is the third publication language (3% and 8%, respectively), followed in the humanities by German (3%) and Spanish (1%) (see Figure 41). French is in Belgium not only the forum language of romanticists but also the second language of the country spoken in Wallonia and by a large majority in Brussels. The latter fact reflects the overall dominance of French among the publications in other languages than Dutch or English.

Underlying these differences between the social sciences and humanities are differences between disciplines (see Figures 14 and 20). Clearly, English is dominant in both the social sciences and the humanities with the related disciplines law (64%) and criminology (63%) having a larger share of publications in Dutch than in English, whereas all other disciplines have more publications in English than in Dutch. In the social sciences, disciplines with a high share of English publications are psychology and economics & business with both 89% of publications written in English. With 63% of its publications in Dutch, criminology has the lowest share of publications in Dutch among the social sciences disciplines. In the humanities, the leading disciplines in share of English publications are communication studies (75%), archaeology (73%), sociology (71%) and art history (71%). The importance of publications written in languages other than Dutch or English is particularly apparent in the disciplines linguistics and literature with 30% and 22% of the publications belonging to this category, respectively.

### **1.5) Is there a shift in choice of publication language of Flemish SSH researchers in the period 2000-2010 towards more English in both articles and book publications?**

English as a publication language is on the rise in the social sciences and humanities, both in number and proportion of publications in English, following the overall international trend of English as the dominant scientific language. In Flanders, this trend goes hand in hand with a decline in the share of both publications in Dutch and in other languages, although a rise in the absolute numbers of these publications is still present (respectively +32% and +30%). The share of English in GP-publications between the periods 2000-2001 and 2008-2009 increases in both the social sciences and the humanities with about 7% (see Figure 13). In addition, the share of English in WoS publications in the humanities also increases with about 7%, while in the social sciences this remains fairly stable (see Table 4). The latter finding can be explained by the already high share of on average 98% of English language publications in 2000-2001, which makes the growth potential minimal. All in all, the shift towards more English publications goes hand in hand with the strong rise of WoS-selected publications, which have the vast majority (~95%) of publications published in English over the whole period 2000-2009. In contrast less than half of the GP-selected articles are written in English (see Table 34).

### **1.6) Which factors influence the publication patterns of Flemish affiliated researchers in the social sciences and humanities in terms of number of publications, choice of publication channel and publication language?**

#### ***Number of publications***

Several causes underlying the rapid growth in number of publications can be identified and/or will need further investigation. First, an increase in productivity of the researchers in the discipline might explain the increase in publications. E.g. the remarkably smaller growth in the period 2000-2011 for law might be explained by an earlier growth in productivity or it might be the growth in productivity is yet to come. Law has, together with economics & business, the highest number of publications at the starting period of the analysis (together counting for about a quarter of all publications), both in number of weighted and un-weighted publication counts. However, whereas economics & business almost double in the number of publications, the growth in law remains rather small. Research on disciplinary and individual evolution in and influencing factors on productivity could clarify the observed evolutions in number of publications (see section 7.2.3). Second, the number of staff and researchers has known an overall growth factor ( $g$ ) of 1.45 for the years 2002 to 2012 and a rapid increase of the number of doctoral students ( $g = 1.78$ ) (see Figure 2). Differences in growth rates in staff per discipline have not (yet) been investigated (see section 7.2.3). Third, the strong increase in WoS-indexed publications, largely responsible for the overall observed increase in number of publications, has two driving factors (see Table 10): (1) Researchers have more often targeted WoS-covered journals, as is apparent from the 134% increase of the number of articles published in journals that have been covered by the WoS throughout the whole period 2000-2009, and (2) the expansion of the WoS, especially the large expansion since 2007 (Moed et al., 2009), allowed for a very steep 409% increase in the number of articles published in proceedings (from 50 to 74) or journals (from 133 to 858) that have been indexed for only a part of the period 2000-2009. Fourth, publication type and language use, both variables interlinked with collaboration patterns, are also influencing the

growth of number of publications. As collaboration has increased over the last decade, in both the social sciences and the humanities, (see research question 2), the effort of a publication is divided (not per se equally) over the co-authors.

### ***Publication type***

Theory has listed various intertwined and often strongly interlinked variables influencing the choice of publication type by individual researchers (see also section 3.3), i.e. personal, environmental and epistemological factors. However, to what extent the different factors actually influence the choice of publication type, is still under debate and needs further investigation. Analysing and comparing the Norwegian database CRISin and the Flemish VABB-SHW (see Figure 21), we found the coverage of articles in the WoS has evolved differently in both countries: the proportion of articles covered by WoS remained stable at about one in three articles in Norway, while it has increased for Flanders from one in four to four in ten articles. As the evolution towards more English publications is similar, it appears that both countries<sup>27</sup> are subject to the continuing internationalisation of research efforts. Therefore, a possible explanation can be found in the different emphasis on WoS publications in the local performance-based research funding systems (PRFSs). In Flanders, from the start in 2003 until 2010 (inclusion of the VABB-SHW), the Flemish BOF regulation only took WoS-indexed publications (and citations) into account (see section 2.3.2), thus pushing all scholars, including those in the social sciences and humanities, towards the WoS. In Norway, the government decided from the start of the PRFS in 2005 that for all disciplines, including the SSH, all peer reviewed publications, whether included in the WoS or not, should be taken into account (see section 5.2). Hence, Norwegian researchers have not faced additional pressure from their institutions and their departments to publish in WoS-covered journals. Researchers, like all other people, react to incentives (see section 3.3.2). And whereas social scientists and humanists in Flanders increasingly publish in WoS-indexed journals, their Norwegian colleagues choose to increasingly publish in the prestigious level 2 (see section 5.2), often but not always WoS publications (Sivertsen, 2010). However, the possible influences on publication behaviour are manifold and further research will be needed (see section 7.2.3).

### ***Language choice***

Different factors are influencing the language choice of Flemish researchers (see section 3.3.3). A first influence can be found in the topics of the different disciplines. English, Dutch, French, German, Chinese etc., are forum languages, i.e. the subject of study in the related literature and linguistic fields of study. This might explain the higher share of other languages in the humanities than in the social sciences, especially for book publications. Furthermore, local topics with a more general audience, e.g. history, are often published in Dutch or French. In addition, both Dutch and French are, beside German, national languages in Belgium and are spoken by a large number of people in the North and South of Belgium, respectively. However, debate exists if local languages are necessary in those cases. Furthermore, as research questions become more interdisciplinary and international (see sections 3.3.3 and 4.3), international collaboration increases and publishing in English becomes a necessity. A second influence is the drive for international recognition and reward, which stimulates publishing in the dominant scientific

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<sup>27</sup> The term 'country' is used for both Norway and Flanders, albeit the latter is no national state, but a region of one.

language English. A third factor might be the choice of some of the Belgian journals to provide more English language articles (e.g. *Belgisch Tijdschrift voor Nieuwste Geschiedenis*; see section 3.3.3). A fourth factor explaining the dominance of English in book publications might be the publisher selection made by the GP, which includes the Norwegian selection of international publishers (see section 5.1). Although GPRC-labelled books with Flemish publishers can be added to the GP-selection, the GP decided to only include GPRC-labelled books from 2009 onwards and these books remain only a small set of the book selections (e.g. 22% of the book selection in 2010; see Figure 42). Our research further indicated that publication language is correlated with the place (country) of publication especially in case of Flanders (see Table 18). Although more than half of the edited books published in Flanders is written in English, a quarter is written in Dutch, whereas four in five of all edited books in our study, i.e. with minimum 1 Flemish affiliated editor, published in the Netherlands, also a Dutch speaking country, are in English. Further research on this topic has been conducted by my colleagues Frederik Verleysen and Tim Engels (Verleysen & Engels, 2014a). A fifth factor has been mentioned above, i.e. the increase in share of WoS publications for both the social sciences and the humanities. The overall share of English in both VABB-WoS and VABB-GP remains stable, albeit at a different level. So, although several publications in another language than English are indexed in the WoS, publishing in the WoS remains predominantly in English for SSH researchers working in Flanders.

## Summary

First, during the period 2000-2011 the number of peer reviewed publications of Flemish affiliated researchers increased rapidly (+110%) with a more pronounced increase in the social sciences (+151%) than in the humanities (+86%). This growth in the number of publications per year can mainly be ascribed to the more than tripling of the number of publications indexed in WoS which has two driving factors: researchers have more often targeted WoS-covered journals as was stimulated by the Flemish performance-based research funding model in place at that time and the large expansion of WoS since 2007. Furthermore, the number of junior researchers and the number and share of collaborative publications have increased rapidly over the last decade. An additional explanation that needs further investigation is the possible increased productivity of the individual researcher.

Second, although the number of WoS articles is increasing swiftly in both the social sciences and humanities, no overall shift away from book publications is apparent. Book publications, i.e. monographs, edited books and book chapters, remain important in the SSH, especially in the humanities. Various intertwined and often strongly interlinked variables, i.e. personal, environmental and epistemological, are influencing the choice of publication type by the individual researcher. However, to what extent the different factors actually influence the choice of publication needs further investigation.

Third, although Dutch is an important publishing language, especially in GP-selected publications in the humanities, English remains the most dominant publishing languages in the humanities and even more so in the social sciences. Moreover, a clear shift towards more English publications is presented in both the social sciences and the humanities as well as in both the publications indexed in WoS and those selected by the GP. The only exceptions are WoS publications in the social sciences, as over 98% of these

publications have been in English since 2000-2001 which makes the growth potential extremely small. The shift towards more English, can be explained by e.g. the search for international recognition, the increase of international research topics and international collaboration, an increase in WoS publications which are mainly in English and the choice of the publication channel to publish preferably English publications.

All in all, although dominant publication patterns within the SSH can be observed, differences between and within disciplines remain.

## 6.2 Collaboration practices

**How is collaboration in SSH measured, especially in edited books? Did Flemish affiliated researchers in the social sciences and humanities (SSH) change their collaboration practices, both domestic and international, in terms of co-authorships and co-editorships in the period 2000-2010/11?**

In order to answer the second research question, an analysis of collaboration patterns was made using the VABB-database (2000-2010/11) and the additional database on edited books (see section 5.3) in order to answer the second research question (see articles 8.4, 8.5, 8.6 and 8.8).

### 2.1) How do we define and measure research collaboration?

Different definitions and measurements of research collaboration exist (see sections 4.1 and 4.4). In this thesis research collaboration is defined as *“the interaction taking place within a social context among two or more scientists that facilitates the sharing of meaning and completion of tasks with respect to a mutually shared, superordinate goal”* (Sonnenwald, 2007; p. 645). Following this definition, research collaboration includes the measurement of co-authorships, co-editorships and editor-book chapter author relations. Regardless of some important caveats (see section 4.4) concerning co-authorship bibliometrics (see section 5.5), an important asset of research on co-authorship is their comparability: they are easily calculated and compared regardless of the underlying characteristics of the collaborative process. Measuring collaboration in edited books is methodologically more challenging, given the fact that collaboration in book publications, in particular in edited books with the role differentiation between editors and chapter contributors, is more complex (see Figure 29 and Table 20). Therefore, 5 additional characteristics of the edited book related with collaboration have been investigated: Per book the number of editors, of chapters, of total authors, of unique authors and the number of authors per chapter.

## **2.2) What are the disciplinary differences in collaboration practices of Flemish SSH researchers for the different publication types (articles, book chapters, edited books and monographs)?**

### **Articles**

For the years 2000-2010, the proportion of articles written by more than one author is higher in the social sciences (82%) than in the humanities (30%) (see Figure 22). Contrary to the social sciences disciplines where co-authorships are common practice, less than half of the articles of every humanities discipline is co-authored. The most collaborative humanities discipline is linguistics followed by philosophy, the least collaborative is literature followed by history (see Figure 23). In addition, the average number of authors per article is considerably higher in the social sciences (3.6) than in the humanities (1.7) (see Table 13). Sociology, psychology and social health sciences have on average the highest number of authors per article and are the fastest evolving disciplines in this matter, whereas history and law seem to adhere much more to the 'lone wolf' model of traditional humanities for their article publications. In comparison with other countries, the proportion of Flemish SSH collaborations is relatively high, especially in the social sciences. Belgium has since long ranked among the top countries regarding relative frequency of research collaboration (Glänzel & Schubert, 2005). Possible explanatory factors include the trilingual character, the small size and the central geographical location of Belgium, and the performance-based research funding system in Flanders.

Likewise, a discrepancy between the articles included in the GP selection (VABB-GP) and those indexed in WoS (VABB-WoS) is observed, showing for both the social sciences and the humanities and all their respective disciplines, a larger proportion of co-authored articles and a higher number of authors per article for VABB-WoS than for VABB-GP (see Figures 23 and 25). For the whole of the social sciences, 92% of WoS-indexed and 67% of GP-approved articles are written in co-authorship in the period 2000-2010 and for the humanities these proportions are respectively 49% and 25%. Differences between VABB-WoS and VABB-GP for the various disciplines are considerable as well: they are smallest for history, social health sciences and political science, and largest for law, philosophy and sociology. Possible explanations for these differences are manifold, ranging from the specificity of the various research fields (e.g. law counting a smaller number of WoS-indexed journals that publish mainly on international or comparative law) to the journal landscape for fields and disciplines (journals possibly favouring collaborative or comparative research outputs transcending national or local topics), to the publication strategies of social sciences and humanities researchers. In addition, in contrast with the social sciences, in the humanities the distribution for the number of authors per article is the same for VABB-GP and VABB-WoS as it shows a clear skewness with a large proportion of single-authored publications and a smaller proportion and a gradual decline for each additional author per publication (see Figure 26 and 27). Whereas the humanities researchers publish overall more by themselves than together, social scientists publish mostly with one or two authors for publications included in the VABB-GP and with three or more authors for publications included in the VABB-WoS.

International collaboration measured by the proportion of co-authored papers is higher in the social sciences than in the humanities (see Figure 24). However, no meaningful distinction between the two fields appears when measuring the share of international co-authors per paper (see Table 14). The 2000-2010 average number of international author fraction ranges from a considerable 1:5 to 1:3. educational

sciences, political science and sociology show international fractions below or about equal to those of law, linguistics and philosophy.

### ***Book chapters***

The more researchers within a discipline collaborate in writing articles, the more they collaborate in writing book chapters (see Figure 32), although overall co-authorship of articles is more common than co-authorship of chapters. Therefore, book chapters are more often co-authored and have on average more authors per chapter in the social sciences than in the humanities.

The proportion of co-authored book chapters in both the social sciences (over 80%) and the humanities (almost 30%) is comparable to this of articles in journals selected by the GP (VABB-GP), and is lower than the proportion of co-authored articles indexed in WoS (VABB-WoS) (see Figure 25). The distribution of the proportions of publications per number of authors for book chapters within the two fields is followed by most of their corresponding disciplines. History is the sole discipline for which co-authorships in 2006-2010 is more common in book chapters than in articles in VABB-WoS. This finding corroborates research showing that historians operate mostly solitary in their research and ensuing publications (Verleysen & Engels, 2012). In addition, the distribution of the number of authors for book chapters in the humanities follows the trend of articles (both VABB-WoS and VABB-GP) of a clear skewness with a large proportion of single-authored publications and a smaller proportion and a gradual decline for each additional author per publication. In the social sciences the distribution follows this of GP-approved articles with an almost equal proportion of book chapters with one and two authors, with a gradual decline for each additional author per publication.

### ***Edited books***

Edited books are defined as collections of chapters written by different authors gathered and harmonized by one or more editors. Collaboration within edited books includes collaboration between authors who co-author a chapter, collaboration between the volume editors, as well as collaboration between the editor(s) of the book and the authors of the book chapters. Five aspects related to collaboration have been investigated (see Figure 29): The number of editors, the total number of authors and of unique authors in the book, the number of book chapters and the number of authors per chapter. The number of editors is rather independent of the other aspects. Furthermore, there is a very strong positive correlation between the number of book chapters and the number of unique authors, meaning that the more book chapters there are in a volume, the more unique authors will be found and vice versa. The total number of authors correlates moderately with the number of book chapters and the number of unique authors (see Table 20).

Co-editing a book is common practice in both the social sciences (91% of the edited books are co-edited) and the humanities (87%), and their corresponding disciplines, irrespective of the number of book chapters, number of authors and number of unique authors in that book. The average number of editors in the social sciences (2.9) is higher than in the humanities (2.6), although differences are tiny and the median for each of the corresponding disciplines varies between 2 and 3 editors per edited book. In the social sciences editing a book with more than 4 editors is more common (26%) than in the humanities (18%), whereas sole editors are more common in the humanities (13%) than in the social sciences (9%).

Furthermore, although the average number of unique authors is higher in the social sciences (22.5) than in the humanities (19.1), the average number of book chapters is lower in the former (15.3) than in the latter (17.7). This indicates that the author pool per edited book is more diverse in the social sciences than in the humanities. The median number of book chapters ranges from 12 for political science and economics to 16 for literature. Political science seems to have a different tradition than all other disciplines in the sense that volumes consist of less chapters. In addition it has the lowest average number of unique authors (16.4). Economics on the other hand is a discipline with some outliers in terms of number of book chapters and number of unique book chapter authors. (respectively 17.0 and 27.0, the latter being the highest of all disciplines). The total number of authors is higher in the social sciences (26.9) than in the humanities (22.2). The highest average number of authors per book has been found in law (34.2), a discipline with a unexceptional average of unique authors per book (21.7). This discrepancy indicates that book chapter authors in law often write more than one book chapter in the same edited book (see Table 19).

### ***Monographs***

Researchers in the social sciences collaborate more in monographs than do their colleagues in the humanities, both in share of monographs in collaboration (respectively 66% and 27%) as well as in average number of authors per monograph (respectively 2.2 and 1.4). Furthermore, whereas most humanities researchers publish a monograph alone (73%) or with 2 authors (18%), researchers in the social sciences publish mostly with 2 authors (36%), alone (34%) or with 3 authors (18%). In addition, monographs with 4 or more authors are more common in the social sciences (11%) than in the humanities (3%) (see Figure 43).

## **2.3) Do Flemish SSH researchers collaborate increasingly more, both domestic and international, in articles, both included and not-included in WoS, in book chapters and/or in edited books?**

### ***Articles***

Research collaboration measured by co-authorship is internationally on the rise, also in the social sciences and humanities. The lower starting point for the SSH regarding the prevalence of collaboration means there has been plenty of room for growth in co-authored publications. Several epistemological, cognitive, economic and social factors influence research collaboration (see section 4.3). SSH researchers in Flanders are following the international trend of increased collaboration in journal articles. In 2000 about half of all articles were published by one individual, in 2010 this proportion has dropped to roughly one third. Although the proportion of multi-authored articles is much larger in the social sciences, the growth rates for the social sciences (+16%) and the humanities (+14%) are similar (see Figure 22). However, whereas humanities researchers appear to have increased their collaborative efforts regarding publications in WoS articles in particular, their colleagues from the social sciences have done the same for GP approved articles (and book chapters) (see Figure 25). The most pronounced evolution towards more co-authored articles between the two sub-periods 2000-2005 and 2006-2010 within the social sciences is political science (+15%) and the most stable one is social health sciences (+2%). Within the humanities the strongest evolution is exhibited by linguistics (+11%), whereas history is the most stable (+5%). In addition to the increased proportion of articles in collaboration, both the social sciences and the humanities show a

significant shift towards on average more authors per article, both for VABB-WoS and VABB-GP (see Table 16). For the social sciences the evolution towards publications with more than one author is proportionally the strongest for the articles in VABB-GP and more moderate for articles in VABB-WoS. In the humanities, the growth in number of authors is most notable for articles in VABB-WoS. Furthermore, the decrease in single authored publications displays a corresponding increase in proportion and number of articles and book chapters with more than one author in the humanities, whereas the social sciences manifest a decrease in the proportion and number of publications with two authors and an increase of publications with three or more authors (see Figure 26 and 27).

In both the social sciences and the humanities, international collaboration is on the rise too. While humanities researchers appear to increase their collaborative efforts irrespective of their national/international character, social scientists seem to focus their effort on international co-publications. On the one hand, the proportion of internationally co-authored articles compared to the total number of articles is increasing considerably sharper for the social sciences than for the humanities and the share of domestic Flemish co-authored articles seems to remain stable in the social sciences but is on the rise in the humanities (see Figure 24). On the other hand, no substantial increase in the share of international co-authors per article over time has been found in most disciplines. For educational sciences, history and linguistics, there has even been a minor decrease in the fraction of international authorship.

### **Book chapters**

The increase in co-authored book chapters for both the social sciences (+4.4%) and the humanities (+4%) is rather moderate. In the social sciences this growth is comparable of this of VABB-WoS articles (+3%), whereas the increase is largest in VABB-GP articles (+8%). In the humanities, the increase in number of co-authored book chapters follows the trend of articles in VABB-GP (+5%) and is lower than the increase in VABB-WoS (+9%). Furthermore, in both the social sciences and humanities, an ongoing evolution towards larger author numbers in book chapters is apparent, be it moderate.

### **Summary**

Collaboration is defined as *“The interaction taking place within a social context among two or more scientists that facilitates the sharing of meaning and completion of tasks with respect to a mutually shared, superordinate goal”* (Sonnenwald, 2007; p.645). Collaboration is often measured using co-authorships and, although co-authorship measures are easily calculated and compared, they capture only those collaboration practices rewarded with co-authorship. Furthermore, measuring collaboration in edited books is more challenging and includes not only co-authorships of book chapters, but also co-editorships and the relation of the editor with the book chapter author. In addition, five aspects related to collaboration within edited books can be defined: Per book the number of editors, of chapters, of total authors, of unique authors and the number of authors per chapter.

Differences in co-authorship and co-editorship patterns are prominent between on the one hand the disciplines and on the other hand the publication types. All in all, social scientists are more collaborative than humanities researchers, for all publication types (articles, book chapters, edited books and monographs) and for both publications included in VABB-WoS and those in VABB-GP. Collaboration is

higher in articles indexed in VABB-WoS than those included in VABB-GP for both the social sciences and the humanities in both proportion of co-authored publications and number of authors per paper. While humanities researchers publish overall more by themselves than together except in edited books, social scientists publish mostly with one or two authors for publications included in VABB-GP and with three or more authors for publications included in VABB-WoS. However, for both the social sciences and (especially) the humanities, co-editing a book is relatively more common than co-authoring an article, a book chapter or a monograph.

Collaboration is on the rise in the SSH both in proportion of co-authored articles and book chapters as well as in number of authors per publication. Although the proportion of multi-authored articles is much larger in the social sciences, the growth rates for the social sciences and the humanities are similar. This overall trend goes hand in hand with the almost tripling of WoS publications (see RQ 1), as collaboration in WoS for both the social sciences and the humanities remains the strongest in these publications. Furthermore, whereas humanities researchers thus appear to have increased their collaborative efforts regarding publications in WoS journals in particular, their colleagues from the social sciences have done the same for GP approved articles and book chapters as the high collaboration rate in WoS journals leaves only a small growth potential. Finally, a trend towards more international co-authored articles is present, though it does not seem to result in the involvement of, on average, more international contributors.

All in all, differences between disciplines remain and collaboration is influenced by a number of epistemological, cognitive, economic and social factors (see section 4.3).

## 6.3 Edited books

### What are the main publication characteristics of the SSH book editors in the period 2000-2011?

In a third and final step the VABB-SHW database (2000-2011) was transformed and linked to the additional database on edited books (see section 5.3 and 5.4) in order to answer the third research question (see articles 8.7 and 8.8).

#### 3.1) How do we define edited books, a publisher and an editor?

Edited books are defined as *collections of chapters written by different authors gathered and harmonized by one or more editors and identifiable by the presence of an ISBN*. Edited books can come into being at the initiative of the publisher, the editor(s) and/or as a result of a scholarly meeting or conference (Lewis, 1996). Furthermore, our definition allows us to distinguish edited books from other types of research literature such as monographs, scientific series, research reports, scientific journals and proceedings (a work published in preparation, rather than as a result, of a conference).

A publisher is, in accordance with the Online Dictionary for Library and Information Science (ODLIS<sup>28</sup>), defined as *a person or corporate entity that prepares and issues printed materials for public sale of distribution, normally on the basis of a legal contract in which the publisher is granted certain exclusive rights in exchange for assuming the financial risk of publication and agreeing to compensate the author, usually with a share of the profits*.

However, as the ODLIS-definition is outdated in several aspects, we present an updated definition of a publisher: *A person or a commercial, governmental or non-profit entity that prepares and issues intellectual content in printed or digital form, with the purpose of their public sale or distribution (including marketing), normally on the basis of a legal contract in which the publisher is granted certain, often exclusive rights in exchange for assuming the financial risk of publication and, depending on the type of published material and contract, agreeing to compensate the author, usually with a share of the profits*.

A book editor is defined in this thesis as *an academic who gathers and harmonizes a collection of book chapters written by different authors which are published in an edited book*. Typically, the names of the academic book editors appear on the cover of the edited book. These editors presumably (co-)determine the choice of the book chapter authors, guided by the needs of the book theme. Although different types of editors are involved with publications (e.g. series editors, acquisition editors, manuscript editors, copy editors), in this thesis we focus solely on the academic book editor, referred to as the editor, whether or not they fulfil other editorial roles. The editor influences the quality of the edited book through the editing process and the possibility of uniting the chapters into a whole (Nederman, 2005). The research in this thesis showed a large variety in the editing process concerning the presence of introductions and conclusions, both used for uniting the chapters. Thomas and Hrebener (1993) state that editing a book

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<sup>28</sup> Reitz, J.M. (s.a.) ODLIS. Online Dictionary for Library and Information Science: [http://www.abc-clio.com/ODLIS/odlis\\_e.aspx](http://www.abc-clio.com/ODLIS/odlis_e.aspx)

consist of 25% organizing and managing, 25% communication and 50% academic work, however, other researchers (e.g. Larivière, 2014) define editing a book as 100% academic work.

### **3.2) Is the edited book in the SSH more internationally oriented than are SSH articles and monographs?**

First, the international feature of the edited book is clearly demonstrated by the distribution of edited books over publishers, the places of publication and the language use. English and international publishing houses are directly related to worldwide accessibility (Hicks, 2004; Verleysen & Engels, 2014b). English is the dominant publication language in edited books (78%) for both the Flemish as the non-Flemish publishers and for both the social sciences (93%) and the humanities (74%) (see also RQ 1.4). Moreover, English as publication language in edited books is more common than English for articles. Besides, half of the edited books are published in the Netherlands (24%) and the United Kingdom (22%), both countries housing large international publisher houses. However, Flanders remains the main publication place for edited books (32%) and, as stated by Verleysen & Engels (2014b), especially in the humanities peer reviewed book publications are often published with local publishers.

Second, the international feature of the edited book is reflected in the international share of co-authorship and co-editorship (see Table 25). In general, the pool of unique co-editors is slightly less international than the unique co-author pool for both the humanities and the social sciences. Still, the edited book is more often internationally co-edited than all other publication types present in the VABB-SHW are co-authored, except, for the monograph in the social sciences (see Figure 38). Furthermore, the international share of unique book chapter authors in the edited books in the VABB-SHW is substantially higher than this of co-authors and co-editors. This indicates that edited books are relatively internationally composed and confirms Edwards' (2012) theory that the edited books offer the space required for authoritative comparative perspectives across dimensions, such as time and geographic location.

### **3.3) How do SSH book editors differ from other researchers, i.e. SSH non-book editors, in terms of gender, career stage, publication and co-authorship practices?**

Editing a book is not a rare practice, especially in (some) disciplines of the humanities where 1 in 10 researchers has edited one or more books. In the social sciences, 1 in 30 researchers has edited a book. Overall, 7.5% of all authors affiliated with one of the Flemish universities and included in the VABB-SHW (2000-2011) have edited one or more books. Moreover, although overall most editors are established researchers, the difference is especially pronounced in the social sciences. In the humanities both established and non-established researchers edit books (see Figure 36). Established researchers are defined in this thesis as *having a minimum of 12 weighted publication counts (publications are weighted conform the weights in the BOF-regulations: articles, book chapters and edited books count 1; monographs count 4 and proceedings papers count 0.5) and at least one publication in a minimum of 6 different years in the period 2000-2011*. More than half of the established editors edit more than 1 book, in contrast to less than 1 in five of non-established editors. Overall, when selecting the established researchers, book editors in both the social sciences and humanities are more productive than other researchers when using both fractional and whole weighted publication counts (see Table 23) and they publish more often book

chapters and monographs (see Figure 37). Although editors are highly collaborative while editing a book (see also RQ 2.2), editors are less collaborative overall, measured by the relative frequency of co-authored publications and number of unique co-authors, and are less well embedded in a diverse network of unique co-authors and co-editors. As edited books are more common in humanities disciplines (see RQ 1.2) and the humanities have been known to collaborate less than the social sciences in articles and book chapters (see RQ 2.2), the low level of collaboration of editors is mainly due to the majority of them being humanities researchers. Additionally, there are few differences in the share of international collaborative publications and of unique co-authors and co-editors between established editors and non-editors. Finally, although most editors are male researchers, gender is only weakly correlated with editorship when differentiating between established and non-established researchers.

### **3.4) Do editors use their co-authorship networks when compounding edited books?**

When compounding edited books, the choice of the contributors helps to determine the value of the edited book as well as the chances of success in finishing the work (e.g. Lewis, 1996; Heumann, 2001; Leal, 2013). Therefore editors need a large network and good networking skills (Thomas & Hrebener, 1993; Edwards, 2012). Overall, there are on average 2.7 editors (median 2) and 19.7 (median 17) unique chapter authors per edited book. The social sciences have a more diverse author pool, measured by the number of unique co-authors for all publication types, than do the humanities. However, the humanities have a more diverse book chapter author pool than do the social scientists. Though, the analysis showed that including book chapter authors in the editor's co-authorship networks based on articles, monographs and proceedings papers, makes those networks substantially larger, demonstrating that editors do not mainly call upon this co-authorship network for the choice of their book chapter authors. Indeed, few of the editors have collaborated with one of the co-editors and/or book chapter authors before or after the publication of the edited book (see Figure 39). Nevertheless, there are slightly more collaborations after than before the publication of the edited book. More specifically, 16% of the editors have co-authored or co-edited with at least one of their co-editors in the 5 or 6 years before publishing the edited book and 25% in the same period after. In addition, 28% of the editors have co-authored or co-edited with at least one of their book chapter authors in the 5 or 6 years before and 36% of them have in the same period after publication of the edited book. Moreover, 1 in 3 book chapter authors that have collaborated before or after publication of the edited book with the editors, is also a co-editor of the book under study, indicating a different relationship between the researchers.

### **Summary**

Edited books, defined as *collections of chapters written by different authors gathered and harmonized by one or more editors and identifiable by the presence of an ISBN*, are of special importance for (the majority) of disciplines in the humanities. Edited books are highly international, which is illustrated by the dominance of English as publication language, by the high share of edited books published in the Netherlands and the United Kingdom (both countries housing large international publishing houses) and by the high share of international book chapter authors and editors, especially compared to this of other

publication types. This indicates that edited books are a prime focus of internationalization and confirms Edwards' (2012) theory that the edited books offer the space required for authoritative comparative perspectives across dimensions, such as time and geographic location.

Overall the results both confirm and contradict the existing image of editors apparent in the scarce current literature. While it is true that such authors, most of them belonging to the humanities, still often prefer to work alone (e.g. when writing a monograph or a book chapter) and are less collaborative for journal articles, the picture of the typical book editor is that of a significantly more productive researcher, especially as regards monographs and book chapters, and having more fractional weighted publications overall. Furthermore, although most editors are male, gender seems not to correlate strongly with editorship. In addition, the edited book might fulfil a good networking opportunity as more co-authorships and co-editorships between the editors and their book chapter authors occur after publishing the edited books, although further research on larger data sets is necessary to corroborate or contradict this finding.

All in all, when measuring collaboration and internationalization in the social sciences and humanities, analysis of edited books is indispensable for these disciplines, especially as humanities often demonstrate lower scores when using solely co-authorship measures (see RQ.2).

## **6.4 Limitations and challenges**

### *Generalizing findings*

The research in this thesis is based on Flemish data only, except for the comparison with Norway. The question arises whether the findings in this thesis apply to other countries

### *Limited time frame*

The research in this thesis uses data over a limited time frame varying from 5 years (e.g. article 8.5 and part of article 8.8) to 12 years (e.g. article 8.6). As more longitudinal data become available through the yearly updates of the database, it will become possible to analyse the impact of changes to the performance-based research funding system. The impact of a major change in the Flemish BOF-regulation, i.e. the legislative introduction of the VABB-SHW in 2008 and its launch in 2010, remains as yet unknown as for this thesis we analysed data in the period 2000-2011.

### *Small selection of edited books*

The study in this thesis focussing on edited books from the VABB-SHW includes only those edited books with one or more Flemish affiliated researchers, resulting in a comprehensive but rather small selection of edited books. The data set could be enlarged by including all edited books in which minimum one Flemish affiliated researcher has (co-)authored minimum one book chapter and by including other comparable local and international data sets, e.g. edited books and book chapters registered in CRISStin.

### *Collaboration with Wallonia*

In this thesis, international collaboration has been identified as collaboration (co-authorship, co-editorship or editor-author relationship) between at least one researcher affiliated and at least one not affiliated with one of the five Flemish universities. Consequently, research collaboration between Flemish affiliated researchers and their colleagues affiliated with one of the universities in the French-speaking community has been treated as international collaboration, while it would be more adequate to treat it as national (interregional) collaboration.

### *Classification of disciplines*

The classification of publications into disciplines used in this thesis is based on the organisational affiliation(s) of the author(s) appointed by the universities. The disciplines are divided into social sciences and humanities, conform the BOF-regulations (see section 3). However, many methods of classification are possible, e.g. based on publications (journal classification, subject categories, citations) or based on ideas (language, topics and methodology) (Sugimoto & Weingart, 2015). In addition, discussion exists on the categorisation of disciplines into social sciences and humanities. E.g. whereas law is often seen as not belonging to either the humanities or the social sciences, communication studies can be classified in both the humanities and the social sciences. Furthermore, using disciplines and fields in this thesis, and thus aggregating the individual researchers' publications, unveils the dominant characteristics of these grouped researchers and covers the intra-disciplinary diversity. Or, as stated by Becher (1994), "*Academic behaviour fails to conform to neat and consistent patterns, but they are tidied up to represent a respectable neat field of study.*" Therefore, the results in this thesis might be distorted by the classification method used. However, as put by Sugimoto & Weingart (2015) "*the "correct" angle from which to approach disciplinary is contingent on the task and set of disciplines at hand.*"

### *Research collaboration versus interdisciplinary research collaboration*

Collaboration can take place between two or more researchers from the same discipline or from different disciplines. However, the latter does not necessarily imply interdisciplinary research collaboration as the emphasis in interdisciplinarity is on integration of different disciplinary knowledge (Wagner, et al., 2011), rather than researchers collaborating over disciplinary boundaries. A common definition on interdisciplinary research collaboration is difficult to define, also due to an ongoing debate on defining disciplines and defining research collaboration, as is mentioned in this thesis. In a report of the National Academies (2004) interdisciplinary research is defined as "a mode of research by teams or individuals that integrates information, data, techniques, tools, perspectives, concepts, and/or theories from two or more disciplines or bodies of specialized knowledge to advance fundamental understanding or to solve problems whose solutions are beyond the scope of a single discipline or area of research practice". In a review article Wagner et al (2011, p.16) distinguish between uni-/monodisciplinarity, multidisciplinarity, interdisciplinarity and transdisciplinary. "Multidisciplinary approaches juxtapose disciplinary perspectives, adding breadth and available knowledge, information and methods. Interdisciplinary approaches integrate separate disciplinary data, methods, tools, concepts and theories in order to create a holistic view or common understanding of a complex issue. Transdisciplinary approaches are comprehensive frameworks that transcend the narrow scope of disciplinary worldviews through an overarching synthesis, such as general systems, policy sciences, feminism, sustainability [...]" As is mentioned in future

research (section 7.2.3), a combination of quantitative and qualitative analysis is needed to capture the interdisciplinary process, which is beyond the scope of this research.

#### *Coverage of authors*

The VABB-SHW gathers all publications from the academic repositories, however, only those publications having minimum one author with a Flemish affiliation at the moment of publication, are included. This means that publications from individual researchers who transferred from a non-Flemish into a Flemish university during the period under study/evaluation, are only partially represented in the database.

## 7 Conclusion

In this conclusion we first give an overview of the main results, followed by five main policy recommendations, possible improvements of the database and suggestions for future research.

### 7.1 Summary of the main results

This thesis explores publication and collaboration practices in the social sciences and the humanities (SSH) and focusses on the evolution of these practices, on the measurement of collaboration in SSH and on edited books as publication output. The literature on these subjects is inconclusive as scientometric and bibliometric studies mostly focus on natural and biomedical sciences and/or are based on data in the Web of Science, a database where social sciences and humanities disciplines are underrepresented. Gradually, publication patterns in the SSH have gained importance in the literature. In the 80's, several articles explored the classification of disciplines and fields. Differences in their characteristics were ascribed to the nature of research in the social sciences, the humanities, the natural and the biomedical sciences. Since the early 90's questions have arisen on the proper use of indicators for the SSH and on the coverage of the SSH in international databases such as WoS. The new millennium has brought a more general awareness of the differences in publication patterns between the SSH and the other sciences, going hand in hand with the construction of comprehensive local and national SSH databases, serving funding and/or evaluation practices in the SSH. In Flanders, the adaptation of the funding system of the universities towards a more inclusive system led to the construction of the VABB-SHW, a comprehensive academic bibliographic database for the social sciences and humanities. From the start of this decade, exploring and analysing the VABB-SHW and additional data sets has brought valuable new insights in publication and collaboration practices in the SSH.

Four main conclusions can be drawn from the empirical studies presented in this thesis (see chapter 8 for full texts and chapter 6 for a summary). First, the increase of the number of publications goes hand in hand with a sharp rise in WoS publications and an increase in collaboration. Our study indicates that not only has WoS increased its coverage since 2007; researchers have also increasingly been publishing in WoS, which is partly seen as a result of the Flemish performance-based research funding system in place at that time. Second, the overall accepted picture of humanities researchers preferably working alone, should be revised as traditional co-authorship measures don't capture the more nuanced collaboration practices present in the humanities. Whereas our research confirms the image of the 'lone humanities researcher' when looking at co-authorships in articles and book chapters, including the edited book in our analysis demonstrates that humanities researchers appear to be highly collaborative when editing a book and dispose of a more diverse book chapter author pool than the social sciences. Third, research into collaboration practices of the SSH using WoS data overestimates collaboration. Our research shows that for both the social sciences and the humanities collaboration in WoS, measured by the share of co-authored publications and the number of authors per paper, is higher than this in other peer reviewed

publications, except for editing a book. Finally, although it was not the primary focus of this thesis, much of the empirical data indicates that internationalization in Flemish SSH is highly present and on the rise. Our research demonstrates that English is - and increasingly so - the dominant publication language in the SSH. Publishing in WoS can also be considered a more general indicator of internationalization, as English is the dominant language of the journals indexed in WoS, although a small but growing number of local journals in other languages have been indexed since 2007. Furthermore, international collaboration is highly present, especially in the edited book, and is increasing for both the social sciences and the humanities. Beside the aforementioned conclusions, some preliminary conclusions and additional questions formulated in this thesis (see section 7.2) need further exploration and confirmation.

The research presented in this thesis contributes towards greater knowledge on SSH publication and collaboration practices using comprehensive data. Further research should focus on the extent to which several factors, e.g. the performance-based research funding system at hand, the increase in staff and productivity and the epistemological disciplinary characteristics, are influencing the changing collaboration practices in the SSH. Furthermore, collaboration practices in the SSH themselves need further investigation. The overall accepted measurement of collaboration, i.e. co-authorship, needs to be revisited and the creation of new indicators is necessary to further understand the dynamics of collaboration practices in the social sciences and especially in the humanities. In addition, focus on the edited book is indispensable in research on publication and collaboration practices in the SSH. In this respect, research should confirm to what extent participating in the creation of an edited book is a result or a facilitator of the collaboration network of the respective researchers. As the literature is still incomplete and many questions remain unanswered, research into communication practices in the SSH, both basic and applied, should be facilitated in Flanders. Furthermore, funding and evaluation systems and the incentives they provide for researchers should evolve with the objectives and insights at hand. Finally, science is getting increasingly international, which is shown by the increase in international collaboration, the increase in international topics and the increase in international databases. Likewise, bibliometric and scientometric research into publication and collaboration patterns should use internationally linked databases and be carried out in international collaboration.

## 7.2 Recommendations

### 7.2.1 Policy recommendations

The research presented in this thesis, both in the literature study as in the own articles, gives more insight into publication and collaboration patterns of social sciences and humanities researchers. However, this thesis is only a piece of the larger puzzle. In this section I will present some policy recommendations based on the research presented in this thesis.

1. The Flemish performance-based research funding system should continuously be adjusted to the ever changing science process in order to obtain intended effects and avoid undesirable ones.
  - a) Monitor systematically the evolutions of scientific communication in the social sciences and humanities, both in Flanders and beyond, using valid measures and comprehensive databases.
  - b) Facilitate research identifying the effects of these evolutions on all actors (e.g. researchers, institutions, society), both in Flanders and beyond.
  - c) Facilitate research identifying the effects on these evolutions, in particular the effect of the Flemish performance-based research funding system.
  - d) Adjust the performance-based funding system accordingly to the new insights, balancing benefits against costs, the latter both in terms of finances, time and value for the scientific process.

Science is important for society and culture as it wants to answer our most profound questions (Bucchi, 2004) and its outcomes influence our world view and the practices of daily life. The dynamics of science and the entire research cycle have changed rapidly over the past few decades and keep on changing (see section 2.2). Scientific communication is often seen as the essence of science as scientists build their knowledge using previous knowledge (see section 2.1). Continuously and systematically analysing scientific publication and collaboration practices of Flemish affiliated researchers in the social sciences and humanities gives more insight in the evolution of the scientific process. The social sciences and humanities have different publication and collaboration patterns than do their colleagues in the natural and biomedical sciences. However, as the latter two are larger in number, have more homogeneous publication patterns and involve often larger budgets, their publication and collaboration patterns are often perceived as the dominant and even standard practices. Taking into account specific characteristics of the social sciences and humanities in 2008, was a first step in adjusting the Flemish performance-based research funding system (PRFS), as explained in section 2.2.2. However, the scientific landscape keeps evolving and new insights in this evolution prevail and the PRFS should evolve accordingly.

Monitoring the evolutions of scientific communication in SSH-disciplines is a first step in the process towards a co-evolving PRFS. Flanders is one of the few countries or regions owning a comprehensive database for the social sciences and humanities, the VABB-SHW (see sections 2.2.2 and 5.1). This rather privileged situation should be utilized by taking a leading role in the research concerning the scientific processes in the SSH-disciplines. A first analysis, using data for the period 2000-2011, indicated amongst others that collaboration patterns, measured by co-authorships, are overestimated when using Web of Science (WoS)-data only in the analysis. On the other hand, collaboration is underestimated in the humanities disciplines when collaboration patterns in edited books between the editor and the book chapter author are not included. Our research thus showed that using valid measures and comprehensive databases are indispensable in the analysis of the scientific communication and collaboration process of SSH-researchers.

Identifying the effects of these evolutions on the scientific process is a second step in the process towards a co-evolving PRFS. Our research indicated that in Flanders scientific publication and collaboration practices in SSH-disciplines are changing too, although differences between disciplines remain. Researchers in these disciplines have been known to publish in international articles, national literature, book publications as well as literature aiming at a more general public, i.e. enlightenment literature. In addition, formalization of collaboration as co-authorship is not always common practice, especially in some of the humanities disciplines. However, in the period under study (2000-2011), researchers in the SSH-disciplines focus more and more on WoS-journal articles, publish more and more in English and publish more and more publications in collaboration. For now, no shift away from book publications has been noted, and enlightenment literature was not included in the scope of this thesis. Unfortunately, the value of single authored publications, of book publications and local publication languages is still unknown. Therefore, research should be facilitated investigating these publication practices as policy steering research practices away from these particular publications might have unintended effects, both positive and negative. The fundamental principles of SSH-research, e.g. targeting at local audience (Must, 2011; Hicks, 2004), must be taken into consideration in the PRFS and its performance indicators. Research into the value and impact of these communication practices is necessary to be able to rightly interpret the effects of a (potential) change in communication patterns.

A third step in the process towards a co-evolving PRFS is the analysis of the effects on the different evolutions of the scientific communication process. Several influencing factors for this change can be identified: personal, environmental, epistemological, economic and cognitive factors, and amongst them is also the Flemish PRFS, the BOF-key. PRFSs have two main objectives: on the one hand distribution of research funds and on the other hand the steering of particular behaviour of researchers into the direction of increased research quality, enhancing accountability of public research and/or promoting greater alignment of research to societal and economic needs (Aagaard, Bloch, & Schneider, 2015; Butler, 2010; Hicks, 2012; Whitley & Gläser, 2007). As mentioned by Auranen & Nieminen (2010), *“the overall rationale behind funding incentives is usually that if money is given to the best performers, it will most likely produce better results and give an overall incentive for better performance”*. However, too much competition might be dysfunctional from the perspective of productivity and collaboration as funding takes time and energy away from research and writing. Flanders belongs to the leading group of countries/regions in

terms of the extent to which the distribution of public research funds depends on output (Spruyt & Engels, 2013b). Incentives given through PRFSs trickle down, to a certain extent, into the evaluation criteria on the level of the departments and the individual. However, little empirical research has identified to which extent PRFSs have an influence on scientific communication practices. Moreover, not all effects are intended nor desirable (Butler, 2010). The effects of research policy vary due to different country-specific funding environments (Whitley & Gläser, 2007), specific reputation and promotion mechanisms (Auranen & Nieminen, 2010; Butler, 2004; Hammarfelt & de Rijcke, 2015) and to disciplinary publication traditions and career stage or academic age (Hammarfelt & de Rijcke, 2015). Benefits of the PRFS need to be weighed against costs, both in terms of finances and values for the research process. More insight in the effects of the Flemish PRFS on the evolution of the publication and collaboration practices of researchers in the SSH, is indispensable to evaluate the system, its objectives and its unintended possibly undesirable effects.

All in all, the VABB-SHW has provided the authorities with a useful tool to further fine-tune the monitoring process of research in Flanders. Given the growing importance of publications in the innovation chain and in the allocation of research funds among the universities, further analysis of the VABB-SHW, the scientific process in the SSH and the continuously changing disciplinary publication cultures is necessary to be able to know and to act accordingly. Flanders aims to be a knowledge society and science and innovation play an important role therein. Adjusting the funding system accordingly to the new insights of intended and unintended effects, is a key element in attaining this goal.

2. The VABB-SHW should be benchmarked internationally.

- a) Communicate openly and internationally not only on the process of the VABB-SHW but also on its costs and benefits towards non-Flemish science policy organisations, scientists and other interested actors.
- b) Participate actively in an online international database combining all results from national and regional databases on the level of the journal, series and publishers.
- c) Identify the differences in scientific communication cultures between Flanders and other countries/regions in order to better understand the Flemish evolution and the different influencing factors, in particular the effect of the Flemish performance-based research funding system.
- d) Play an international leading role analysing publication practices in SSH.

First, Flanders has been one of the first regions to have adjusted its input-related funding system, namely the BOF-key, installed in 1994, into an input- and output-related funding system in 2003. Furthermore, the BOF-key changed again including the VABB-SHW in 2010 and domain-specific impact scores in 2012 (see also section 2.2.2). Science policy in one country builds upon own past experiences and those of others, learning from those experiences and adjusting and evolving the system. For example, the construction of the VABB-SHW, was largely inspired by the Norwegian database CRISTin (see section 5.2),

using amongst others its level 2 list of book publishers as the main basis for selection of qualified publishers. As science policy is evolving not only in Flanders but also in other countries and regions, the BOF-key, as a whole and more specifically the introduction of the VABB-SHW, can be of great interest for countries which installed or are interested in installing a performance-based research funding system (PRFS), especially for those whose PRFS is not adjusted to the publication culture in SSH. No “ideal” methodology exists in dividing research funding, and debate on the indicators and the intended and unintended effects is ongoing. Therefore, ECOOM Antwerp has been communicating the process of the VABB-SHW both nationally and internationally since its start (e.g. Engels, Ossenblok & Spruyt, 2012; Verleysen, Ghesquière & Engels, 2014). However, its costs and benefits, amongst others those listed during the evaluation of the VABB-SHW organised by the Flemish government in 2013 (Zuijdam et al., 2013), should be communicated openly and in English too.

Second, science is an interactive process that is influenced by several factors of which the international disciplinary community is one. In order to identify the disciplinary scientific communication culture, a large international database is needed to be able to look over national and regional borders. As social sciences and especially humanities are still underrepresented in large commercial databases such as Web of Science (WoS) and Scopus, the creation of a SSH international database would facilitate international comparative studies in SSH. Two different databases should be constructed or enhanced. First, as several countries and regions (e.g. Norway, Denmark, Sweden, Spain, Germany, Australia, etc. ) already constructed local, often comprehensive meta-data databases for (all) disciplines in SSH, combining and comparing these lists of journals and publishers in an online platform, would provide an international benchmarking tool for the VABB-SHW and the Flemish government. Constructing such a platform does not require all joining countries to agree upon the quality of the journals and publishers included as long as open communication on the selection criteria is provided. This feature would be simultaneously its strength and its weakness for inclusion of the information could happen fast but comparability on the level of the records would be limited. Therefore, a second database should be supported, namely the European Reference Index for the Humanities and Social Sciences (ERIH PLUS)<sup>29</sup>. ERIH PLUS could provide in the currently missing tool to monitor, compare and cluster the publication practices of SSH researchers, not only in Flanders but in all joining countries. Science is an international process and the dynamics of science should be identified using international data. In addition, identifying disciplinary cultures, comparing different evolutions and different systems in different countries can help identifying the possible effects of the local PRFS on the local publication practices. As pointed out by Luwel (2010): “*International comparative studies of the impact of performance-based research funding systems that draw on in-depth knowledge of national systems could be of great benefit to national authorities and universities in their efforts to increase the effectiveness and efficiency of institutional funding*”.

Third, as mentioned in the evaluation report on the VABB-SHW, conducted in 2013 by Technopolis (Zuijdam et al., 2013), and following my own experience, the GP-members, next to ECOOM, spend lots of time on the construction of the VABB-SHW. An important part of the work of the GP is the judgement whether a publication channel meets the criteria stipulated in the BOF-regulations. One of these criteria is the use of peer review of a publication channel. In the past, and to the best of my knowledge, in the

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<sup>29</sup> <http://www.esf.org/index.php?id=4813>

present still, searching the internet and documenting the peer review system is still done by the GP-members themselves. However, this task could be delegated to administrative support staff or/and librarians. By shifting this rather time-consuming administrative task to administrative staff, the GP could focus on the future developments of the VABB-SHW, i.e. on new innovative ideas in performing their task by playing a leading role in the search towards new methods and clear criteria in monitoring and discussing the publication cultures and evaluation practices (e.g. evaluation of book publications and publishers) in the SSH.

3. Research evaluation of individual researchers and research units in SSH should be adjusted to the objectives of science and the (sub)disciplinary culture at hand.
  - a) Outline the objectives of each researcher and research unit before evaluation in communication with the respective researchers.
  - b) Use metrics in combination with peer review.
  - c) Critically evaluate old and new measures in communication with the (sub)disciplines at hand.
  - d) Facilitate further research into the publication practices of SSH disciplines not included in the VABB-SHW.

*“Research evaluation is confronted with the challenge of finding a balanced system of indicators which adequately captures the performance of a multitude of research fields with often very different degrees of disciplinarity and transdisciplinarity. Depending on the relative importance of certain intra- and extra-science dissemination channels, the indicators should be weighted accordingly. In the end, any weighting depends on the objectives of the research organizations and programmes that are assessed.” (Kaufmann & Kasztler, 2009)*

Before individual researchers or research units can be evaluated, the objectives of the research should be clearly outlined by the researcher(s) themselves and approved of by the respective evaluation institution. As indicated by several researchers, evaluation systems often aim to increase research quality, enhance accountability of public research and/or promote greater alignment of research to societal and economic needs (Aagaard, Bloch, & Schneider, 2015; Butler, 2010; Hicks, 2012; Whitley & Gläser, 2007). However, the translation of these goals differs over (sub)disciplinary cultures. E.g. as is shown in this thesis, collaboration measured by co-authorships is often positively correlated with personal productivity, citation counts and prestige of and acceptance rate in the journal (see section 4.20). However, collaboration in the social sciences and especially the humanities should include not only co-authorship but co-editorship and editor-authorship relations as well (see section 6.2). Furthermore, research evaluation of individual researchers and research units should give a balanced image of the work and skills of the researchers under evaluation, including research, education and socio-economic impact. Therefore,

the adequate evaluation system must be multidimensional, allowing for diversity and variability and this in accordance with the respective objectives.

How these objectives can be measured is open for debate (Cronin & Sugimoto, 2015; Wilsdon, et al., 2015) and several commonly used measures are criticized by members of the scientometric community (e.g. h-index, journal impact factors, etc.). Furthermore, as science communication evolves into science 2.0 (see section 2.2.1), measures should adopt accordingly including the digital bridge between science and society (DORA<sup>30</sup>; Rousseau & Ye, 2013; Osterloh, Wollersheim, Ringelhan & Welppe, 2015). Besides, as metrics only give a partial image of what is measured (e.g. citations for quality; co-authorship for research collaboration), and operate unevenly across the range of disciplines (e.g. citation windows are larger in SSH than in natural sciences (Glänzel & Schoepflin, 1999)), metrics can be used as an aid in research evaluation but should always be accompanied with peer review assessments (Hicks, Wouters, Waltman, de Rijcke & Rafols, 2015). In addition to metrics representing only partially the aspect under evaluation, using databases such as WoS and VABB-SHW will also give a distorted view as they are limited in their coverage. E.g. as shown in this thesis, WoS does not cover all peer reviewed articles, especially not in disciplines belonging to the humanities. The VABB-SHW fills this gap in that it gathers all peer reviewed publications from researchers in the social sciences and humanities. However, publication practices in SSH do, next to international, national and book publications also include enlightenment literature (Hicks, 2004), a publication category only partially covered by the VABB-SHW (Verleysen & Engels, 2013b). Hicks (2004) points out that an ideal evaluation includes all four literatures, and thus also enlightenment literature. Enlightenment literature in the social sciences and the humanities is non-scholarly literature which moves knowledge into application, compared to patenting in the natural and the biomedical sciences. Therefore, enlightenment literature should be valued as worthy output in evaluations, just like patenting is (Narin, 1994). All in all, metrics should be evaluated in communication with the respective researchers as the disciplinary culture defines the interpretation of the results, e.g. research quality is perceived differently in the humanities (Hug, Ochsner, & Daniel, 2013), social media could be used differently in different disciplines and societal impact is gained in different ways.

The VABB-SHW is a database constructed to adjust and refine the Flemish PRFS, the BOF-key, by taking (part of) the publication practices in the SSH into account. The VABB-SHW has been evaluated as positive in this perspective (Zuijdam et al., 2013). However, the VABB-SHW, like the WoS, was not built to evaluate individual researchers and the criteria for inclusion in the VABB-SHW, like those of WoS, do not necessarily match the criteria used in evaluations. Therefore, the VABB-SHW, as all other databases, should be used with care in research evaluation. Further research into the publications not included in the GP-selection would give more insight in all publication practices of SSH, and would provide us with a more balanced view on the costs and benefits of using the VABB-SHW in individual evaluations.

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<sup>30</sup> <http://www.ascb.org/dora/>

4. Research collaboration in the SSH should be measured and valued with attention to the specific characteristics of the fields, disciplines and research at hand.
  - a) Facilitate research on collaboration practices in the SSH using comprehensive databases and new measures.
  - b) Facilitate research looking into the value of the single author publication in the SSH.
  - c) Stimulate open access publishing.
  - d) Boost research collaboration by facilitating spatial proximity and informal contact.

Research collaboration measured by co-authorship is positively correlated with personal productivity, citation counts, prestige of the journal and acceptance rate of the journal (see section 4.2). However, most of these studies use databases such as WoS and Scopus, in which the social sciences and the humanities are known to be underrepresented (see sections 1.1 and 2.2.2.). Therefore, bibliometric studies on these disciplines using these databases are incomplete and biased. Furthermore, due to the specific characteristics of the social sciences, and especially the humanities, collaboration cannot solely be measured by co-authorship (Sula, 2012; see article 8.8). Laband and Tollison (2000) indicate that intellectual collaboration includes formal co-authorship as well as presentations of papers at workshops, seminars and other professional meetings and informal commentary from colleagues, journal referees and editors. Therefore, additional research using comprehensive data and applying new measures of collaboration should be facilitated.

Although previous research has focussed on the advantages of research collaboration (see section 4.2), to the best of my knowledge, so far no research has focussed on the value of single authored publications. As humanities researchers still publish mostly on their own, research into the value of single authored publications is indispensable, especially as collaboration is increasingly stimulated, either directly or indirectly, through evaluation and funding systems.

Furthermore, as science is *an sich* a collaborative process as explained by Subramanyam (1983), building new knowledge using previous knowledge, this previous knowledge should be accessible for all researchers, all over the world. In this light, open access publishing should be stimulated in Flanders and beyond, and even required, through open access journals, university repositories or accessible social media (e.g. ResearchGate and Academia.edu).

Finally, research collaboration can be stimulated in a 'soft' way by increasing spatial proximity between researchers (Katz, 1994; Larivière et al., 2006) and by facilitating informal contacts (Becher, 1994; Katz, 1994; Lamont & Molnár, 2002). Beside research stays and attending conferences, spatial proximity between researchers can also be introduced into the university itself. Hitherto, disciplines are often ossified into physical structures research units. However, introducing flexible workplaces away from disciplinary walls, could feed interdisciplinary informal contacts, which could fertilize new ideas and interesting discussions. Besides, informal networking events should be facilitated, especially for newly arrived foreign researchers as loneliness might be lurking around the corner.

5. Information science should be installed as an academic education and research field in Flanders.

- a) An academic inter- and multidisciplinary study in information science should be facilitated in Flanders
- b) Research in information science, especially in informetrics, both basic and applied, should be facilitated

Information science is defined by ODLIS<sup>31</sup> as “*The systematic study and analysis of the sources, development, collection, organization, dissemination, evaluation, use, and management of information in all its forms, including the channels (formal and informal) and technology used in its communication.*” Information science is a multidisciplinary area focussing on how information is created and processed in society. Since the arrival of the computer and the internet in the 1970s, information is increasingly spread using digital technology. As a result, in the last decades of the 20<sup>th</sup> century, an information explosion took place and information management, i.e. *the skilful exercise of control over the acquisition, organization, storage, security, retrieval and dissemination of the information resources* (ODLIS), became increasingly important and even essential to the successful operation of an organization. Therefore, it seems only logical that Flanders provides an academic interdisciplinary study to enhance scientific insight in information sciences, combining the necessary knowledge going from intellectual property law and knowledge management, over computer science and organizational studies to scientometric and bibliometric studies. As the world becomes in essence information- and technology-driven, there is an increasing need for experts who look at the bigger picture of information exchange and study how people interact with, use, create and disseminate information. Such experts can help implement sound, secure, user friendly technology and are able to play a leading role in solving ICT problems that go beyond the technical aspect.

In addition, research in informetrics, i.e. “*the study of the quantitative aspects of information in any form and in any social group*” (Tague-Sutcliffe, 1992; p.1), should be facilitated. As mentioned in this thesis, the field of informetrics has several audiences: bibliometricians, scientometricians, other scientific disciplines, business and science policy (Glanzel & Schoepflin, 1994). As the latter is the most dominant already for several years, a dramatic increase of the need for methods and instruments to evaluate, to select and to monitor public R&D spending has taken place. Therefore, applied policy-related research has dominated several debates and conferences. However, as emphasized by Glänzel and Schoepflin (1994), basic research in this interdisciplinary field remains important as well, as it is often the foundation on which applied research is built. E.g. basic research into different types of collaboration in the social sciences and humanities would provide more insight in what is measured by co-authorship and co-editorship.

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<sup>31</sup> Reitz, J.M. (s.a.) ODLIS. Online Dictionary for Library and Information Science: [http://www.abc-clio.com/ODLIS/odlis\\_e.aspx](http://www.abc-clio.com/ODLIS/odlis_e.aspx)

## 7.2.2 Possible improvements of the database

The VABB-SHW consists of a searchable user friendly Online Public Access Catalog (OPAC)<sup>32</sup> which is based on the database in Brocade, i.e. the library information system maintained by the library of the University of Antwerp. During my research I came across some practical issues as well as some possible structural improvements of the database.

1. The database is constructed on the publication level, i.e. the level of the journal article, book chapter, edited book, monograph and proceedings paper. However, no match could be made between the authors of a book chapter and the respective editors, as not all elements in the database are linked. As our research has shown, when studying research collaboration in the humanities, including edited books and the relation between the editor and the book chapter gives another image of humanities researchers, often perceived as loners in their academic work. Therefore, it would be useful to make implicit links in the database (e.g. via ISBN) explicit.

2. Some information, such as the disciplinary affiliation(s) of the author(s), can only be found in the database on the level of the record but not on that of the individual author. However, the availability of the disciplinary affiliation relates to the university repository and system of delivery of the data and, unfortunately, this information is not available to ECOOM for all universities. Research on the level of the individual author is important as it shows the diversity of research publishing and collaboration practices within a discipline.

3. In all but one university, researchers themselves are responsible for the actual registration of their publications in the university repository. As a consequence, standardization is more difficult to achieve (e.g. author names), data is more often missing (e.g. number of pages in a monograph) and mistakes are more frequently made (e.g. publication date of a journal article). The registration of publications in the university repositories should be done by librarians following uniform rules. E.g. in the current system, all researchers affiliated with one of the Flemish universities receive a unique author identifier, or ALOI. Researchers affiliated with more than one Flemish university receive more than one unique identifier, i.e. one per university. During the last 5 years all ALOIs from the same researcher were merged into 1 ALOI. However, this work was complicated as Flemish surnames such as 'Van Putte' have been registered both as 'Van Putte' and as 'Putte,Van'. Standardization of the author names would facilitate this procedure.

4. Researchers not affiliated with one of the Flemish universities are not assigned a unique author identifier, ALOI. The usage of an international research identifier for all researchers in the database, both those affiliated with a Flemish university and the others, could help to overcome the problem of researcher identification, the latter being important in research of e.g. individual publication and collaboration practices. The ORCID<sup>33</sup> is an example of an open, non-profit, community driven effort to create and maintain a registry of unique researcher identifiers, which could help link research activities outside the scope of the VABB-SHW.

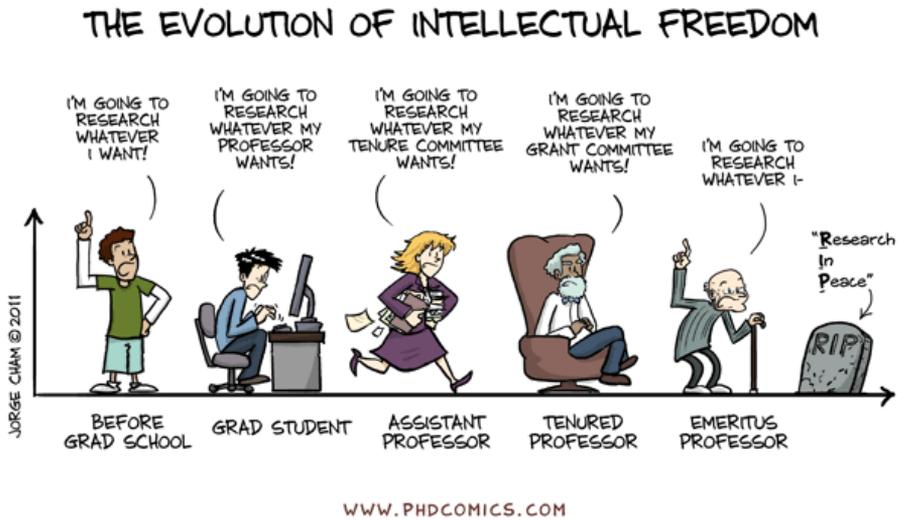
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<sup>32</sup> <https://www.ecoom.be/nl/vabb>

<sup>33</sup> <http://orcid.org/>

5. The VABB-SHW database is an independent database with no links to other national or international databases. However, as mentioned in section 7.2.1, benchmarking the VABB-SHW on an international platform and with ERIH-plus would have the benefit, not only of advertising the database and the linked funding system, but also of comparing to and learning from other experiences and thereby increasing its quality.
6. For research purposes, it would be interesting to merge the VABB-SHW data, maintained by ECOOM-Antwerp, with the WoS data, maintained by ECOOM-Leuven. As the latter contains a comprehensive set of publication and citation data of the natural and biomedical sciences, merging the two databases would enhance research into interdisciplinary research on the boundaries between SSH and the other sciences. Furthermore, research on publication practices in the SSH might profit from a(n indirect) link with the survey data, maintained by ECOOM-Gent.
7. In order to facilitate funding institutions to use the VABB-SHW in their selection procedures (e.g. selection of FWO-panel members), the database should be linked with the FWO-tool in that way that CV's can be uploaded from the VABB-SHW by the researcher at hand. This would simplify the manual work behind the screening of the FWO-panel candidates.
8. In order to be able to have a more complete picture of publications and collaboration patterns in SSH, classic methods such as citation analysis could be useful. Therefore, one could start with importing Google book citations (Kousha & Thelwall, 2015) of the VABB-SHW book publications.

### 7.2.3 Suggestions for future research



#### Publication patterns

Publication patterns in the social sciences and humanities should be monitored systematically both quantitative and qualitative and compared, in order to define disciplinary cultures within and outside Flanders and to identify the different evolution(s). In addition, the search for valid measures and the use of comprehensive databases should never end.

#### *Evolutions in publication patterns*

In this thesis, as well as in several foreign studies, strong evolutions in publication patterns have been demonstrated. A strong rise of English as publication language, especially in publications selected by the GP, the increase in number of publications, the increased share of WoS publications, etc. Can science keep growing at this impressive rate? Will the use of English as a publication language continue to gain momentum? Moreover, will new trends be revealed, e.g. will the future indeed see a shift towards journals away from books as the medium of dissemination of research in the SSH? Continuously monitoring the publication practices in SSH will help to identify the influences of and on the evolutions exposed.

#### *The edited book*

The edited book is underrepresented in scientometric and bibliometric research. Beside the studies in this thesis which is based on a comprehensive data set, literature on edited books is rather scarce and comprises on the one hand essays, mostly based upon own experiences, and on the other hand data-driven research using small local databases or the Book Citation Index from Web of Science, the latter

biased towards publications in English. Therefore, several questions concerning the edited book remain unanswered. In order to answer these questions, I suggest using a larger data set and conducting a large survey. First, the rather limited data set on edited books should be enlarged by including all edited books in which minimum one Flemish affiliated author has published a book chapter and by including a longer period of time. In addition, including other comparable local and international data (e.g. edited books indexed in CRISTin), would facilitate a more elaborated and robust data set which enhances the possibility for interesting disciplinary comparisons. Furthermore, comparing and combining different local and international data sets is needed to assess the extent to which the results are specific for Flanders. However, analysing publication data alone will not provide all answers and additional information should be gathered by a questionnaire, preferably international, and preferable not only in the social sciences and the humanities but also in other fields.

#### 1) What is the value of the edited book for research communication in the different disciplines?

Despite edited books being undervalued externally, e.g. they are rarely included in evaluation systems (e.g. Norway, UK), researchers keep on using them to communicate their research. Therefore, the question arises what is the value of the edited book for research in both the social sciences and the humanities as well as in the natural and the biomedical sciences? Hitherto, to the best of my knowledge no study has been conducted to define this value. As indicated by Hartley (2015), the value of the edited book is difficult to determine as the reasons for editing are manifold, depending strongly on the type of edited books (original works or previously published papers), on the initiator (the publisher or the researcher) and on the occasion (e.g. as a result of a(n) (in)formal meeting or conference, as a support of a course, to pay tribute to a colleague). Therefore, in a first step, these differences should be mapped for all edited books. In addition, the composition of edited books varies between the different scientific fields. Puuska and Miettinen (2008 cited in Puuska, 2010) find that in the natural and biomedical sciences, edited books are often extensive reviews of a research area. In the social sciences and the humanities collections of already published papers by different authors co-exist with collections of original contributions. A first hypothesis might be that we expect that interdisciplinary and international research is often published in edited books as the main advantage of this special publication type is the possibility of combining different perspectives on a broad theme, irrespective of place and researchers' disciplines (Edwards, 2012; Leal, 2013; Lewis, 1996; Nederman, 2005). However, interdisciplinary and international research questions are more prominent in the natural and biomedical sciences, yet, most edited books are published in the social sciences and especially in the humanities, disciplines with often more domestic research topics (see section 3.3.1). A second hypothesis might be that edited books involve more often publications that can be presented in a chapter, but are not of interest for an article, e.g. explain a methodological issue in detail.

#### 2) In what way do disciplinary characteristics influence the choice of a researcher to publish an edited book?

Several researchers such as Bilgan (1973), Kyvik (1991), Becher & Trowler (2001) and Whitley (2007) analysed the disciplinary characteristics of fields. All analysis indicate that disciplinary differences are to be found on a continuum and the aforementioned researchers are all indicating different (partly

overlapping) main characteristics of the different fields. However, as stated by Kyvik (1991, p71): “ *The strong emphasis on the book as a form of communication in the humanities and the social sciences, in contrast to the natural and medical sciences, is largely a result of the distinctive character of these fields.*”. He provides three reasons to support his statement: 1) the cognitive structure of the SSH, 2) the degree of competition, 3) the audience structure. Kyvik relates these characteristics to the publish of books in general (not to edited books particularly). He states that researchers in the social sciences and the humanities need more space to explain their thoughts and methods than their colleagues in the natural and the biomedical sciences as the first have a lack of uniform language (e.g. mathematics) and of consensus on methods and research topics. Furthermore, the degree of competition is lower in the social sciences and humanities, so more time can be spend on writing research, and the research in these fields is more often focused on a general audience, thus requires more comprehensive descriptions. The question arises in which way this is (still) true for book publications in general and for edited books in particular. A hypothesis might be that the disciplinary traditions and epistemological factors might influence the choice of a researcher to publish an edited book rather than a monograph. It might be believed editing a book is less time-consuming than writing a monograph, especially when collecting already published research. Therefore, the degree of competition for priority in a field might be influencing the number of edited books in the respective field. Distinguishing in the data between a collection of original papers and that of already published ones in a discipline, might confirm or reject this hypothesis.

### 3) Who is co-editing a book?

As experienced scholars have more accumulated knowledge and dispose of a larger network (Puuska, 2010), one could expect that more experienced scholars are more likely to publishing an edited book. However, our research (see article 8.7) found that this is true for the social sciences, where 70% of the editors are established, but not for the humanities, where half of the editors is an established researcher. An explanation for the high level of unestablished editors in the humanities might be found in the high level of collaboration in edited books. Four in five edited books in our study have been co-edited by 2 or more researchers. Further research should check this hypothesis by looking at the number of times an edited book has been edited by a senior researcher combined by a junior researcher. Furthermore, in our research, focus was on the established editors (see article 8.8) and therefore, half of the editors in the humanities were not yet investigated. Research into the difference in publication and collaboration practices between established editors and non-established editors in the humanities, would give more insight in who is editing a book.

### 4) Do editors rely on their (international) network when appointing book chapter authors?

As the choice of the contributors is highly relevant for the quality and the success of the book editing project, we expected book editors to rely on their network when appointing book chapter authors. In this thesis we found editors did not rely on their co-authorship network when appointing book chapter authors, and one explanation could be found in the influence of the publisher and the readership in the choice of the book chapter author, e.g. more international authors are asked to collaborate to meet the international marked. However, it might also be that the network of the editor is only partially visible

through co-authorship relations. Both quantitative and qualitative research into the network and the use of the network while (co-)editing a book, could confirm, nuance or further reject our hypothesis. One example is to look at the intensity of the collaboration, i.e. add the number of time an editor collaborates with his respective book chapter authors. Another example is to look at a longer period under study as this might clarify the start of a co-authorship and co-editorship relationship. An additional study would be needed to identify existing relations between the editor and the book chapter authors, which are not visible when measuring collaboration through co-authorship and co-editorship.

#### 5) Do editors fulfil a bridge function in the co-authorship networks?

As our results showed, editors collaborate slightly more with their book chapter authors after than before publishing the edited book. However, due to the limited time frame used, the small data set and the fact that not all collaboration is captured in co-authorship, these findings need to be confirmed. Furthermore, the question arises whether the book chapter authors of the same edited book collaborate more after than before publishing of the edited book.

#### *Proceedings papers*

Proceedings papers have not been investigated thoroughly in this thesis. However, as both fields count for 3% proceedings papers, the publication type is entitled to further investigation. First, one might expect that in disciplines where articles are more common than book publications, and thus often having a high degree of priority (Kyvik, 1991), publishing a proceedings paper is more common than in book-publishing disciplines. Second, one might expect that especially young researchers publish proceedings papers. As mentioned by Puuska (2010), conferences are the ideal place for young researchers to present their research ideas. The question arises whether this is true for all fields and all disciplines.

#### *Book publications in WoS*

As mentioned in the thesis (see article 8.6) WoS has since 2011 indexed book publications in the Book Citation Index (BkCI). However, as pointed out by other researchers, the BkCI has several limitations, such as: bias towards English as publication language (Gorraiz et al., 2013) and a restricted publisher selection (Torres-Salinas et al., 2013). Comparing the VABB-SHW with the BkCI would give more insight in the comprehensiveness of the latter.

#### *Enlightenment literature and non-peer reviewed publications*

Social scientists and humanities scholars publish international articles, national literature, book publications and literature aiming at a more general public, i.e. enlightenment literature (Hicks, 2004). The study of enlightenment literature was not included in this thesis. However, several questions have not yet been answered: Is enlightenment literature making place for international scientific literature? Is enlightenment literature important enough to be included in the evaluation systems of individual scholars? Are senior researchers more likely to publish enlightenment literature as career incentives have a lower impact on them? Is there more or less collaboration place in enlightenment literature than in the other literature? Research into this special type of typical SSH literature, would give more insight in the whole publication pattern of the SSH.

The VABB-SHW consists of a selection of publications in journals and with publishers using peer review prior to publication. However, the universities deliver to ECOOM Antwerp all publications present in the university repositories, thus also including publications authors believe worth registering in the university repositories but which are not peer reviewed. The question arises what this literature encompasses. As one might expect, not all enlightenment literature is peer reviewed, however, it might be that not all non-peer reviewed literature is enlightenment literature.

### *Gender*

A previous study based on WoS demonstrated disciplines from social sciences showed “*a larger proportion of female authors, whereas the humanities are still heavily dominated by men* (Larivière, Gingras, Cronin, Sugimoto, 2013, p. 212). In Flanders, 42% of the social scientists and 38% of the humanities researchers affiliated with one of the Flemish universities and publishing in the VABB-SHW during the period 2000-2011 are female (see Figure 40 in appendix). The disciplines with the least female researchers are theology (27%) and philosophy (28%), those with the most female researchers educational sciences (50%) and criminology (54%). As previous studies have showed (see section 3.2.1), female researchers have different publication patterns and preferences than their male colleagues, e.g. women tend to publish less and collaborate less. According to a study of Larivière et al. (2013), women tend to publish more locally than men do. As WoS is still biased towards (international) English language publications, gender studies based on WoS data only, are consequently not including all publication and collaboration practices of female researchers.

### *Identify the core literature within SSH by analysing dissemination and citation patterns*

As mentioned by several studies and as is apparent in this thesis, the social sciences and humanities are underrepresented in WoS. According to Hicks (2004) the low coverage of SSH journal literature in WoS might indicate a lack of core literature and thus a high fragmentation of the dissemination and citation of the literature. In Flanders, for most disciplines in the SSH, about half of the articles appear in the first 10% of the journals, although large differences remain (see also Table 35 and Figure 44 in appendix). Unfortunately the VABB-SHW does not include citation data. However, analyzing not only dissemination patterns but also citation patterns using citations from google books, WoS, Scopus and an own citation database, would give more insight in the publication patterns and its disciplinary differences of SSH researchers.

## **Collaboration patterns**

### *International study on collaboration practices in SSH*

Collaboration practices differ between disciplines and between countries; however, the question arises to which extent disciplinary publication cultures are similar across national boundaries. During the past years several studies on publication practices in social sciences and humanities have been conducted and several of them concerned collaboration patterns. Some studies have been conducted on WoS-data and others have been conducted on (comprehensive) local databases (e.g. Aksnes & Mikki, 2012; Ardanuy, 2012; Cronin, Shaw & La Barre, 2003; Larivière, Gingras & Archambault, 2006; Levitt & Thelwall, 2010; Ossenblok, Verleysen & Engels, 2014; Puuska, 2014). All these studies could and should be combined in a

meta-analysis (e.g. review article) on collaboration patterns in the different disciplines of the social sciences and the humanities and this for all publication types studied.

#### *Domestic collaboration patterns*

In the performance-based research funding system in Flanders, a whole counting per university is used, i.e. a publication counts for a university when at least one of the authors is affiliated with the respective university, and irrespective of the number of authors affiliated with this university. This system would possibly stimulate interuniversity collaboration within Flanders. Furthermore, spatial proximity is seen as a facilitator of collaboration (Katz, 1994; Larivière et al., 2006), which would stimulate intrauniversity and intradepartmental collaboration. Furthermore, research in the SSH is increasingly based on large data sets, research that facilitates teamwork. Analysing the collaboration patterns within Flanders, looking at universities, departments and research units, would give more insight in collaboration practices and collaboration networks within the SSH. A researcher collaborating 10 times with the same colleague has a different collaboration network than a researcher collaborating one time with 10 different colleagues.

#### *International collaboration patterns*

In this thesis, international collaboration has been identified as collaboration (co-authorship, co-editorship or editor-author relationship) between at least one researcher affiliated and at least one not affiliated with one of the five Flemish universities. Research collaboration between Flemish affiliated researchers and their colleagues affiliated with one of the universities in the French-speaking community (see section 2.2.2) should be investigated as it would enlighten our knowledge on interregional collaboration in Belgium. Research into differences in collaboration patterns between on the one hand Wallonia (different language, same country) and on the other hand the Netherlands (different country, same language), could shed more light into disciplinary collaboration cultures and possible differences in language barriers.

Next to the aforementioned specific research into collaboration patterns of Flemish affiliated researchers with their colleagues from Wallonia and the Netherlands, it would be interesting to look into collaboration patterns with other countries. By looking at the country affiliation of non-Flemish affiliated unique co-authors in the VABB-SHW, links with countries and institutions would be made visible and knowledge communities could be identified. Furthermore, the question arises whether international collaboration is more apparent in publications in journals and with publishers indexed in WoS than in those in journals and with publishers selected by the GP.

#### *Interdisciplinary collaboration patterns*

In a review article, Wagner et al. (2011) distinguish between uni-/monodisciplinarity, multidisciplinarity, interdisciplinarity and transdisciplinarity, all being a refinement of the concept interdisciplinarity. As interdisciplinary research is on the rise due to more complex research questions, scientometric research concerning interdisciplinary research is progressively important. These analyses of interdisciplinary research are often conducted using citation analysis on data from WoS, Scopus and Google scholar. Yet, the latter is known to contain several errors whereas the first two databases are known to represent especially the natural and biomedical sciences and to a lesser extent the social sciences and the humanities (e.g. Archambault, et al., 2006). Consequently, citation analysis fails partly in analyzing an

important part of social relevant research, more particularly the collaboration between the social sciences and the humanities on the one hand and the natural and biomedical sciences on the other (Wagner et al., 2011). Several problems can occur when researching interdisciplinarity: e.g. incomplete author affiliation (Porter, Cohen, Roessner, & Perrault, 2007) and incorrect author affiliation due researchers who are not working in the same discipline as what they studied (Wagner et al., 2011). In addition, as mentioned by several authors (e.g. Wagner et al., 2011) interdisciplinary research is linked to integration of different disciplinary knowledge rather than collaboration between disciplines. Therefore, co-authorship might not be the most adequate research method. Additional research into different research methodologies such as co-word analysis (van Raan, 2004), surveys and citations and cluster analysis of e.g. acknowledgements and journals is needed. As mentioned by Wagner et al. (2011) only a combination of quantitative and qualitative analysis can reveal the interdisciplinary research collaboration processes. All in all, research into interdisciplinarity using the VABB-SHW and the WoS combined, could give more insight in the collaboration process of SSH researchers.

#### *Correlation between collaboration and publication patterns*

In this thesis, both publication and collaboration patterns were studied. However, so far, not all correlations between on the one hand publication patterns and on the other hand collaboration patterns have been investigated and we can only suspect the correlation between those two. E.g. is language choice correlated with collaboration patterns? And, additionally, is there a difference in correlation between language choice and collaboration for the different publication types including non-peer reviewed and enlightenment literature? Even more, are there differences in this respect for personal characteristics of the researchers such as gender and career stage? And what are the disciplinary differences in this respect?

#### *Authorship practices*

As mentioned by Laudel (2002), different collaboration practices exist and not all are rewarded by authorship, i.e. ghost authorships. Although the humanities seem to ennoble single authored papers, the pressure to publish increases and ghost authorships might become real authorships. Furthermore, although the first author often is regarded as the leading author of the publication, disciplinary differences exist and alphabetical order is still common in some disciplines. The question arises whether a new attitude towards co-authorships (e.g. the diminishing of ghost authorships and multi-authorship) is present. An analysis of disciplinary traditions into authorship, including both rewarding collaboration and alphabetical authorship, would give more insight in the evolution of collaboration measured by co-authorships and could clarify the precise socio academic and corporate publishing context in which SSH publication outputs come into being.

#### **Influences of evolution in publication patterns**

Publication patterns in the social sciences and humanities are changing, although differences between disciplines remain. Researchers in the SSH disciplines focus to a greater extent on WoS journal articles, publish increasingly in English and in collaboration. The question arises how these changing publication patterns influence research and society. The value of single authored publications, of book publications,

local publication languages and enlightenment literature is still unknown. Benneworth (2015) indicated that alternative publication types in the humanities are especially important for societal impact. Research should be investigating the value of these publication practices of the social sciences and the humanities for research and society. Policy steering researchers away from these particular publications practices might have some unexpected and unintended effects, both positive and negative.

### **Influences on evolution in publication patterns**

In order to further explain the changing publication patterns, it is necessary to further analyse and link several variables underlying the observed evolutions.

#### *Staff*

One of the possible explanations of the rapid increase in publications is the increase in number of researchers. Linking the differences in growth rates in staff per discipline with the growth rate of the number of publications in that discipline would be useful. However, data on the number of researchers (the sum of full time equivalents or of affiliated researchers) collected by the Flemish Interuniversity Council (VLIR) for their annual statistics, use different disciplines than those used in the VABB-SHW. Therefore, it might be better to use the unique researchers registered in the VABB-SHW and who have published one or more publications in the time under study, as we did in this thesis. For this future research, two periods could be compared, e.g. 2000-2003 and 2011-2014, however, additional cleaning of the unique author names will be needed, as the data used in this thesis comprises the years 2000-2011.

#### *Productivity*

Productivity varies between and within disciplines. As already stated by Lotka in 1926, a relatively small proportion of research workers in a specific field are responsible for the majority of the publications. Kyvik (1991) lists 5 explanations of productivity differences: Ability (i.e. personal skills), time use (i.e. the time and energy put into research), resources (i.e. financial support and research assistance), scientific network (i.e. informal contacts and extra-institutional connection) and organizational context (e.g. group standards, team size, etc.). In the research in this thesis, not a lot of attention has been given to individual productivity, though we found that established editors seem to be more productive overall than established non-editors. More insight in the differences in productivity of individual researchers might explain differences found between the disciplines. E.g. the remarkably smaller growth for law in number of publications compared to other disciplines, might be explained by an early growth in publication culture and thus a smaller growth potential. Furthermore, high productivity is often correlated with high collaboration. However, the question arises if this finding is true for the social sciences and the humanities, when using a comprehensive database and including collaboration in edited books.

#### *Performance-based research funding*

Although our research implies that SSH researchers have responded to the incentives of the respective Flemish and Norwegian performance-based research funding systems, influences on publication behaviour are manifold and further research indicating a direct link between the funding system and the publication behaviour is required. However, research on the influence of performance-based research

funding is difficult to achieve as not only the system but also the influences depend largely on the country. Debate flourishes: on the one hand, disciplinary cultures have a large influence on publication cultures (Whitley, 2007) and on the other hand are researchers, like all other people, known to react to incentives. As more PRFSs are installed, new research can and should be performed, feeding the debate with new insights based on comprehensive databases.

#### *Disciplinary cultures*

In this thesis, the book *Productivity in academia: Scientific publishing at Norwegian universities* of Kyvik (1991) is extensively used in analyzing the epistemological disciplinary characteristics. However, the work might be (partially) outdated as 25 years have passed since its publication. The work of Kyvik should be tested with respect to the new scientific reality and updated if necessary (e.g. digital humanities). Furthermore, not all epistemological factors have been clarified in the work of Kyvik, e.g. how are research methods and research topics related to publication and collaboration practices and how does digitalization influence the epistemological characteristics of the different disciplines? Future researchers should investigate the applicability of epistemological characteristics.

## 8 Full text of included publications

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## 8.1 Changing publication patterns in the social sciences and humanities, 2000-2009 (Scientometrics, 2012)

### Reference

Engels, T.C.E., Ossenblok, T.L.B., & Spruyt, E.H.J. (2012). Changing publication patterns in the social sciences and humanities, 2000-2009. *Scientometrics*, 93, 373-390

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### ABSTRACT

An analysis of the changing publication patterns in the social sciences and humanities (SSH) in the period 2000-2009 is presented on the basis of the VABB-SHW, a full coverage database of peer reviewed publication output in SSH developed for the region of Flanders, Belgium. Data collection took place as part of the Flemish performance-based funding system for university research. The development of the database is described and an overview of its contents presented. In terms of coverage of publications by the Web of Science we observe considerable differences across disciplines in the social sciences and humanities. The overall growth rate in number of publications is over 62.1%, but varies across disciplines between 7.5% and 172.9%. Publication output grew faster in the social sciences than in the humanities. A steady increase in the number and the proportion of publications in English is observed, going hand in hand with a decline in publishing in Dutch and other languages. However, no overall shift away from book publishing is observed. In the humanities, the share of book publications even seems to be increasing. The study shows that additional full coverage regional databases are needed to be able to characterise publication output in the social sciences and humanities.

### Keywords

social sciences; humanities; language use; publication types; books; Flanders

### Classification

MSC: 01; 94 / JEL: A14; O38

## INTRODUCTION

Several countries have gradually evolved towards performance-based funding of university research (Hicks, 2012). This is also the case for Flanders, the northern Dutch-speaking region of Belgium, where part of the government funding for research is distributed over the universities according to their share of articles indexed in Thomson Reuters' Web of Science (WoS) since 2003. Using the WoS, research in the natural, life and technical sciences has been meticulously monitored over the last 25 years (Debackere & Glänzel, 2004; Luwel, 2000; Moed, Luwel, Houben, Spruyt, & Van Den Berghe, 1998). An early attempt to extend monitoring to items that are not included in the WoS proved feasible (Moed, Luwel, & Nederhof, 2002). Hence, because thus far the coverage of social sciences and humanities (SSH) publications in the WoS remains limited (Adams & Testa, 2011; Archambault, Vignola-Gagne, Côté, Lariviere, & Gingras, 2006), the logic approach for the Flemish government was to instruct an independent body to map the SSH publications that are not indexed in the WoS as well. In 2008 the government provided the legal framework for the construction of the Flemish Academic Bibliographic Database for the Social Sciences and Humanities ("Vlaams Academisch Bibliografisch Bestand voor de Sociale en Humane Wetenschappen" or "VABB-SHW") in the Flemish university financing decree and the modified BOF regulation on the financing of the University Research Fund ("Bijzonder Onderzoeksfonds" or "BOF"). The VABB-SHW has provided the Flemish government with a useful tool to further fine-tune the distribution of research funding over universities in Flanders, and allows to analyse changing publication patterns in the peer reviewed literature over a ten year period. The present article describes how the database was constructed and elaborates on the specific properties of peer reviewed publications written by SSH scholars affiliated with Flemish universities.

In ordering the VABB-SHW, the Flemish government met the demands voiced by researchers, trade unions and universities to take into account the specific characteristics of the SSH when allocating research funds among the universities, in particular the fact that publications by SSH researchers working in Flanders often appear in books and/or in Dutch. This observation is similar to that made elsewhere: the scholarly output of social scientists and humanities scholars is diverse in terms of publication types and languages (Hicks, 2004; Hornbostel, 2008). As a result national or regional databases are needed to obtain full coverage of publications in the social sciences and humanities (Martin et al., 2010). Probably the best known database of this kind, albeit covering all research fields, is the Norwegian CRISTIN database (Schneider, 2009; Sivertsen, 2010). Contrary to that database, however, the VABB-SHW was built up retrospectively in order to obtain a ten year window and hence a stable new parameter for the BOF-key (Debackere & Glänzel, 2008). Although the weight of this parameter in the 2011 BOF-key is restricted to 2.6%, the new database will probably have a wider impact both in terms of funding and usage. This is because the parameter will also be reused for the distribution of the university operating budgets and other research funds (Engels, Spruyt, Glänzel, & Debackere, 2009), and because the universities themselves will probably also use the database for internal purposes at various levels as is the case in Norway (Sivertsen, 2010).

## CONSTRUCTION OF THE VABB-SHW

The VABB-SHW gathers the bibliographic references of published research outputs by scholars who are affiliated with Flemish universities<sup>34</sup> and are active in the SSH. In accordance with the rules stipulated in the BOF regulation, the following five publication types are eligible for inclusion in the VABB-SHW:

- a) articles in journals;
- b) monographs;
- c) edited books;
- d) articles or chapters in books;
- e) proceedings papers that are not part of special issues of journals or edited books.

The BOF regulation further lists a number of basic criteria which eligible outputs need to meet. They are to:

- a) be publicly accessible;
- b) be unambiguously identifiable by ISBN or ISSN number;
- c) make a contribution to the development of new insights or to applications resulting from these insights;
- d) have been subjected - prior to publication - to a demonstrable peer review process by scholars who are experts in the (sub)field to which the publication belongs. Peer review should be done by an editorial board, a permanent reading committee, external referees or else by a combination of these.

The Flemish government decided to entrust the interuniversity Centre for R&D Monitoring (“Expertisecentrum Onderzoek en Ontwikkelingsmonitoring” or “ECOOM”) with the construction of the VABB-SHW and the executive committee of ECOOM, in turn, instructed the team of the University of Antwerp to implement the actual construction of the database. The Antwerp ECOOM team was given the responsibility for the technical development of the database and as such coordinated the different stages of the database construction in close collaboration with colleagues of other universities, in particular the Leuven ECOOM team.

The Flemish government simultaneously decided to establish an Authoritative Panel (“Gezaghebbende Panel” or “GP”), which is composed of 18 professors affiliated with Flemish universities and university colleges and whose expertise covers the main SSH disciplines. The GP works independently of the Flemish government and is supported technically by ECOOM and administratively by the Flemish Interuniversity Council (“Vlaamse Interuniversitaire Raad” or “VLIR”). The task of the GP is to evaluate which of the journals and book publishers with whom researchers affiliated with a Flemish university published at least once in the period 2000-2009 fulfil the aforementioned criteria. The universities also installed a GP

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<sup>34</sup> Publications by researchers employed at university colleges are also accepted for inclusion in the VABB-SHW database. However, not all university colleges submitted data regarding publications carrying an address of their institution because these publications, while included in the publicly accessible online version of the VABB-SHW, are not taken into account for the calculation of the BOF-key. Hence, given the incomplete character of the data supplied by the university colleges, we limit our analysis to the publications written by scholars affiliated with one or more Flemish universities.

steering committee ("Bureau GP"), consisting of 5 GP members, one from each university, in order to outline the working method and prepare the meetings of the plenary panel. Most GP members also chair a disciplinary subpanel which they consult in the processes of journal and publisher selection. In addition to the criteria of the BOF regulation, the GP decided to include only publications of at least four pages in the VABB-SHW.

At the end of 2008, the executive committee of ECOOM adopted the Metadata Object Description Schema (MODS) architecture of the database. This approval gave the green light to the universities to start with the preparations for the first data submissions to be forwarded to the Antwerp ECOOM team by 1 September 2009. Each institution addressed issues regarding the completeness in terms of number of records in their bibliographic databases, regarding the correctness and completeness of the data and metadata for each record, and regarding the compliance with the MODS architecture. The university libraries invoked the help of all faculty and researchers in SSH to check whether all their publications since 2000 were entered correctly and completely in the local bibliographic database. This included the addition of ISSN and ISBN that were often not systematically available in the databases. Several librarians per university worked intensively in order to clean and upgrade the data until a first test of compliance with the MODS architecture was possible. To this end, the Antwerp ECOOM team provided a parser to check the XML structure of the data, to check conformity with the MODS architecture and to check the validity of each record in terms of minimally required fields and data correctness. Using a detailed list of errors, librarians could then apply further corrections. The universities also agreed on the mapping of local publication types to the VABB-SHW publication types.

In the fall of 2009 the Antwerp ECOOM team then further upgraded, cleaned and standardised the data. In a first phase this included the addition and correction of ISSN and ISBN using record listings, the standardisation of ISSN and ISBN (into ISBN-13), the standardisation of journal names using the ISSN.org database, and the standardisation of book publisher names using isbndb.com and other catalogue lists. Subsequently erroneously submitted records such as abstracts, book reviews and editorials were searched for and deleted from the database after consultation with the universities. The Antwerp ECOOM team also listed all potentially WoS-indexed records and looked up and added their ISI UT-codes if missing but available. Lastly, possible duplicates in the database were identified using a set of keys and algorithms that compared the records' UT-codes, digital object identifiers, ISSN/ISBN, year of publication, page numbers (if applicable), and text strings made up of the least occurring characters in the record titles. All potential duplicate records were presented as couples in the database and were, when indeed referring to the same publication, merged by a research assistant. Building on the deposited 2000-2008 publication descriptions, ECOOM handed over the first lists of journals, book publishers, book titles and proceedings papers to the GP by the end of 2009. Following the second data submission by the universities on 1 April 2010, the same data cleaning and standardisation procedures were applied before the lists were complemented with the sources of the additionally supplied records (outputs up to 2009).

In the VABB-SHW all records were assigned to disciplines on the basis of the author(s) affiliation(s) with a SSH unit, i.e. the research group, the research centre, the institute or the department in which the author carries out research. In other words, all SSH research units of the Flemish universities were assigned to a discipline. After the validation of this classification of units into disciplines by the universities and the GP,

the classification was used to assign authors and their publications to disciplines. As a result all publications were assigned to one or more of the following disciplines (1) in the humanities: archaeology; art history (including architecture and arts); communication studies; history; law; linguistics; literature; philosophy (including history of ideas); theology (including religious studies), and/or (2) in the social sciences: criminology; economics & business (including library & information science); educational sciences; political science; psychology; sociology (including social health sciences). Publications that could not (unambiguously) be classified into one or more of the aforementioned 15 disciplines (for instance, publications of anthropologists) or that were published by university policy makers not affiliated with a SSH unit (for instance, publications on research policy) were assigned to one of three general categories, i.e. social sciences-general, humanities-general or other.

This uniform and complete attribution of publications to disciplines, as well as the aforementioned data cleaning and standardisation processes, allowed the Antwerp ECOOM team to provide the GP with overviews of journals, book publishers, book titles and proceedings papers for the whole database and per discipline, thus facilitating the work of the GP and its disciplinary subpanels. The lists submitted to the GP also stated which journals and proceedings papers were partially or completely indexed in the WoS. The GP decided that these journals and proceedings papers fulfilled the criteria of the BOF regulation because articles indexed in the WoS are automatically included in the calculation of the BOF-key when carrying an address of a Flemish university. This GP decision, however, did have important consequences in that all articles published in journals that were added to the WoS during the period 2000-2009 were included for the calculation of the BOF-key, either as a WoS publication if indeed indexed in that database or as a GP-approved publication if not indexed in the WoS.

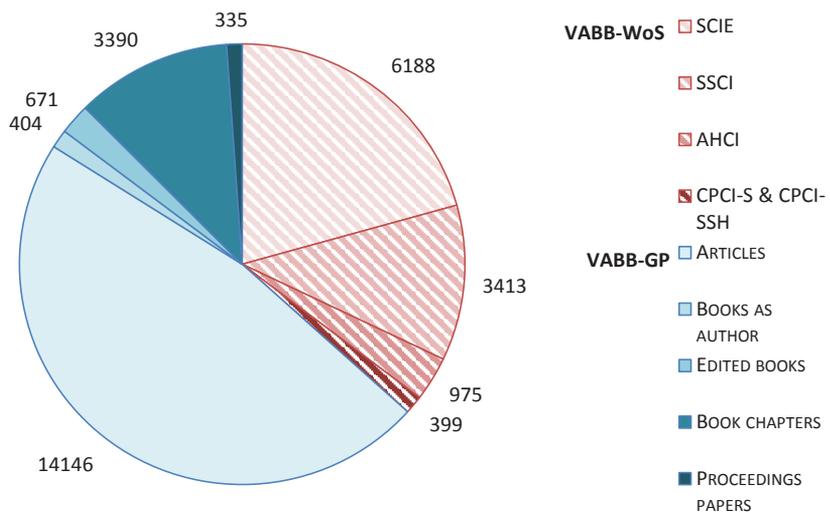
On 1 October 2010, after almost a year of intensive work, the GP supplied ECOOM with the list of journals and book publishers that, according to the GP, apply a peer review procedure and publish scholarly content (Ghesquière, Van Bendegem, Gillis, Willems, & Cornelissen, 2011). The journal list included, in addition to the journals that were (partially) indexed in the WoS, all journals in which researchers affiliated with a Flemish university had published and that mentioned their peer review policy on their website or, in case no website was available, in their colophon. The selection of book publishers proved more difficult because only few publishers submit all their books to peer review. Therefore, after elaborate discussion and consideration of alternatives, the GP decided to include only the book publishers that had been selected in Norway for the level 2, i.e. the most prestigious and selective international book publishers (Sivertsen, 2010). In accordance with the BOF regulation only the articles that appeared in these selected journals and the books, edited books and book chapters that appeared with these selected publishers, have been included in the VABB-SHW, provided that they also met the extra criterion of a minimum length of four pages. With regard to proceedings papers, the GP decided to include all papers of four pages or more that appeared in a serial proceedings volume, i.e. carrying an ISSN, or that were published with one of the selected book publishers. On the basis of the GP's decisions the Antwerp ECOOM team subsequently narrowed down the set of unique records (N=86558) to those that met the BOF and GP criteria, i.e. 29921 records or 34.6% of the total. On 15 October 2010 the Antwerp ECOOM team forwarded the result of this exercise to the universities so that the lists of publications that qualified for inclusion in the first version of the VABB-SHW could be validated and, whenever necessary, be amended

by submitting proof of ISSN, ISBN or page numbers no later than 15 November 2010. This strict approach enabled ECOOM to forward the results of the first version of the VABB-SHW to the Flemish government on 1 December 2010 and publish the lists of journals and book publishers together with the public version of the database on the ECOOM website ([www.ecoom.be/vabb](http://www.ecoom.be/vabb)).

### CHARACTERISATION OF PUBLICATIONS IN THE SOCIAL SCIENCES AND HUMANITIES

The first version of the VABB-SHW encompassed 29921 publications, i.e., outputs stemming from the period 2000-2009 with the author or at least one of the co-authors affiliated with a Flemish university.

Figure 10 provides an overview of the nature of the publications included in the VABB-SHW. Two main output groups can be discerned in this respect: the first group consists of 18946 publications (63.3%) that were not indexed in the WoS but met the BOF criteria, the GP-approved selection of journals and book publishers as well as the GP-imposed minimum required content of four pages. The second group counts 10975 publications (36.7%) that are described in the WoS and qualified for inclusion in the calculation of the BOF-key. These two groups will henceforth be referred to as VABB-GP and VABB-WoS, respectively, and their union as VABB-SHW.



**Figure 10:** Number of publications per type included in the first version of the VABB-SHW (VABB-GP and VABB-WoS) (2000-2009).

The 18946 VABB-GP publications can be further subdivided according to publication type: 14146 journal articles, 404 monographs, 671 edited books, 3390 book chapters and 335 proceedings papers (see also Table 2). The 10975 VABB-WoS publications can also be further specified according to the WoS sub-database(s) in which they were captured: 6188 of the VABB-WoS publications were described in the Science Citation Index Expanded (SCIE), the largest sub-database covering publications in the natural, life and technical sciences. More than half (3313) of these publications not only appeared in the SCIE, but

were also captured in the Social Science Citation Index (SSCI) and/or the Arts and Humanities Citation Index (AHCI). That 2875 articles appear in the SCIE only may come as a surprise for a SSH database. This is mainly due to collaboration with the health sciences, e.g. by psychologists and sociologists, and to social scientists active in math intensive specialisms such as statistics and operations research that are prominent in faculties of economics and business. A second subtype consists of 3413 publications that were indexed in the SSCI (with 479 publications co-indexed in the AHCI) and a third subtype comprises 975 publications that were only entered in the AHCI. Finally, 399 proceedings papers were included in either of the two proceedings databases, namely the Conference Proceedings Citations Index – Sciences (CPCI-S) and the Conference Proceedings Citations Index – Social Sciences & Humanities (CPCI-SSH).

Figure 10 shows that the combined publication types monographs, edited books and book chapters, merely account for 14.9% of the publications comprised in the VABB-SHW. However, these book outputs are more decisive in the composition of the BOF-key because monographs and edited books are assigned a weight factor of 4.0 and 2.0, respectively, while journal articles, book chapters and proceedings papers receive 1.0, 1.0 and 0.5, respectively. The GP is allowed by the BOF regulation to put forward proposals to change these weight factors. Moreover the GP can differentiate the weighting within publication types, as is the case in Norway where all eligible journals and book publishers are categorized into two levels (Sivertsen, 2010). However, such a differentiation could not be realised for the first version of the VABB-SHW because of the tight schedule and strict criteria stipulated in the BOF regulation (Ghesquière et al., 2011). Although differentiation in weighting could benefit book publications, it is especially the number of them that could increase in future versions of the VABB-SHW. It remains to be seen whether the resulting percentage of book publications will then more faithfully reflect percentages reported in the literature (Adams & Testa, 2011; Nederhof, 2006; Sivertsen, 2009).

## **CHARACTERISTICS OF THE DISTINCT DISCIPLINES**

Table 2 provides an overview of the number of publications by discipline and publication type in the first version of the VABB-SHW. Apart from listing the number of publications within each discipline, Table 2 also gives the distribution of the publication types within each discipline. The total number of unique records (by publication type) comprises the publications assigned to one or more of the 15 VABB-SHW disciplines as well as those categorized into one of the three general categories (humanities-general, social sciences-general, and other). Hence the sum of the subtotal humanities (that includes humanities-general) and the subtotal social sciences (that includes social sciences-general) is larger than the total number of unique records.

Table 2 shows that the vast majority of the scholarly outputs in the database are journal articles (82.6%), followed at considerable distance by book publications (14.9%), while the number of proceedings papers currently contained in the database is very limited (2.4%). The share of books and book chapters is higher in the humanities (n=3482, i.e. 23.2%) than in the social sciences (n=1073, i.e. 7.2%). Articles indexed in the WoS dominate in the social sciences (n=7656, i.e. 51.6%) whereas they represent only about one in seven articles in the humanities (n=2165, i.e. 14.4%). The disciplines law and economics & business together account for almost a third of all publications in the database (15.6% and 14.9%, respectively).

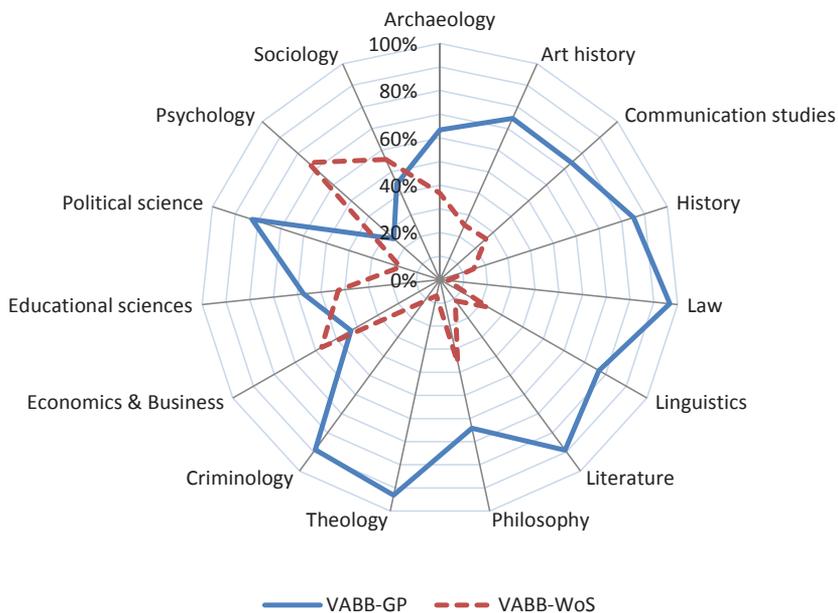
The second largest disciplines are sociology and psychology representing 10.3% and 9.5% of the records in the database respectively. The disciplines with the lowest number of publications are archaeology (1.3%), art history (2.3%), communication studies (2.4%), and criminology (2.9%).

When interpreting the data presented above, one must bear in mind that the numbers of PhD students, postdocs and tenured staff differ substantially from faculty to faculty and that not every discipline is lectured at each of the five Flemish universities. For example, only the universities of Brussels (VUB), Ghent (UGent) and Leuven (K.U.Leuven) have research groups in archaeology, whereas each university has a faculty of law and a faculty of economics & business. The numbers and percentages listed here therefore only provide information on the weight of a discipline within the total number of peer reviewed Flemish publications in the broad field of the SSH. The data as such do not give any indication as to the productivity of scholars within a given discipline.

**Table 2:** Number of publications included in the VABB-SHW (VABB-GP and VABB-WoS) by discipline and by publication type (2000-2009).

<i>Discipline</i>	<i>Journal articles</i>		<i>Book Chapter s</i>	<i>Edited books</i>	<i>Mono graph s</i>	<i>Proceedings papers</i>		<i>Total</i>	<i>% in VABB -SHW</i>
	VABB- GP	VABB- WoS	VABB- GP	VABB- GP	VABB -GP	VABB- WoS	VABB- GP	VABB- SHW	
Archaeology	176	133	40	6	11	12	18	396	1.3
Art history	295	150	135	38	12	22	28	680	2.3
Communication studies	425	170	94	16	3	19	1	728	2.4
History	773	193	233	52	28	0	19	1298	4.3
Law	4018	144	320	89	55	11	20	4657	15.6
Linguistics	908	457	511	135	59	54	83	2207	7.4
Literature	631	143	376	87	36	0	31	1304	4.4
Philosophy	786	603	279	42	30	36	9	1785	6.0
Theology	610	85	410	85	53	1	4	1248	4.2
<i>Subtotal Humanities</i>	<i>9005</i>	<i>2165</i>	<i>2587</i>	<i>587</i>	<i>308</i>	<i>165</i>	<i>244</i>	<i>15041</i>	<i>50.3</i>
Criminology	741	95	24	1	2	2	1	866	2.9
Economics & business	1472	2379	297	32	52	157	53	4442	14.8
Educational sciences	626	530	63	7	8	7	16	1257	4.2
Political science	781	217	204	33	21	1	3	1260	4.2
Psychology	617	2085	84	5	5	18	24	2838	9.5
Sociology	1211	1701	123	10	7	8	10	3070	10.3
<i>Subtotal Social sciences</i>	<i>5735</i>	<i>7656</i>	<i>873</i>	<i>99</i>	<i>101</i>	<i>257</i>	<i>119</i>	<i>14840</i>	<i>49.6</i>
Total unique records	14146	10576	3390	671	404	399	335	29921	100.0
%	47.3	35.3	11.3	2.2	1.4	1.3	1.1	100.0	

Figure 11 depicts the proportions by discipline of the VABB-GP and VABB-WoS publications in the VABB-SHW. The spider chart shows that the share of VABB-GP publications is higher than that of VABB-WoS publications for most disciplines and for all disciplines in the humanities. Hence the percentage of WoS-indexed publications in the humanities (15.5%) is much lower than in the social sciences (53.3%). Disciplines with over 80% of VABB-GP publications are law (96.7%), theology (93.1%), literature (89.0%), criminology (88.8%), history (85.1%), and political science (82.7%). The disciplines psychology (25.5%), economics & business (42.9%), and sociology (44.3%), all three belonging to the social sciences, display a lower percentage of publications in the VABB-GP compared to the VABB-WoS. By and large these percentages of WoS coverage reflect the percentages that have been reported in the literature (Nederhof, 2006; Sivertsen, 2009).



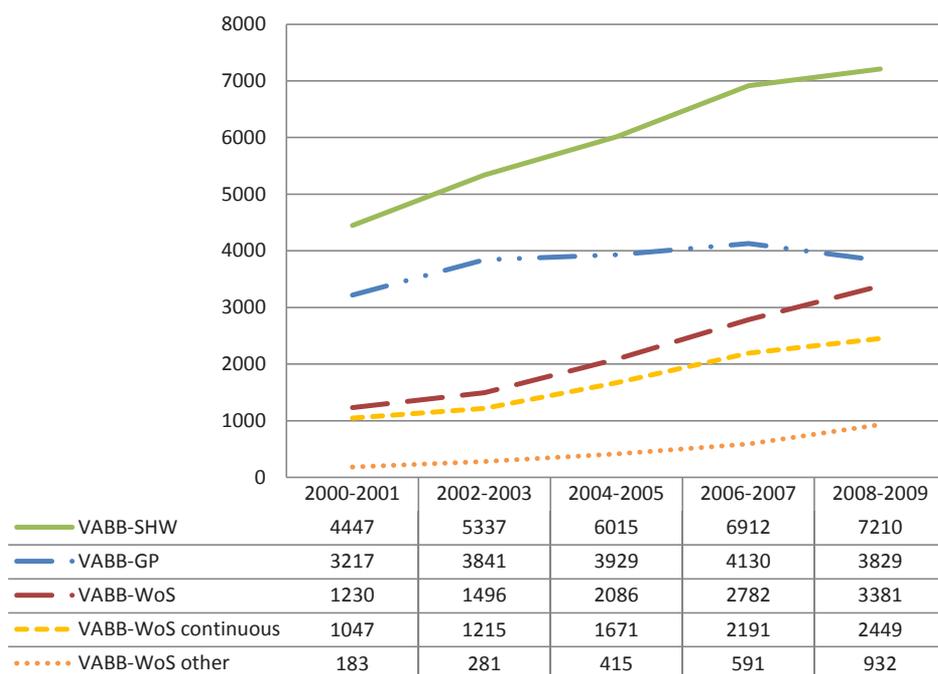
**Figure 11:** Proportions of VABB-GP and VABB-WoS publications in the VABB-SHW by discipline (2000-2009).

### A GROWTH IN PUBLICATIONS

It can be deduced from the 2011 BOF-key that the number of SCIE-indexed publications with the author or at least one co-author affiliated with a Flemish university rose from 5515 to 9941 throughout the period 2000-2009, i.e. an 80% increase. The VABB-SHW now allows to compare this growth with that of the publications by SSH researchers affiliated with a Flemish university.

Figure 12 shows the evolution of the number of VABB-SHW publications (including a breakdown into VABB-GP and VABB-WoS publications) between 2000-2009. We observe a 62.1% increase of the

number of publications when comparing 2000-2001 to 2008-2009. This growth in the number of publications/year can mainly be ascribed to the almost tripling (+ 174.9%) of the number of publications comprised in the VABB-WoS. Given that for several years only WoS-indexed publications contributed to the Flemish performance-based funding model for university research, this result is not too surprising (Ossenblok, Engels, & Sivertsen, 2012). Two factors are driving this steep increase in WoS coverage. First, researchers have more often targeted WoS covered journals, as is apparent from the 133.9% increase of the number of articles published in journals that have been covered by the WoS throughout the period 2000-2009 (VABB-WoS continuous), as shown in Figure 12. Second, the expansion of the WoS allowed for a very steep 409.3% increase of the number of articles published in proceedings (from 50 to 74) or journals (from 133 to 858) that have not been indexed in the WoS throughout the period 2000-2009 (VABB-WoS other). Apart from the addition of new journals, the latter observation is mainly due to the fact that a large number of journals have been additionally indexed in the WoS since 2007 (Moed et al., 2009). Given that these journals often have a regional rather than international scope, we should be careful in inferring increased internationalization from the overall increase of the number of WoS publications. Still, considering the fact that the journals that have been indexed in the WoS continuously are predominantly international journals, we can conclude from the increasing numbers of articles published in these journals that the trend in publishing behaviour to increasingly address an international audience (Fry et al., 2009) also applies to SSH scholars working in Flanders.



**Figure 12:** Number of VABB-SHW (VABB-GP and VABB-WoS) publications per two year period. The VABB-WoS publications are further subdivided into articles that appeared in journals that have been indexed in the WoS throughout 2000-2009 (VABB-WoS continuous) and articles that appeared in proceedings or journals that have not been indexed in the WoS throughout the whole period 2000-2009 (VABB-WoS other).

Table 3 lists the VABB-SHW publication counts by discipline for the years 2000-2001, the growth rates as compared to this baseline for 2002-2003, 2004-2005, 2006-2007 and 2008-2009, and, as a measure of average growth, the slope through the growth rates (the growth rate for 2000-2001 being 1). The number of publications has been growing in all disciplines, as is apparent from the positive slope values. However, large variability between disciplines can also be observed: the slopes range from 0.02 to 0.43 and the standard deviation of the 2008-2009 growth factors per discipline is 0.47. Whereas law, because of an apparent drop in number of publications in 2008-2009, grew only 7.5%, political science grew 172.9%. Other disciplines that more than doubled their output are educational sciences (+129.2%), communication studies (+145.2%), and psychology (+168.8%). Overall, growth is stronger in the social sciences (+97.2%) than in the humanities (+33.7%), although the latter percentage is tempered by the very modest growth in law.

**Table 3:** Growth rates of the VABB-SHW (VABB-GP and VABB-WoS) per two year period and by discipline as compared to the number of publications per discipline in 2000-2001 (2000-2009).

<i>Discipline</i>	<i>2000-2001</i>	<i>2002-2003</i>	<i>2004-2005</i>	<i>2006-2007</i>	<i>2008-2009</i>	<i>Slope</i>
	<i>baseline</i>	<i>growth rates</i>				
Archaeology	60	1.067	1.417	1.333	1.783	0.18
Art history	85	1.612	1.588	1.988	1.812	0.20
Communication studies	84	1.369	1.750	2.095	2.452	0.36
History	208	0.913	1.149	1.558	1.620	0.19
Law	789	1.256	1.266	1.305	1.075	0.02
Linguistics	317	1.391	1.331	1.644	1.596	0.14
Literature	180	1.456	1.583	1.533	1.672	0.14
Philosophy	295	1.149	1.207	1.383	1.312	0.09
Theology	193	0.860	1.373	1.482	1.751	0.21
<i>Subtotal Humanities</i>	<i>2415</i>	<i>1.216</i>	<i>1.267</i>	<i>1.409</i>	<i>1.337</i>	<i>0.09</i>
Criminology	138	0.971	1.152	1.413	1.739	0.19
Economics & business	635	1.142	1.351	1.746	1.756	0.21
Educational sciences	154	1.273	1.623	1.974	2.292	0.33
Political science	129	1.845	1.946	2.248	2.729	0.39
Psychology	317	1.303	1.760	2.199	2.688	0.43
Sociology	434	1.219	1.544	1.537	1.774	0.19
<i>Subtotal Social sciences</i>	<i>2003</i>	<i>1.201</i>	<i>1.487</i>	<i>1.749</i>	<i>1.972</i>	<i>0.25</i>
Total unique records	4447	1.200	1.353	1.554	1.621	0.16

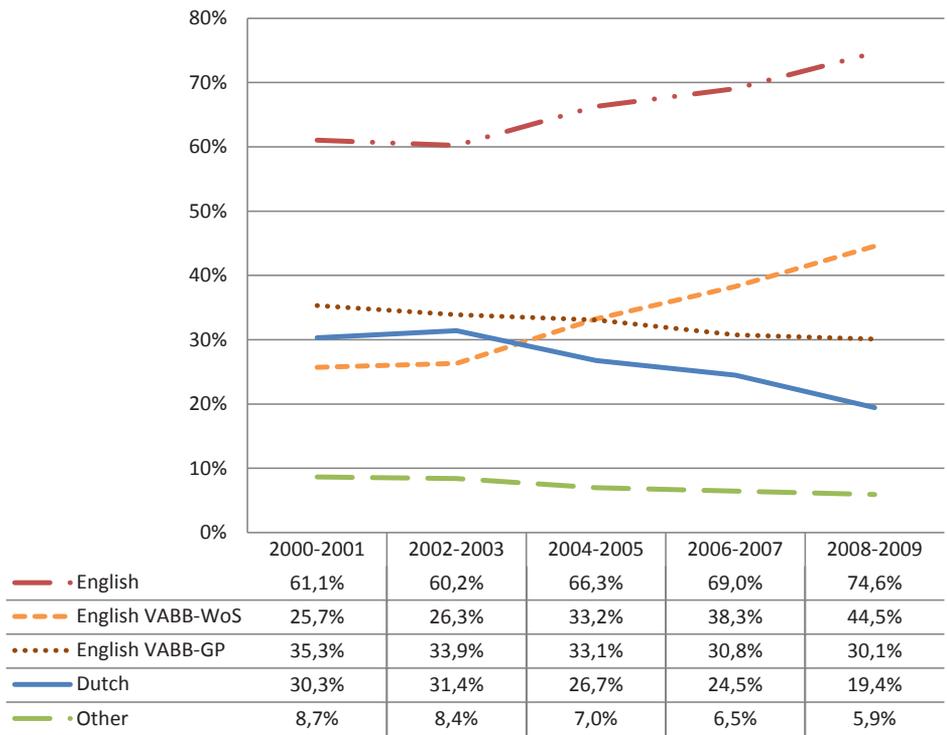
Further investigation into the causes underlying the rapid growth in number of publications might disclose whether there are any objective reasons for the considerable differences in growth ratio between the various disciplines. Some disciplines may have experienced an above average growth in staff and researchers, e.g. because of a rapid increase of the number of students. Differences in growth rates may also be explained through shifts in language use and type of publications if, for example, publishing more in English over time leads to more co-publishing with international colleagues. Such multiplier effects

might be important in understanding the difference in growth rate between the humanities and the social sciences, and might contribute to a better understanding of the (lack of) growth in law. What can already be concluded without further studies is that scholars in the SSH in Flanders annually account for an increasing number of publications, both in total and by discipline. However, especially in the humanities, growth in some disciplines seems to be stagnating or even reversing the last few years.

### **SHIFTS IN LANGUAGE USE**

In addition to a growth in the number of publications, several studies have also reported shifts in publishing behaviour, in particular an increase in the number of outputs written in English (Kyvik, 2003; Prpic, 2007). This trend is also reflected in the VABB-SHW, in which English as scientific language equally assumes an increasingly important place.

Figure 13 illustrates that the share of publications in English included in the VABB-SHW increased from 61.1% in 2000-2001 to 74.6% in 2008-2009, whereas conversely the proportion of publications in Dutch dropped from 30.3% to 19.4%. Likewise, the percentage of publications written in other languages decreased from 8.7% to 5.9%.



**Figure 13:** Evolution of the use of English, Dutch and other publication languages within the VABB-SHW (VABB-GP and VABB-WoS) for the period 2000-2009.

Figure 13 further shows that the publications written in English are increasingly WoS-indexed. Whereas the share of VABB-GP publications written in English decreased from 35.3% to 30.1%, that of VABB-WoS publications written in English increased from 25.7% to 44.5%. The latter evolution is due to the strong rise in VABB-WoS publications (see Figure 12), rather than a shift towards WoS-indexed journals publishing in English, because, as Table 4 shows, the vast majority (~95%) of VABB-WoS publications for the whole period 2000-2009 are written in English. So although several journals that publish in another language than English are indexed in the WoS, publishing in the WoS remains dominantly in English for SSH researchers working in Flanders. For the VABB-GP too the proportion of publications in English seems to have remained stable, although at a much lower level of about 50%, except for the last two years during which 56.7% of the VABB-GP outputs were published in English, as seen in Table 4.

**Table 4:** Evolution of the use of English as a publication language within the VABB-GP and the VABB-WoS (2000-2009).

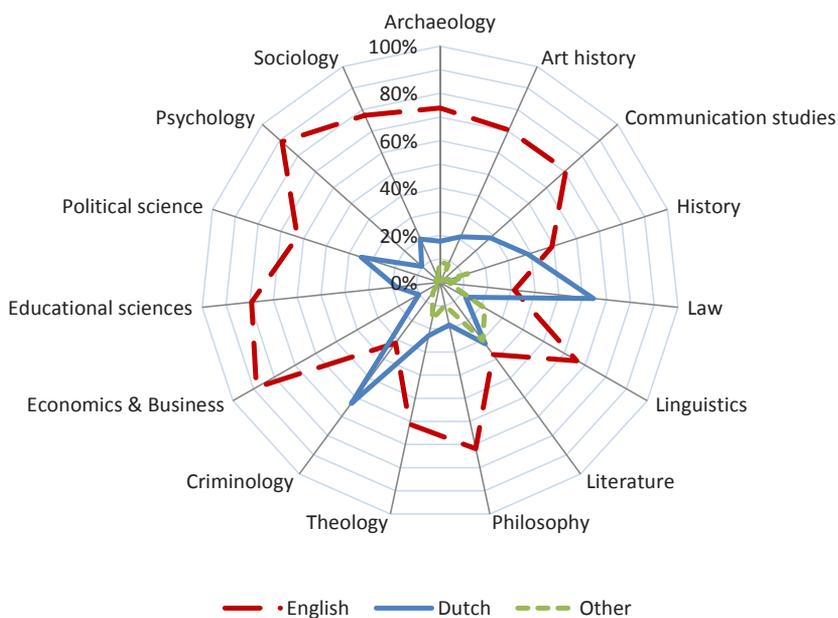
	<i>English in</i>	2000- 2001	2002- 2003	2004- 2005	2006- 2007	2008- 2009	<i>Total</i>	<i>Growth</i>
Humanities	VABB-GP	948	1087	1190	1323	1333	5881	1.406
		44.7%	41.6%	45.7%	47.0%	52.2%	46.3%	
	VABB-WoS	222	247	388	472	566	1895	2.550
		76.0%	76.2%	85.7%	80.6%	83.9%	81.3%	
Social sciences	VABB-GP	657	767	862	877	907	4070	1.381
		55.7%	56.7%	58.6%	59.0%	63.2%	58.8%	
	VABB-WoS	808	1037	1483	1991	2450	7769	3.032
		98.1%	98.6%	98.4%	98.7%	97.5%	98.2%	
Total	VABB-GP	1571	1808	1989	2126	2170	9664	1.381
		48.8%	47.1%	50.6%	51.5%	56.7%	51.0%	
	VABB-WoS	1144	1405	1998	2646	3212	10405	2.808
		93.0%	93.9%	95.8%	95.1%	95.0%	94.8%	

Table 4 also presents the evolution of the use of English as a publication language for the humanities and the social science separately. For both the VABB-GP and the VABB-SHW the share of publications in English is considerably larger for the social sciences (58.8% and 98.2%, respectively) than for the humanities (46.3% and 81.3% respectively).

Underlying these differences between the humanities and the social sciences are differences between disciplines. Figure 14 provides an overview by discipline of the proportion of publications written in English, Dutch and other languages. Clearly, English is dominant in the social sciences except criminology, which has 63.2% publications in Dutch. Only in the discipline of law there is a still larger share (64.5%) of publications in Dutch. All other disciplines have more publications in English than in Dutch. Outstanding disciplines in this respect are psychology and economics & business with 88.9% and 88.7% of publications written in English, respectively.

The importance of publications written in languages other than Dutch or English is particularly apparent in the disciplines linguistics and literature with 30.4% and 21.6% of the publications belonging to this category. About two thirds of these publications are in French which in Belgium is not only the forum language of romanticists but is also the second language of the country spoken by a large majority in

Brussels and Wallonia. The latter fact reflects in the overall dominance of French among the publications in other languages than Dutch or English. 4.7% of all VABB-SHW publications are in French. These are mainly in the humanities (8.1% of all humanities publications are in French), but also in the social sciences (1.4%, i.e. three quarters of the total of 1.9% of publications published in other languages than Dutch or English).

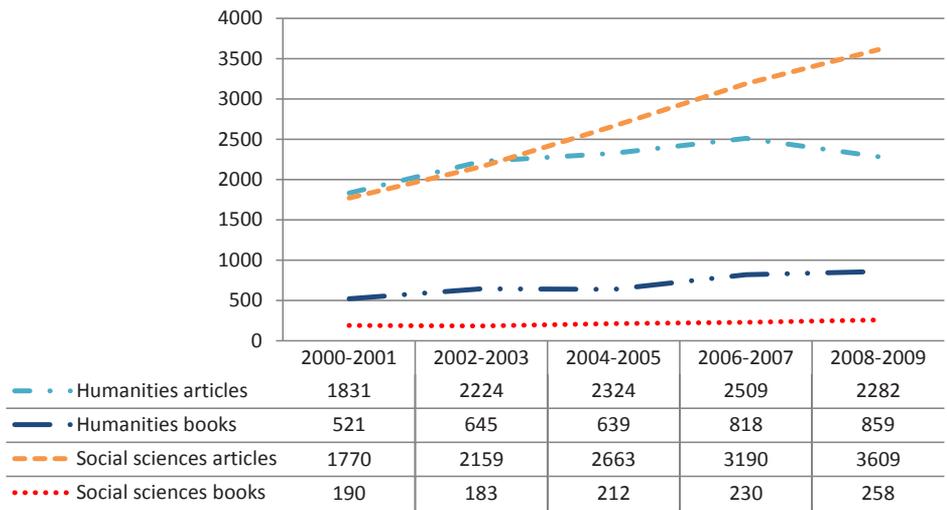


**Figure 14:** Percentages of publications in English, Dutch and other languages by discipline (2000-2009).

## SHIFTS IN PUBLICATION TYPE

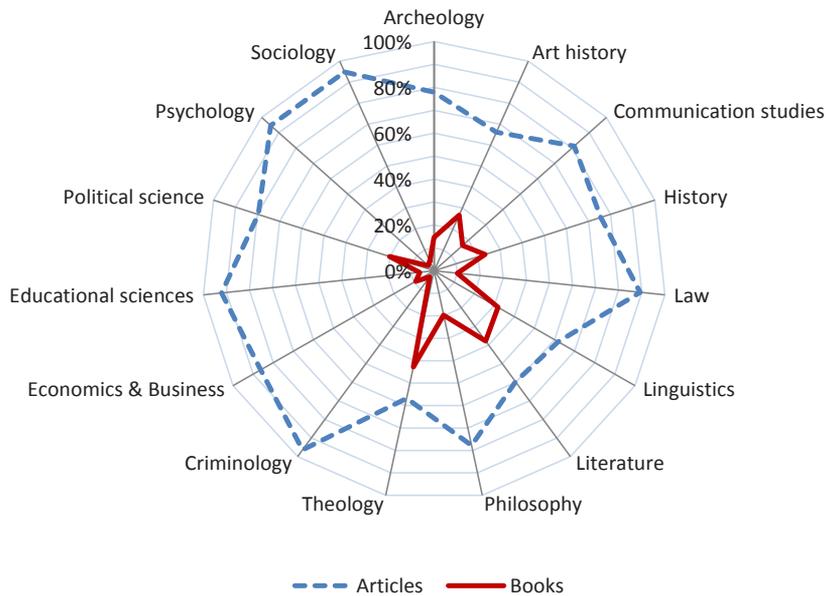
As already mentioned the VABB-SHW data show that also the SSH scholars in Flanders have focused more on publishing in internationally oriented journals in the past decade. Increasing preference is given to WoS-indexed international journals as outlets for articles. Does this evolution also lead to less book publishing in absolute numbers and/or proportionally? Studies have reported an increased use of the journal article as medium of dissemination, not only in the social sciences (Adams & Testa, 2011), but also in the humanities (Thompson, 2002). And although the importance of book publishing in the social sciences and humanities has been clearly demonstrated (Nederhof, 2006; Nederhof, Van Leeuwen, & van Raan, 2010), reports that book publishing is under pressure and the fear that it might in the end even disappear seem to be widespread (Johnston et al., 2009; Williams, Stevenson, Nicholas, Watkinson, & Rowlands, 2009).

Figure 15, however, shows that the evolution of the publication type shares differs between the humanities and the social sciences. Not only, as already observed, is the increase in number of publications steeper in the social sciences than in the humanities. Moreover, the proportion of journal articles evolves differently for both. In the humanities the share of journal articles slightly declined from 77.8% in 2000-2001 to 72.7% in 2008-2009. In the Social sciences, however, the share of journal articles has increased from an already very high level of 90.3% to 93.3%. Contrary to the evolutions with regard to language use, these evolutions are slow and barely detectable at the level of the individual disciplines. In conclusion, no overall shift towards the journal article as the chosen publication vehicle is observed in the SSH in Flanders in the period 2000-2009. Rather, the publication habits of the humanities and the social sciences seem to be diverging, with only the latter opting for the journal article dominated model (cf. Adams & Testa, 2011).



**Figure 15:** Evolution of the publication type shares in the VABB-SHW (VABB-GP and VABB-WoS) for the humanities and the social sciences (2000-2009).

The disciplines that are most dominated by journal articles are criminology, educational sciences, psychology, and sociology, with each over 90% of output in the form of journal articles, although the percentage for sociology would drop below 90% if social health sciences were separated from mainstream sociology. As shown in Figure 16, political science is the only discipline of the social sciences where book publications represent more than 20% of the output. This appears to be due to the fact that political scientists more frequently than other social scientists in Flanders choose an international book publisher. In the humanities, however, the dominance of journal articles is less pronounced, with book publications accounting for more than a quarter of the output in art history, linguistics, literature, and theology.



**Figure 16:** Percentages of publication types (journal articles and books, i.e. monographs, edited books, book chapters) by discipline (2000-2009).

### FUTURE PERSPECTIVES

The BOF regulation provides an annual update of the VABB-SHW. Each year by April 1st the universities will submit the metadata of their new (and newly registered) publications to the ECOOM, which will allow it to provide the GP with new lists of journals and publishers that SSH researchers working in Flanders have published in or with. This will allow the GP to further refine its judgement, also because the universities can and have asked for the revision of the decision with regard to specific journals. In particular, the GP intends (1) to include more publishers, or at least more book publications, and (2) to implement differential weighting of journals articles and book publications according to prestige of the journals and the publishers in future versions of the VABB-SHW (Ghesquière et al., 2011). By the end of 2012 the decisions of the GP will be evaluated by a committee of international experts, thus providing for an independent expert validation of the application of the BOF criteria to the lists submitted to the GP.

Meanwhile, the further development of the VABB-SHW is not happening in a vacuum. Several professors, including members of the GP, criticised the limited range of book publishers selected for the first version. The main reason is that the selection resulted in the inclusion in the VABB-SHW of only 17.0% of the total of 26222 records with a correct ISBN and consisting of at least four pages. Thus, a total of 21757 records (83.0%) were not included because the publisher had not been selected for the VABB-SHW. A ranking of these publishers according to frequency reveals that the first 11 publishers are local publishers that

together account for almost half (44.9%) of the non-approved book publications. Among the 50 most frequently occurring publishers only 7, representing 4.9% of the non-approved book publications, can be considered international publishers. In view of this data the launch of the Guaranteed Peer Reviewed Content (GPRC) label by the Flemish Association of Publishers (“Vlaams Uitgeversvereniging” or “VUV”) is especially promising. Faced with the prospect of most of their publications by academics being excluded from the VABB-SHW because of lack of demonstrable peer review, the publisher association decided to implement the GPRC-label in order to make peer review explicit and traceable (see, for more information, [www.boekenvak.be/gprc](http://www.boekenvak.be/gprc)). This development allows the GP to include books published with local publishers in future versions of the VABB-SHW. In view of the selection of more books published with international book publishers the recent launch of the Thomson Reuters Book Citation Index is a new development that is closely followed. The new index might be used as an aid to identify more peer reviewed books and book series. As a result of these developments future versions of the VABB-SHW might contain a larger proportion of book publications.

In addition, the VABB-SHW remains the subject of and source for scientific research on distinct aspects of the publishing behaviour in the SSH in Flanders, as well as on evolutions in this publication behaviour. Such analysis yields useful information that permits to place the publishing behaviour of Flemish SSH scholars in an international frame. Several foreign studies as well as the present analysis of the first version of the VABB-SHW demonstrate that scholarly communication within the SSH is subject to strong evolution. Will scholars continue to publish at an ever increasing rate? Will the use of English as publication language continue to gain momentum? Will the future indeed see a shift towards journals or books as the medium of dissemination? Finally, further research on the typical publishing behaviour of individual disciplines will provide more profound insight into the specific dynamics governing the development of scholarly communication.

## **CONCLUSION**

The scientific landscape in Flanders has experienced profound changes in recent years. In 2003 the Flemish government decided to introduce a performance-based funding system for university research in which the number of publications annually generated by scholars at each Flemish university is one of the key indicators. Because of the limited coverage of the Web of Science of publications in the social sciences and humanities, the government decided by the end of 2008 that an additional database covering the publication data of scholars active in Flanders in the SSH, the so-called VABB-SHW, needed to be constructed.

This article presents a first analysis of the VABB-SHW database. The study reveals that the annual number of publications by SSH scholars working in Flanders increased significantly in the past decade, with output in the social sciences growing faster than output in the humanities. We also observe an outspoken increase in the absolute and relative number of publications written in English, which is mostly due to a rapid increase in the number and percentages of WoS-indexed publications. However, we did not find an overall shift towards publishing journal articles. Rather, publishing journal articles remains dominant in the social sciences but might be somewhat on the return in the humanities. In sum, more is being

published, more often in English and in WoS-indexed journals, but there are no indications that there are proportionally more journal articles and less book publications.

## ACKNOWLEDGEMENTS

The authors thank all colleagues who helped in building and analysing the VABB-SHW database, in particular the colleagues in the libraries and the departments of research affairs, the chair and the members of the GP, and Rudi Baccarne, Kirsten Cornelissen, Jan Corthouts, Koenraad Debackere, Nele Dexters, Alain Descamps, Danielle Gilliot, Wolfgang Glänzel, Marc Luwel, Saskia Peersman, Richard Philips, Ronald Rousseau, and Bart Thijs. We are grateful to the Flemish Government for providing an adequate legal framework and funding.

## REFERENCE LIST

- Adams, J. & Testa, J. (2011). Thomson Reuters book citation index. In E. Noyons, P. Ngulube, & J. Leta (Eds.), *The 13th conference of the International Society for Scientometrics and Informetrics* (pp. 13-18). Durban, South Africa: ISSI, Leiden University and University of Zululand.
- Archambault, E., Vignola-Gagne, E., Côté, G., Lariviere, V., & Gingras, Y. (2006). Benchmarking scientific output in the social sciences and humanities: The limits of existing databases. *Scientometrics*, 68, 329-342.
- Debackere, K. & Glänzel, W. (2004). Using a bibliometric approach to support research policy making: The case of the Flemish BOF-key. *Scientometrics*, 59, 253-276.
- Debackere, K. & Glänzel, W. (2008). Evidence-based bibliometrics: A decade of bibliometrics-based science policy in Flanders. In J. Gorraiz & E. Schiebel (Eds.), *10th International Conference on Science and Technology Indicators* (pp. 123-125). Vienna, Austria: Austrian Research Centres.
- Engels, T. C. E., Spruyt, E. H. J., Glänzel, W., & Debackere, K. (2009). Het Vlaams academisch bibliografisch bestand voor de sociale en humane wetenschappen: Instrument ten dienste van een optimaal wetenschapsbeleid? *Tijdschrift voor Onderwijsrecht & Onderwijsbeleid*, 2008-09, 395-403.
- Fry, J., Creaser, C., Butters, G., Craven, J., Griffiths, J., & Hartley, D. (2009). *Communicating knowledge: How and why researchers publish and disseminate their findings. Supporting paper 4: Literature review*. London: Research information Network.
- Ghesquière, P., Van Bendegem, J.-P., Gillis, S., Willems, D., & Cornelissen, K. (2011). Het VABB-SHW: eerste versie klaar, nu verfijnen. In K. Debackere & R. Veugelers (Eds.), *Vlaams Indicatorenboek 2011* (pp. 260-264). Brussel: Expertisecentrum O&O Monitoring.
- Hicks, D. (2004). The four literatures of social science. In H. F. Moed, W. Glänzel, & U. Schmoch (Eds.), *Handbook of quantitative Science and Technology Research: The use of publication and patent statistics in studies of S&T systems* (pp. 473-496). Dordrecht: Kluwer Academic.
- Hicks, D. (2012). Performance-based university research funding systems. *Research Policy*, 41, 251-261.
- Hornbostel, S. (2008). Gesucht: Aussagekräftige Indikatoren und belastbare Datenkollektionen. Desiderate geisteswissenschaftlicher Evaluierung in Deutschland. In E. Lack & C. Marksches (Eds.), *What the hell is quality?* (pp. 55-73). Frankfurt/New York: Campus Verlag.
- Johnston, R., Richards, K., Gandy, M., Taylor, Z., Paasi, A., Fox, R. et al. (2009). The future of research monographs: an international set of perspectives. *Progress in Human Geography*, 33, 101-126.
- Kyvik, S. (2003). Changing trends in publishing behaviour among university faculty, 1980-2000. *Scientometrics*, 58, 35-48.

- Luwel, M. (2000). A bibliometric profile of Flemish research in natural, life and technical sciences. *Scientometrics*, 47, 281-302.
- Martin, B., Tang, P., Morgan, M., Glänzel, W., Hornbostel, S., Lauer, G. et al. (2010). Towards a bibliometric database for the social sciences and humanities - A European scoping project: A report produced for DFG, ESRC, AHRC, NWO, ANR and ESF. Sussex: Science and Technology Policy Research Unit.
- Moed, H. F., Linmans, A. J. M., Nederhof, A., Zuccala, A., López Illescas, C., & de Moya Anegón, F. (2009). Options for a comprehensive database of research outputs in social sciences and humanities. *Research report to the project board of the scoping study "Towards a bibliometric database for the social sciences and humanities"*. Leiden & Madrid: CWTS & CSIC.
- Moed, H. F., Luwel, M., Houben, J. A., Spruyt, E., & Van Den Berghe, H. (1998). The effects of changes in the funding structure of the Flemish universities on their research capacity, productivity and impact during the 1980's and early 1990's. *Scientometrics*, 43, 231-255.
- Moed, H. F., Luwel, M., & Nederhof, J. (2002). Towards research performance in the humanities. *Library trends*, 50, 498-520.
- Nederhof, A. J. (2006). Bibliometric monitoring of research performance in the social sciences and the humanities: A review. *Scientometrics*, 66, 81-100.
- Nederhof, A. J., Van Leeuwen, T., & van Raan, A. (2010). Highly cited non-journal publications in political science, economics and psychology: a first exploration. *Scientometrics*, 83, 363-374.
- Ossenblok, T. L. B., Engels, T. C. E., & Sivertsen, G. (2012). The representation of the social sciences and humanities in the Web of Science. A comparison of publications patterns and incentive structures in Flanders and Norway (2005-2009). *Research Evaluation*, 21, 280-290.
- Prpic, K. (2007). Changes of scientific knowledge production and research productivity in a transitional society. *Scientometrics*, 72, 487-511.
- Schneider, P. (2009). An outline of the bibliometric indicator used for performance-based funding of research institutions in Norway. *European Political Science*, 8, 364-378.
- Sivertsen, G. (2009). Publication patterns in all fields. In F. Aström, R. Danell, B. Larsen, & J. W. Schneider (Eds.), *Celebrating scholarly communication studies: A Festschrift for Olle Persson at his 60th birthday* (pp. 55-60). ISSI.
- Sivertsen, G. (2010). A performance indicator based on complete data for the scientific publication output at research institutions. *ISSI Newsletter*, 6, 22-28.
- Thompson, J. W. (2002). The death of the scholarly monograph in the humanities? Citation patterns in literary scholarship. *Libri*, 52, 121-136.
- Williams, P., Stevenson, I., Nicholas, D., Watkinson, A., & Rowlands, I. (2009). The role and future of the monograph in arts and humanities research. *Aslib proceedings*, 61, 67-82.

## **8.2 Bibliometric analysis of research in the social sciences and humanities at the Flemish universities, based on the Flemish Academic Bibliographic Database for the social sciences and humanities (VABB-SHW) (Vlaams Indicatorenboek, 2013; translated in English)**

### **Preface**

ECOOM publishes biennially an overview in Dutch of the Flemish research in *Het Vlaamse Indicatorenboek* (or the Flemish book of Indicators). In 2011, ECOOM-Antwerp has published for the first time a book chapter on the VABB-SHW (Ossenblok, Stevens, Spruyt, & Engels, 2011). In 2013 (Ossenblok, Verleysen, Spruyt, & Engels, 2013) and 2015 (Verleysen, Ossenblok, Spruyt & Engels, 2015) this book chapter has been updated and elaborated where necessary. As the data in the book chapter published in 2013 are more recent than those published in Engels et al. (2012), it is relevant to publish these data in this doctoral thesis. However, all text concerning the construction of the VABB-SHW has been left out as it largely overlaps with the previous article (see section 8.1) and entirely overlaps with the information given in article 8.1.

### **Reference**

Ossenblok, T., Verleysen, F., Spruyt, E., Engels, T. (2013). Bibliometrische analyse van het Vlaamse universitaire onderzoek in de sociale en humane wetenschappen aan de hand van het VABB-SHW. *In Vlaams Indicatorenboek 2013, p.181-193* <http://anet.ua.ac.be/docman/irua/6fb6d3/6b724b54.pdf>

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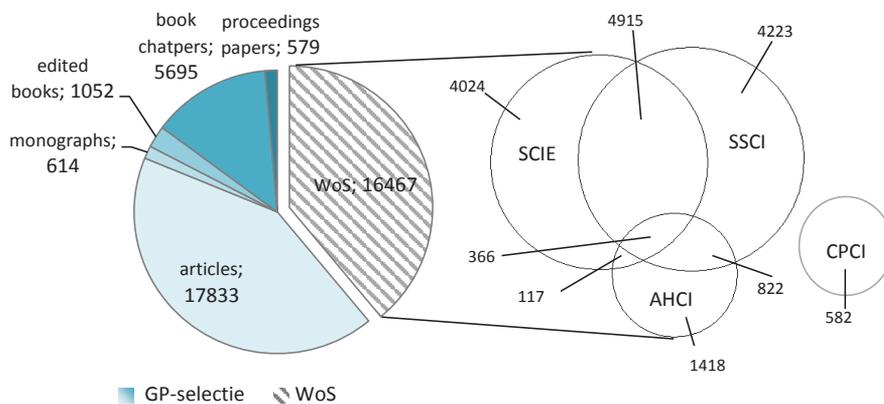
### **Translation into English**

Danny Vindevogel

## CHARACTERISATION OF THE FLEMISH UNIVERSITY PUBLICATIONS IN SOCIAL SCIENCES AND HUMANITIES

The VABB-SHW encompasses 42.264 publications, i.e., outputs stemming from the period 2000-2011 with at least one of the co-authors affiliated with a Flemish university.

Figure 17 provides an overview of the nature of the publications included in the VABB-SHW. Two main output groups can be discerned in this respect: the first group consists of 25.773 publications (61.0%) that were not indexed in the WoS but met the BOF-criteria, the GP-approved selection of journals and publishers as well as the GP-imposed minimum required content of four pages. The second group counts 16.467 publications (39.0%) that were described in the WoS and hence qualified for inclusion in the calculation of the BOF key. These two groups will henceforth be referred to as VABB-GP and VABB-WoS, respectively.



**Figure 17:** Nature and type of the publications included in the VABB-SHW (VABB-GP and VABB-WoS; 2000-2011).

The 25.773 VABB-GP publications can be further subdivided according to publication type: 17.833 (69.2%) journal articles, 614 (2.4%) monographs, 1052 (4.1%) edited books, 5695 (22.1%) book chapters and 579 (2.2%) proceedings papers (see also Table 5).

The 16.467 VABB-WoS publications can also be further specified according to the WoS sub-database(s) in which they were captured: 15.885 (96.5%) publications are journal articles, subdivided into 4024 articles described only in the Science Citation Index Expanded (SCIE), the largest sub-database covering publications in the natural, life and technical sciences, 4223 articles captured in the Social Science Citation Index (SSCI) only and 1418 publications indexed in the Arts and Humanities Citation Index (AHCI) only. Furthermore, the SCIE and SSCI shared 4915 publications, the SCIE and AHCI had 117 articles in common, the SSCI and the AHCI co-indexed 822 publications and 366 journal articles were indexed in all three sub-

databases. Finally, 582 (3.5%) proceedings papers were included in either of the two proceedings databases, namely the Conference Proceedings Citations Index – Sciences (CPCI-S) and the Conference Proceedings Citations Index – Social Sciences & Humanities (CPCI-SSH).

Surprisingly, Figure 17 shows that the combined publication types *monographs*, *edited books* and *book chapters*, account for 17.4% (n=7361) of the publications comprised in the VABB-SHW.

### **CHARACTERISTICS OF THE DISTINCT DISCIPLINES**

Table 5 provides an overview of the number of publications by discipline and publication type in the VABB-SHW (2000-2011). Apart from listing the number of publications within each discipline, Table 5 also gives a clear picture of the distribution of the five publication types within each discipline. The total number of publications by publication type comprises the publications assigned to one or several of the 16 VABB-SHW-listed disciplines as well as those categorized into one of the three general categories (social sciences – general, humanities – general and other).

**Table 5:** Number of publications included in the VABB-SHW (VABB-GP and VABB-WoS) by discipline and by publication type (2000-2011).

Discipline	Journal articles		Monographs		Edited		Book		Proceedings papers				Total				
	VABB-GP #	%	VABB-WoS #	%	VABB-GP #	%	VABB-GP #	%	VABB-GP #	%	VABB-WoS #	%	VABB-GP #	%	VABB-WoS #	%	
Archaeology	229	41.3	186	33.6	16	2.9	11	2.0	66	11.9	32	5.8	14	2.5	63.9	36.1	
Art history	430	40.5	238	22.4	20	1.9	63	5.9	223	21.0	50	4.7	37	3.5	74.1	25.9	
Communication studies	558	50.6	262	23.8	8	0.7	34	3.1	189	17.2	12	1.1	39	3.5	72.7	27.3	
Criminology	921	75.1	143	11.7	8	0.7	23	1.9	125	10.2	3	0.2	4	0.3	88.0	12.0	
Economics & business	1817	30.9	3114	53.0	69	1.2	62	1.1	495	8.4	83	1.4	236	4.0	43.0	57.0	
Educational sciences	845	43.2	809	41.4	12	0.6	51	2.6	193	9.9	23	1.2	22	1.1	57.5	42.5	
History	924	52.7	296	16.9	41	2.3	63	3.6	388	22.1	37	2.1	4	0.2	82.9	17.1	
Law	4891	82.4	236	4.0	77	1.3	141	2.4	552	9.3	25	0.4	15	0.3	95.8	4.2	
Linguistics	1158	36.2	749	23.4	94	2.9	197	6.2	800	25.0	136	4.2	67	2.1	74.5	25.5	
Literature	752	43.9	211	12.3	54	3.2	119	7.0	536	31.3	38	2.2	2	0.1	87.6	12.4	
Philosophy	1014	39.1	835	32.2	55	2.1	80	3.1	549	21.1	19	0.7	44	1.7	66.1	33.9	
Political science	1016	55.4	367	20.0	39	2.1	50	2.7	353	19.3	4	0.2	4	0.2	79.8	20.2	
Psychology	767	18.8	3061	75.2	9	0.2	7	0.2	162	4.0	33	0.8	33	0.8	24.0	76.0	
Social health sciences	854	21.1	3081	76.1	5	0.1	5	0.1	62	1.5	13	0.3	29	0.7	23.2	76.8	
Sociology	897	45.0	846	42.4	10	0.5	22	1.1	197	9.9	13	0.7	10	0.5	57.1	42.9	
Theology	795	46.9	140	8.3	66	3.9	112	6.6	573	33.8	9	0.5	1	0.1	91.7	8.3	
Total (incl. general categories)	17833	42.2	15869	37.5	614	1.5	1052	2.5	5695	13.5	579	1.4	622	1.5	61.0	39.0	
																42264	100

Table 5 clearly shows that the vast majority of the scholarly outputs in the VABB-SHW are journal articles (79.7%), followed at considerable distance by book contributions (17.5%), while the proportion of proceedings papers in the database is limited (2.9%). However, the spread of the publication types differs considerably from discipline to discipline and across all disciplines. In all disciplines, more than half of the publications included in the VABB-SHW are journal articles. This predominance is most pronounced in the disciplines sociology (87.4%), psychology (94.0%) and social health sciences (97.2%). The disciplines with the highest percentages of book publications are linguistics (34.1%), literature (41.4%) and theology (44.3%). The proportion of proceedings papers is relatively small in all disciplines, with percentages ranging from 0.4% (political science) to 8.3% (archaeology).

Table 5 also lists the proportions by discipline of the VABB-GP and VABB-WoS publications in the VABB-SHW. The data show that the share of VABB-GP publications is higher than that of VABB-WoS publications for most disciplines. Disciplines with over 80% of VABB-GP publications are law (95.8%), theology (91.7%), criminology (88.0%), literature (87.6%) and history (82.9%). The disciplines social health sciences (23.2%), psychology (24.0%) and economics (43.0), on the other hand, display a lower percentage of publications in the VABB-GP compared to the VABB-WoS.

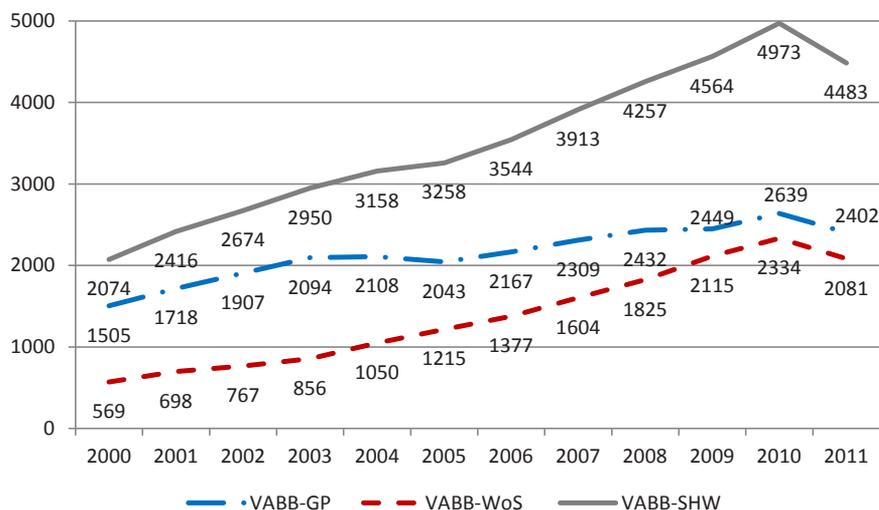
At discipline level, law and economics account for more than a quarter of all publications in the database (14.0% and 13.9%, respectively). The second most important group consists of social health sciences and psychology (each 9.6%). The disciplines with the lowest number of publications are communication studies (2.6%), art history (2.5%) and archaeology (1.3%). The numbers and percentages listed here do not give any indication as to the mean productivity of scholars within a given discipline, but only provide information on the weight of a discipline over the total number of Flemish publications in the broad field of the SSH. Not every discipline is lectured at each of the five Flemish universities, nor do they count equal numbers of scholars.

## **A GROWTH IN PUBLICATIONS**

There is a growing international trend that scientists annually contribute to a higher number of publications (Martin et al., 2010). This trend is also apparent in Flanders, in which a significant increase in publication outputs has been seen over the past decade. It can be deduced from the composition of the 2012 and 2013 BOF keys that the number of SCIE-indexed publications with a co-author affiliated with a Flemish university has risen by approx. 75% since 2000. A similar and even stronger increase is observed for the SSH, with the disciplines in the social sciences experiencing a stronger growth than those belonging to the humanities (Engels, Ossenblok, & Spruyt, 2012). The annual VABB-SHW update allows us to monitor whether this evolution will continue in the future.

Figure 18 shows the evolution since 2000 of the number of VABB-SHW publications. The graph shows that the international trend of increasing publication numbers is also reflected in the SSH in Flanders. The steep increase in the number of publications per year can mainly be ascribed to the almost tripling of the number of publications comprised in the VABB-WoS. This observation can undoubtedly also be explained by the fact that a large number of journals have been additionally indexed in the WoS since 2007 (Moed et al., 2009). Considering the fact that the WoS predominantly incorporates internationally oriented journals, we

can conclude that the trend in publishing behaviour to increasingly address an international audience (Fry et al., 2009), also applies to the SSH.



**Figure 18:** Number of VABB-SHW (VABB-GP and VABB-WoS) publications by year (2000-2011).

The observation that the publication numbers in virtually all disciplines are lower in 2011 compared to 2010, can be accounted for by the fact that the data for the publication year 2011 had not been completely submitted by the associations on 1 April 2012 because not all authors had entered their latest publications in the individual academic bibliographies by this date. The annual VABB-SHW update in 2011 not only includes the new publications for 2010 (+100%) but also an additional proportion (23.5%) of outputs stemming from the publication year 2009 (Verleysen et al., 2012). The new BOF Resolution ('12) also provides the possibility that the universities submit not only new publications from the preceding year but also additions and corrections pertaining to the penultimate year for the annual VABB-SHW update (submission deadline: 1 May). As such, it is expected that the data for 2011 will have been further completed when VABB-SHW IV is launched on 1 June 2014.

Table 6 lists the weighted VABB-SHW-included publication counts by discipline for the periods 2000-2002, 2003-2005, 2006-2008 and 2009-2011. Upon comparing the four 3-year periods, we conclude that the weighted publication output in the SSH nearly doubled in Flanders between 2000 and 2011. Comparison of the number of publications generated in the first 3-year period (00-02) with those from the last 3-year period (09-11) reveals an outspoken increase in the number of publications in all 16 listed disciplines. The smallest growth is found in law (+44.9%), while all other disciplines (except for philosophy: +74.3%, linguistics: +86.1%, economics: +91.9% and theology: +93.7%) experienced an increase by more than 100%, with two disciplines registering a growth of even more than 200%, i.e., political science (+223.3%) and communication studies (+256.3%).

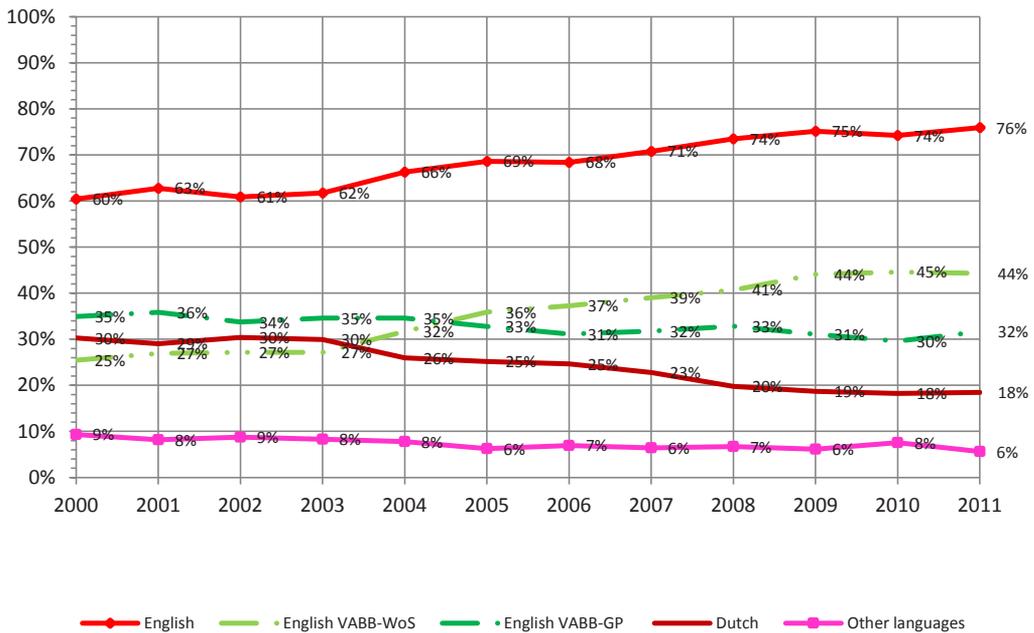
**Table 6:** Weighted VABB-SHW (VABB-GP and VABB-WoS) publication counts and growth percentages by discipline (2000-2011).

Discipline	2000-02	2003-05	2006-08	2009-11	Growth%
Archaeology	102	124	151	204	100.5%
Art history	162	221	284	412	155.1%
Communication studies	126	218	308	449	256.3%
Criminology	209	213	327	499	138.8%
Economics & business	1002	1285	1715	1922	91.9%
Educational sciences	263	412	559	736	180.2%
History	315	356	531	655	108.1%
Law	1241	1502	1607	1798	44.9%
Linguistics	573	740	1002	1067	86.1%
Literature	236	512	528	579	145.1%
Philosophy	515	587	732	897	74.3%
Political science	225	435	559	728	223.3%
Psychology	532	805	1189	1541	189.7%
Social health sciences	544	873	1145	1482	172.4%
Sociology	311	442	534	728	134.3%
Theology	319	397	555	618	93.7%
Total (incl. general categories)	7424	9583	12124	14376	93.7%

Further investigation into the causes underlying this rapid growth might disclose whether there are any objectifiable reasons for the considerable differences in growth ratio between the various disciplines (ranging from 44.9% up to 256.3%). Have some disciplines experienced a shift in growth pattern over time? Did for example the growth in publication culture set in earlier within law, or can such a growth be expected in years to come? What can already be concluded without further studies is that SSH scholars in Flanders annually account for an increasingly higher number of publications, both in total and by discipline.

## SHIFTS IN LANGUAGE USE

In addition to a growth in the number of publications, several studies have also reported shifts in publishing behaviour, in particular an increase in the number of outputs written in English (Kyvik, 2003; Prpic, 2007). This trend is also reflected in the VABB-SHW, confirming that English as scientific language assumes an increasingly important place in the SSH (Engels et al., 2012). Figure 19 illustrates that the share of publications in English included in the VABB-SHW increased from 60.4% to 75.9% for all publication types throughout 2000-2011, whereas conversely the proportion of publications in Dutch dropped from 30.3% to 18.5%. Likewise, the percentage of publications written in other languages decreased from 9.3% to 5.6% during this period.



**Figure 19:** Evolution of the use of English, Dutch and other publication languages within the VABB-SHW (VABB-GP and VABB-WoS) (2000-2011).

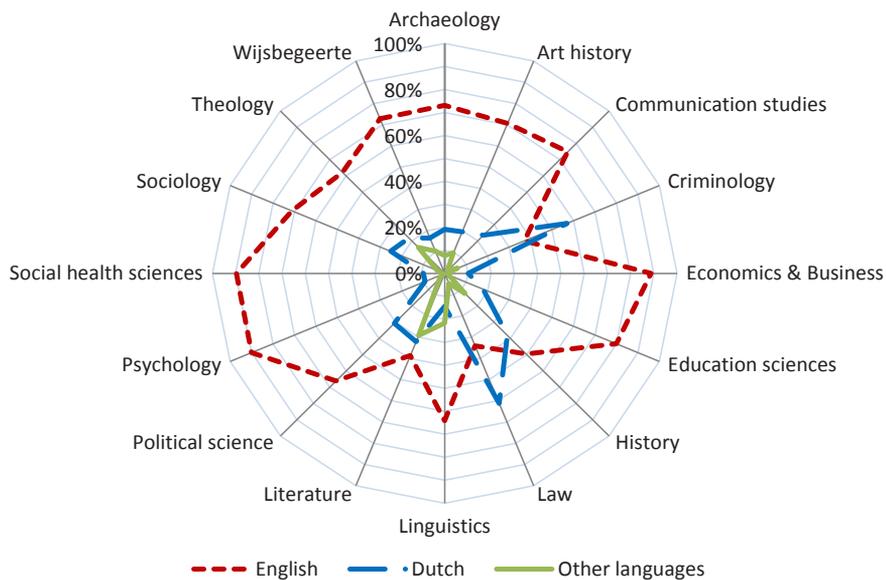
Figure 19 further shows that the share of VABB-GP publications written in English decreased from 35.0% to 31.6%, while that of English-written VABB-WoS publications increased from 25.5% to 44.9%. The question arises as to which extent the latter increase is positively correlated to the strong rise in VABB-WoS publication counts (Figure 18). Table 7 shows that the vast majority of VABB-WoS publications (journal articles: ~95%, proceedings papers: ~97%) were written in English over the entire period under study, i.e., the increase in the number of publications in English in the VABB-SHW (Figure 19) perfectly mirrors the overall rise in the number of VABB-WoS publications (Figure 18). Table 7 further demonstrates a slight increase (>45%) in the share of English-written VABB-GP publications and a strong rise (>80%) in the proportion of English-written VABB-GP proceeding papers. The book publications included in the

VABB-GP are largely written in English (~75%) and this share remains stable over time. This prevalence of English as main publication language in book outputs can be largely explained by the preference to select mainly international publishers for inclusion in the VABB-GP.

**Table 7:** Evolution of the use of English as publication language within the VABB-GP and VABB-WoS (2000-2011).

English in		2000-2002	2003-2005	2006-2008	2009-2011	Total
VABB-GP	Articles	41.0%	42.8%	43.7%	46.6%	43.6%
	Book publications	73.3%	73.6%	78.6%	73.9%	75.0%
	Proceedings	57.6%	69.0%	77.3%	80.5%	73.2%
VABB-WoS	Articles	93.6%	95.0%	95.3%	95.1%	94.9%
	Proceedings	94.8%	98.9%	95.9%	98.3%	97.3%

Figure 20 provides an overview by discipline of the number of publications written in English, Dutch and other languages for all disciplines included in the VABB-SHW. Overall, it can be concluded that English is the most important publication language in the VABB-SHW. Outstanding disciplines in this respect are psychology, social health sciences and economics with 90.1%, 89.7% and 88.8% of publications written in English, respectively. The disciplines in which publications are most often published in Dutch are law (61.2%) and criminology (57.0%). All other disciplines have more publications in English than in Dutch.



**Figure 20:** Percentages of publications in English, Dutch and other languages by discipline (VABB-GP and VABB-WoS; 2000-2011).

Figure 20 shows the percentages of publications in English, Dutch and other languages by discipline. The importance of publications written in languages other than Dutch or English is particularly apparent in the disciplines linguistics and literature with 29.1% and 21.6% of the publications written in languages other than Dutch or English, respectively. This finding shows that various languages are represented within the VABB-SHW.

### SHIFTS IN PUBLICATION TYPE

The above findings suggest that SSH scholars in Flanders have focused on publishing increasingly in internationally oriented journals in the past 12 years. Increasing preference is given to WoS-indexed journals (Ossenblok, Engels, & Sivertsen, 2012). This section does not deal with shifts within one publication type but instead investigates whether any evolutions applicable to all publication types can be observed. A study conducted a decade ago already reported an increased use of the journal article as medium of publication, at least in the humanities (Thompson, 2002). Recently, Diana Hicks (2013) expressed the fear that the overall strong emphasis on journal articles discourages scientists to invest any more time in publishing books.

**Table 8:** Evolution of the publication type shares in the VABB-SHW (VABB-GP and VABB-WoS; 2000-2011).

Period	Journal articles		Total journal articles	Monographs	Edited books	Book chapters	Total books	Total
	VABB-GP	VABB-WoS	VABB-SHW	VABB-GP			VABB-GP	VABB-SHW
2000-2002	3875	1937	<b>5812</b>	118	155	890	<b>1163</b>	<i>7164</i>
	66.7%	33.3%	<b>81.1%</b>	10.1%	13.3%	76.5%	<b>16.2%</b>	<i>97.4%</i>
2003-2005	4582	2943	<b>7525</b>	126	211	1181	<b>1518</b>	<i>9366</i>
	60.9%	39.1%	<b>80.3%</b>	8.3%	13.9%	77.8%	<b>16.2%</b>	<i>96.6%</i>
2006-2008	4833	4635	<b>9468</b>	187	275	1481	<b>1943</b>	<i>11714</i>
	51.0%	49.0%	<b>80.8%</b>	9.6%	14.2%	76.2%	<b>16.6%</b>	<i>97.4%</i>
2009-2011	4543	6354	<b>10897</b>	183	411	2143	<b>2737</b>	<i>14020</i>
	41.7%	58.3%	<b>77.7%</b>	6.7%	15.0%	78.3%	<b>19.5%</b>	<i>97.2%</i>

Table 8 outlines the evolution in the share of journal articles and book publications over all disciplines. The most immediately striking finding is that the percentage of journal publications - and hence also that of book publications - remained stable in the period 2000-2011. The slight increase in book publications (+3.3%) in the SSH in Flanders in the period 2000-2011 is largely attributable to the last 3-year period (2009-2011) and can be virtually entirely explained by the incorporation of GPRC-labelled book publications since 2009 (7.0% of 2737) and the individual book selection (14.0% of 2737).

## REFERENCE LIST

- Adams, J. & Testa, J. (2011). Thomson Reuters book citation index. In E. Noyons, P. Ngulube, & J. Leta (Eds.), *The 13th conference of the International Society for Scientometrics and Informetrics* (pp. 13-18). Durban, South Africa: ISSI, Leiden University and University of Zululand.
- Engels, T. C. E., Ossenblok, T. L. B., & Spruyt, E. H. J. (2012). Changing publication patterns in the social sciences and humanities, 2000-2009. *Scientometrics*, 93, 373-390.
- Engels, T. C. E., Spruyt, E. H. J., Glänzel, W., & Debackere, K. (2009). Het Vlaams academisch Bibliografisch bestand voor de sociale en humane wetenschappen: Instrument ten dienste van een optimaal wetenschapsbeleid? *Tijdschrift voor Onderwijsrecht & Onderwijsbeleid*, 2008-09, 395-403.
- Fry, J., Creaser, C., Butters, G., Craven, J., Griffiths, J., & Hartley, D. (2009). *Communicating knowledge: How and why researchers publish and disseminate their findings. Supporting paper 4: Literature review*. London: Research information Network.
- Ghesquière, P., Van Bendegem, J.-P., Gillis, S., Willems, D., & Cornelissen, K. (2011). Het VABB-SHW: eerste versie klaar, nu verfijnen. In K. Debackere & R. Veugeliers (Eds.), *Vlaams Indicatorenboek 2011* (pp. 260-264). Brussel: Expertisecentrum O&O Monitoring.
- Hicks, D. (2013). One size doesn't fit all: On the co-evolution of national evaluation systems and social science publishing. *Confero*, 1, 67-90.
- Kyvik, S. (2003). Changing trends in publishing behaviour among university faculty, 1980-2000. *Scientometrics*, 58, 35-48.
- Martin, B., Tang, P., Morgan, M., Glänzel, W., Hornbostel, S., Lauer, G. et al. (2010). Towards a bibliometric database for the social sciences and humanities - A European scoping project: A report produced for DFG, ESRC, AHRC, NWO, ANR and ESF. Sussex: Science and Technology Policy Research Unit.
- Moed, H. F., Linmans, A. J. M., Nederhof, A., Zuccala, A., López Illescas, C., & de Moya Anegón, F. (2009). Options for a comprehensive database of research outputs in social sciences and humanities. *Research report to de Project Board of the Scoping Study "Towards a bibliometric database for the Social Sciences and Humanities"*. Leiden & Madrid: CWTS & CSIC.
- Ossenblok, T. L. B., Engels, T. C. E., & Sivertsen, G. (2012). The representation of the social sciences and humanities in the Web of Science. A comparison of publications patterns and incentive structures in Flanders and Norway (2005-9). *Research Evaluation*, 21, 280-290.
- Ossenblok, T. L. B., Verleysen, F. T., & Engels, T. C. E. (2014). Co-authorship of journal articles and book chapters in the SSH (2000-2010). *Journal of the American Society for Information Science and Technology (Jasist)*. 65(5), p. 882-897. DOI: 10.1002/asi.23015
- Prpic, K. (2007). Changes of scientific knowledge production and research productivity in a transitional society. *Scientometrics*, 72, 487-511.
- Sivertsen, G. (2010). A performance indicator based on complete data for the scientific publication output at research institutions. *ISSI Newsletter*, 6, 22-28.
- Thompson, J. W. (2002). The death of the scholarly monograph in the humanities? Citation patterns in literary scholarship. *Libri*, 52, 121-136.
- Verleysen, F. T. & Engels, T. C. E. (2012). Historical publications at Flemish universities, 2000-2009. *Belgisch Tijdschrift voor Nieuwste Geschiedenis*, 42, 110-143.
- Verleysen, F. T. & Engels, T. C. E. (2013a). A label for peer reviewed books. *Journal of the American Society for Information Science and Technology (Jasist)*, 64, 428-430.
- Verleysen, F. T. & Engels, T. C. E. (2013b). Measuring internationalisation of book publishing in the social sciences and humanities using the barycentre method In Gorraiz, J., Schiebel, E., Gumpfenberger, C., Hörlesberger, M. & Moed, H. (Eds.), *Proceedings of the 14th international society of scientometrics and informetrics conference (ISS) (15<sup>th</sup> to 20<sup>th</sup> July 2013)*, (pp. 1170-1176), Vienna (Austria).

Verleysen, F. T., Ossenblok, T. L. B., & Engels, T. C. E. (2012). Een veld in beweging: Onderzoeksevaluatie in de sociale en humane wetenschappen. *Tijdschrift voor Onderwijsrecht en Onderwijsbeleid*, 2011-12, 345-351.

### **8.3 The representation of the social sciences and humanities in the Web of Science. A comparison of publication patterns and incentive structures in Flanders and Norway (2005-9) (Research Evaluation, 2012)**

#### **Reference**

Ossenblok, T.L.B., Engels, T.C.E. and Sivertsen, G. (2012). The representation of the social sciences and humanities in the Web of Science. A comparison of publication patterns and incentive structures in Flanders and Norway (2005-2009). *Research Evaluation*, 21, 280-290.

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#### **ABSTRACT**

This paper studies publication patterns in the social sciences and humanities (SSH) in Flanders and Norway using two databases that both cover all SSH peer reviewed journal articles by university scholars for the period 2005 to 2009. The coverage of journal articles by the Web of Science (WoS) and the proportion of articles published in English is studied in detail applying the same methodologies to both databases. The study of WoS coverage and language use is chosen because the performance-based funding systems that are in place in both countries have given different emphasis to publishing in WoS covered journals. The results show very similar, almost identical evolutions in the use of English as a publication language. The proportion of articles covered by the WoS, however, is stable for Norway but has increased rapidly for Flanders. This finding shows that the parameters used in a performance-based funding system may influence the publishing patterns of researchers.

#### **FUNDING**

This work was supported by the Nordic Institute for Studies in Innovation, Research and Education and by the Centre for R&D Monitoring financed by the Flemish government.

## INTRODUCTION

Achieving full coverage of the scholarly publications in the social sciences and humanities (SSH) in bibliographic data sources is notoriously difficult (Hicks, 1999; Archambault, Vignola-Gagne, Côté, Larivière, & Gingras, 2006; Nederhof, 2006). Although commercial databases such as the Web of Science (WoS) and Scopus have made considerable advances in increasing the coverage of the archival journals and articles in these fields, they still give limited representation of the SSH (Hicks & Wang, 2009) especially of output by researchers in non-English-speaking countries<sup>35</sup> (Larivière & Macaluso, 2011). In Flanders and Norway, however, shared databases for all the universities have been set up with complete coverage of the scholarly output in the SSH (Engels, Ossenblok, & Spruyt, 2012; Sivertsen, 2010). Using these databases, we compare WoS coverage and language use of journal articles in selected SSH disciplines and examine some possible explanations for the different trends we find.

In 2008 the Flemish government instructed the Centre for R&D Monitoring (ECCOM) to collect from the universities all references of SSH publications that have appeared since 2000, including those that are not indexed in the WoS. In doing so the government supplemented the on-going monitoring of WoS-indexed publications and citations (Debackere & Glänzel, 2004; Debackere & Glänzel, 2008), and acknowledged that a specific instrument was needed in order to do justice to the SSH in a performance-based research funding system (PRFS). Hence the government provided the legal framework for the construction of the *Flemish Academic Bibliographic Database for Social Sciences and Humanities* (“Vlaams Academisch Bibliografisch Bestand voor de Sociale en Humane Wetenschappen” or “VABB-SHW<sup>36</sup>”) in the Flemish university financing decree and the BOF regulation on the financing of the *University Research Fund* (“Bijzonder Onderzoeksfonds” or “BOF”). The VABB-SHW gathers the bibliographic references of published SSH research outputs by scholars who are affiliated to Flemish universities. In accordance with the regulations stipulated in the BOF regulation, eligible outputs need to meet a number of basic criteria. They are as follows: to be publicly accessible, be unambiguously identifiable by ISBN or ISSN number, make a contribution to the development of new insights or to applications resulting from these insights, and have been subjected - prior to publication - to a demonstrable peer review process by scholars who are experts in the (sub)field to which the publication belongs. Peer review should be done by an editorial board, a permanent reading committee, external referees or else by a combination of all (for a full account see: Engels et al., 2012). Norway’s shared database of scholarly publications from the higher education sector, CRISTin<sup>37</sup>, has complete data since 2005 from all fields of research, not only in the SSH (Schneider, 2009; Sivertsen, 2010). The data are defined, delimited and structured in almost exactly the same way as in the VABB-SHW database, which was in fact inspired by CRISTin. This allows for a direct comparison of scholarly publishing trends in SSH at Flemish and Norwegian universities. Although both databases cover books, book chapters and proceedings as well, in this article, only articles in journals are taken into account.

A common feature of the science policy system in Flanders and Norway is that performance indicators derived from the VABB-SHW and CRISTin are applied in a performance-based research funding system

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<sup>35</sup> The term ‘country’ is used for both Norway and Flanders, albeit the latter is no national state, but a region of one.

<sup>36</sup> <http://www.ecoom.be/vabb>

<sup>37</sup> <http://www.cristin.no/english/>

(PRFS) that distributes institutional grants to the universities. In Norway, a publication indicator based on institutional data was implemented in the local PRFS in 2006, using publication counts for 2005 (Schneider, 2009). In Flanders a VABB-SHW derived indicator was added to the WoS publications and citations indicators in 2010, based on publication counts for 2000-2009 (Engels et al., 2012). Previous research and discussions regarding PRFSs, e.g. the RAE in the UK and the ERA in Australia, show that such funding systems, whether they involve evaluation of output or not, do influence publication behaviour directly or indirectly in terms of productivity and chosen publication channels (Gläser & Laudel, 2007; Hicks, 2012). Furthermore, the purpose of PRFSs is to steer research in desired directions and increase its quality (Whitley, 2007) and quantity (Hicks, 2012). However, the intended and unintended impact of a funding system depends on a variety of characteristics of the system and the field (Whitley, 2007; Schneider, 2009). An important difference between the funding systems in Flanders and Norway is that until 2010 the funding formula in Flanders has been based on WoS publications only, while the Norwegian funding formula has from the start in 2006 been based on complete data in CRISStin. In addition, citation counts for WoS publications are included in the Flemish funding system, but not in the Norwegian one. Consequently, in the period studied here, there has been an explicit incentive to publish in WoS journals in Flanders, but not in Norway, where all scholarly publications count. Hence, we expect that this difference in incentive structures between Norway and Flanders translates into different trends in WoS coverage of SSH publications. Specifically, we hypothesise that the increase in WoS coverage in absolute as well as in relative terms is more pronounced in Flanders than in Norway.

In addition to the variable WoS coverage we use the proportion of publications in English as a more general indicator of internationalisation. This is especially important as both Norway and Flanders belong to rather small language groups: Norwegian is spoken by about five million people, but is easily read in Denmark, Sweden and parts of Finland as well, and there are several common Nordic scholarly journals publishing in both Danish, Norwegian and/or Swedish. Dutch, the official language of Flanders, is read and written by about 23 million people, 17 million living in the Netherlands and six million living in Flanders. Hence both Norwegian and Flemish researchers have a potential audience of about 20 million that they can address in the local language, which is mostly their mother tongue<sup>38</sup>. Therefore, *ceteris paribus*, Norwegian and Flemish researchers in SSH could be expected to publish about equal proportions of their work in a local language and hence an equal proportion of their work in English. However, given the different incentives of the local PRFSs and taking into account that most journals indexed in WoS publish in English, we expect a stronger trend towards publishing in English in Flanders than in Norway.

In the following sections we first detail the methodology used for comparison of SSH publication patterns in Flanders and Norway. In this study, only disciplines that account for at least 200 (fractionally counted) articles in both Flanders and Norway in the period between 2005 and 2009 are taken into account. These 13 disciplines are business & finance, comparative literature, economics, education & educational research, history, law, linguistics, media & communication, philosophy & history of ideas, political science,

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<sup>38</sup> In scholarly communication, it is less relevant to include the Afrikaans, a variant of Dutch spoken in South Africa, since English is the language of local written scholarly communication. Furthermore, most scholars in Flanders do not publish in French unless articles are translated for publication in bilingual journals. French is the second official language in Belgium spoken by well over 4 million people in the southern region of the country. Overall, 3.8% of the fractionally counted publications in the VABB-SHW are in French. Another 1.9% of the VABB-SHW publications are written in another language than English, Dutch or French. In CRISStin two language groups have been identified: local (including Norwegian, Danish and Swedish) and English (including also a small proportion of other languages).

psychology, sociology, and theology & religion. We characterise and compare the disciplines in both countries in terms of WoS coverage and publishing in English. We then zoom in on the largest differences in terms of WoS coverage and analyse to what extent journals with strong local ties, some of which have recently been added to the WoS, explain apparent differences in publication patterns. Next, we detail the year by year evolution of WoS coverage and publishing in English for the whole of the SSH as well as for each of the aforementioned disciplines. The main finding of our analysis is that, although publishing in English is as widespread and increases at the same pace in Flanders and Norway, WoS coverage is stable in the latter but increased rapidly in the former. We discuss this result in the light of the incentives provided by the respective PRFSs, and outline the limitations of our study and some challenges for future research.

## METHODOLOGY

In this paper data from CRISTin and the VABB-SHW are compared. References in both databases are collected through a similar mechanism, i.e. via the universities and the university colleges<sup>39</sup> which collect the references in their local institutional repositories, and serve a similar basic goal, i.e. the distribution of research funds over universities through a performance-based funding system. In both countries only peer reviewed publications are included in the bibliometric indicators for the funding system. A dynamic authority record of approved scholarly journals with peer review has been established in both countries. However, the selection process leading to the respective lists of peer reviewed journals occurs at different levels. In Norway, the responsibility for selecting peer reviewed publications lies primarily with the university departments. Any issues that arise are discussed at gradually more distant levels, i.e. the level of the faculty, the university or the national publishing board (Sivertsen, 2010). In Flanders, although the BOF regulation stipulates that only peer reviewed content should be submitted for the VABB, the universities have in practice submitted all full bibliographic references of eligible publication types. The government appointed *Authoritative Panel* (“Gezaghebbende Panel” or “GP”) decided which journals publish peer reviewed content on the basis of an overview of all journals in which researchers working in Flanders had published SSH work between 2000 and 2009. As a result only peer reviewed articles that either are not indexed in the WoS and consist of at least four pages, or are indexed in the WoS as articles, letters, notes, proceedings papers or reviews in the SCIE, SSCI and/or AHCI databases are taken into account (Engels et al., 2012). Although in both systems borderline cases can occur, the result is that in both databases the overwhelming majority of the articles do indeed contain peer reviewed content. In order to further maximize the comparability of the data in the CRISTin and the VABB-SHW databases, identical disciplinary classifications and counting methods were implemented for both databases.

All 20.000 journals included in CRISTin have been classified by disciplinary panels organized by the Norwegian Association of Higher Education Institutions (the rector’s conference) into 80 mutually disjunctive subfields which are subordinated to 5 disciplinary categories: 11 engineering subfields, 29 health sciences subfields (including psychology and social work), 21 humanities subfields, 7 natural sciences subfields, and 12 social sciences subfields. Each of the SSH subfields as well as psychology and

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<sup>39</sup> In Norway all university colleges contribute to CRISTin and hence their publications are included in this analysis. In Flanders only 6 out of 19 university colleges submitted data for the VABB-SHW thus far. The very limited volume of peer reviewed output of Flemish university colleges is not taken into account in this analysis.

social work have been considered for inclusion in this study. To be able to compare the article data in CRISTin with the data in the VABB-SHW, the journals in the VABB-SHW in which Flemish researchers published between 2005 and 2009 (N = 4398) have been classified into one of the 80 subfields in CRISTin. This task was facilitated by the fact that over two thirds (71.8%) of the journals in the VABB-SHW, representing 61.2% of all journal articles, had already been assigned to one of the 80 disciplines in CRISTin. Hence only 1240 (28.2%) journals needed to be classified. This was done in a cyclic process whereby the authors of this paper each classified the journals cumulatively while checking consistency of decisions.

With regard to the counting method, different standards have been adopted in Norway and Flanders. In Norway the performance-based funding system uses a fractional counting method that attributes equal share to each author and then accumulates shares per institution. The Flemish BOF-key, however, uses a whole counting method that attributes the whole publication to each university whose address is mentioned on the paper (Debackere & Glänzel, 2004; Debackere & Glänzel, 2008). To be able to compare the data, the Norwegian fractional counting method has been applied to the VABB-SHW data. Specifically, the number of fractional articles is counted as the sum of the fractions per university based on its share of authors on a paper, with a minimum fraction of 0.1 per paper for the SSH. The result of this method might differ slightly from the result of a fractional count at the country level because of authors affiliated to two or more institutions.

WoS coverage and language use were determined in CRISTin and the VABB-SHW database as follows. In CRISTin, journals are identified as WoS-included or not, and, if included, the first year of indexation is available. WoS coverage of articles is inferred from these Thomson Reuters provided data. In the VABB-SHW, a slightly different method has been used: articles are considered WoS covered if a unique WoS-identifier, a UT-code, is available in the database. This identification at the article level is a necessary component of the VABB-SHW as the BOF regulation stipulates that WoS-indexed publications, as well as their citations, are counted separately before non-WoS-indexed articles are counted. For the calculation of the BOF-key, the data have been validated at record and aggregated levels by the research administrations of the Flemish universities, assuring maximum accurateness. Thus for both databases the most accurate measuring method has been chosen.

Similarly language use in terms of local language, English and other languages has been determined at the journal level in CRISTin and at the record level in the VABB-SHW database. Here too the difference in measurement level is due to the specific context in which the VABB-SHW has been set up. In particular, several Belgian journals are, or have been, bilingual Dutch-French journals that publish articles in Dutch as well as French by researchers affiliated to Flemish universities, necessitating the identification of the language of articles at the record level. Hence the language of articles has been collected from the universities and has been completed where missing. In CRISTin, the language classification is on the level of journals, taking into account the main language of articles in the journal. Journals mainly publishing in the Nordic languages with occasional articles in English have been classified as "Nordic". In Norwegian research, publishing in other languages than English or Norwegian most often means contributing to philological research in the study of other languages or literatures. These disciplines are among the smaller ones not studied specifically here, but only included in the totals. They contribute to most of the articles in the category of "Other" languages.

To assure the robustness of the results, only SSH disciplines that account for at least 200 fractional articles in Flanders as well as in Norway in the period 2005 to 2009 are specified in this paper. However, the smaller SSH disciplines are included in the aggregated counts for SSH as a whole. The smaller disciplines for which no results are presented are anthropology, archaeology & conservation, architecture & design, art history, Asian and African studies, classical studies, dance, development studies, English studies, ethnology, gender studies, geography, Germanic studies, interdisciplinary humanities, interdisciplinary social sciences, library & information science, musicology, romance studies, Scandinavian studies, Slavonic studies, social work, and theatre & drama. Together these disciplines represent 1397.7 and 3136.4 fractionalized articles in Flanders and Norway, respectively.

## RESULTS

Table 9 gives an overview of the SSH articles in CRISin and the VABB-SHW database for the period 2005 to 2009. The total number of fractional articles, the number of fractional articles included in the WoS, and the number of fractional articles published in the local language (Dutch or Norwegian, Danish & Swedish, respectively) as well as the corresponding percentages, are presented for the whole of SSH as well as the 13 largest SSH disciplines in Flanders and Norway.

In terms of publication volume, most disciplines are of comparable size in Flanders and Norway. Exceptions are business & finance (503.5 versus 926.6 articles), education & educational research (369.1 versus 1094.0 articles), and law (2054.3 versus 806.6 articles). The first two differences are probably the result of the contribution of Norwegian university colleges, which typically offer several programmes in management as well as education, to CRISin. The volume of Flemish research in law may profit from the fact that law articles are often published in Dutch as well as in French, resulting in double counting of some of the academic work in law. The overall coverage in WoS amounts to almost one in three articles in both countries (32.7% and 32.3%, respectively), whereas the percentage of articles in a local language is lower in Flanders (36.5%) than in Norway (43.7%). However, there are substantial differences between disciplines.

Looking at WoS coverage, law is by far the least covered discipline (2.4% and 4.2%, respectively), whereas well over 50% of economics and psychology articles are indexed. Large differences in WoS coverage appear for comparative literature (37.5% versus 15.9%), education & educational research (35.1% versus 18.3%), media & communication (20.3% versus 11.7%) and philosophy & history of ideas (30.5% versus 16.3%), as well as for history (20.9% versus 40.5%) and political science (25.4% versus 62.3%). For the first four disciplines WoS coverage for Flanders is almost the double of that for Norway, whereas the inverse holds for the latter two disciplines. One reason for these divergences might be the inclusion in the WoS of journals in which scholars from either Flanders or Norway publish often. To analyse this possibility, the journal frequencies for each of the 13 disciplines were checked for the presence of journals that account for 5 or more per cent of fractionalized articles in the discipline in Flanders or Norway. Closer inspection of these frequently used outlets revealed that for each of the aforementioned six disciplines where WoS coverage for either country (almost) doubles that of the other country, this can partly be explained by the inclusion in the WoS of journals with strong local ties. Strong local ties was operationally defined as journals with 50 or more per cent of all WoS-indexed articles carrying an address of either Belgium and/or

the Netherlands, or Norway, Denmark and/or Sweden. Table 10 gives an overview of these journals and their respective contribution to the WoS coverage of their discipline.

**Table 9:** Number of fractional articles, WoS coverage and local language publishing for Flanders (F) and Norway (N), 2005-2009.

Discipline		# of articles	WoS coverage		Local language	
			#	%	#	%
All SSH	F	8622.7	2818.5	32.7%	3145.1	36.5%
	N	10052.3	3237.4	32.2%	4396.5	43.7%
Business & finance	F	503.5	246.8	49.0%	57.8	11.5%
	N	926.6	333.3	36.0%	253.4	27.3%
Comparative literature	F	215.5	80.8	37.5%	47.5	22.0%
	N	225.1	35.8	15.9%	159.7	71.0%
Economics	F	351.9	187.4	53.2%	42.3	12.0%
	N	473.3	339.7	71.8%	91.4	19.3%
Education & educational research	F	369.1	129.7	35.1%	57.2	15.5%
	N	1094.0	200.4	18.3%	577.3	52.8%
History	F	605.2	126.3	20.9%	339.3	56.1%
	N	463.7	187.6	40.5%	268.3	57.9%
Law	F	2054.3	48.6	2.4%	1561.5	76.0%
	N	806.6	34.2	4.2%	606.5	75.2%
Linguistics	F	336.8	102.5	30.4%	50.2	14.9%
	N	314.6	138.1	43.9%	25.3	8.1%
Media & communication	F	232.2	47.2	20.3%	92.5	39.9%
	N	217.2	25.5	11.7%	70.8	32.6%
Philosophy & history of ideas	F	445.0	135.8	30.5%	117.2	26.3%
	N	344.0	56.2	16.3%	208.0	60.5%
Political science	F	403.3	102.6	25.4%	165.7	41.1%
	N	425.2	264.9	62.3%	125.9	29.6%
Psychology	F	1113.8	926.8	83.2%	107.8	9.7%
	N	787.4	523.7	66.5%	178.2	22.6%
Sociology	F	205.9	49.3	24.0%	95.3	46.3%
	N	277.5	102.3	36.9%	133.4	48.1%
Theology & religion	F	388.5	64.7	16.6%	102.5	26.4%
	N	551.7	100.2	18.2%	347.8	63.0%

Table 10 shows that for history the WoS coverage of Norwegian research is similar to that of Flemish research if one takes into account the influence of articles that appeared in the journal *Historisk Tidsskrift*. Similarly the WoS coverage of Flemish research in media & communication and in philosophy & history of ideas approaches that of Norwegian research when considering that the articles that appeared in the journals *Tijdschrift voor Communicatiewetenschap* and *Tijdschrift voor Filosofie* explain a substantial part of the initially observed Flemish lead. However, for the disciplines of comparative literature, education & educational research and political science the difference in WoS coverage between Flanders and Norway remains well above 10% when journals with strong local ties are taken into account. Hence the question arises how the WoS coverage of SSH and its disciplines has evolved.

The observations made in Table 10 also point towards the possibility that Flemish and/or Dutch researchers have actively worked towards inclusion of the journals that are important to them in the WoS. Indeed, of all 3.850 journals that have been newly added to the WoS in the period 2005 to 2009, 192 are published in Belgium (22) or the Netherlands (170), but only 17 in Denmark (5), Norway (6) or Sweden (6). Here, one has to bear in mind that the Netherlands is home to several large international publishing houses, hence this finding does not automatically imply that university researchers working in Flanders have special interests in these journals. However, researchers at Flemish universities did publish in the period 2005 to 2009 in 21 (10.9%) of the newly added journals stemming from Belgium or the Netherlands, whereas Norwegian SSH researchers published in 4 (23.5%) of the newly added journals that are published in Norway, Denmark or Sweden. Overall, 45.5% of the 394.7 WoS covered Flemish SSH articles appeared in one of the newly added SSH journals that are published in the Low Countries (Belgium and the Netherlands). For Norway the corresponding percentage is 11.2% of the 469.1 WoS covered articles. However, the percentage of WoS publications by SSH researchers that appeared in one of the newly added journals are almost identical for Flanders and Norway: 14.0% of the 2818.5 fractional articles and 14.5% of the 3237.4 fractional articles, respectively. Hence, although SSH researchers benefit equally from the expansion of the WoS, the inclusion of journals with strong local ties contributed more to this result for Flemish SSH researchers than for Norwegian SSH researchers.

**Table 10:** WoS-included journals with strong local ties, i.e. with 50% or more articles carrying an address of Belgium and/or the Netherlands; or Norway, Denmark and/or Sweden (2005-2009).

Journal title	Indexed in WoS since	Discipline	# (%) of locally produced WoS-indexed articles	Impact on % WoS coverage for Flanders	Impact on % WoS coverage for Norway
Pedagogische Studieën	2009	Education & educational research	27 (93.1%)	+2.5%	none
Belgisch Tijdschrift voor Nieuwste Geschiedenis	2007	History	39 (86.7%)	+2.7%	none
Historisk Tidsskrift	1980	History	62 (98.4%)	none	+17.1%
Tijdschrift voor Communicatiewetenschap	2007	Media & communication	56 (98.2%)	+4.8%	none
Tijdschrift voor Filosofie	1970	Philosophy & history of ideas	71 (59.7%)	+7.0%	none
Internasjonal Politikk	1966	Political science	48 (84.2%)	none	+13.6%
Ephemerides Theologicae Lovanienses	2007	Theology & religion	31 (50.8%)	+3.3%	none

**Table 11:** Evolution of WoS coverage of SSH articles for both Flanders and Norway (numbers and percentages of fractional articles; 2005-2009).

Discipline	2005		2006		2007		2008		2009		growth in #	Δ % 05-09	
	#	%	#	%	#	%	#	%	#	%			
All SSH	F	434.8	26.1	492.1	28.3	591.0	32.5	679.1	36.2	621.6	40.8	1.430	14.7
	N	587.3	32.6	556.3	33.5	674.5	34.2	670.5	30.5	743.5	31.2	1.266	-1.4
Business & finance	F	39.8	39.0	43.9	44.1	61.6	58.0	53.6	54.3	47.9	49.3	1.203	10.3
	N	52.8	37.6	66.4	49.2	76.7	42.1	54.7	26.0	82.7	32.0	1.566	-5.6
Comparative literature	F	9.0	20.7	20.5	44.6	16.0	33.0	22.8	49.8	12.5	39.5	1.389	18.8
	N	9.0	20.2	4.0	14.2	14.0	30.8	6.8	10.3	2.0	4.9	0.222	-15.3
Economics	F	34.6	45.9	31.3	52.1	46.7	54.5	46.0	56.0	28.8	58.3	0.831	12.4
	N	68.9	72.9	66.2	69.5	76.7	71.8	70.7	74.0	57.2	70.4	0.831	-2.5
Education & educational research	F	9.2	14.9	19.5	28.5	25.7	31.2	30.3	43.3	45.0	52.1	4.887	37.2
	N	29.4	17.1	34.2	20.0	39.9	18.0	44.3	17.8	52.6	19.0	1.790	2.0
History	F	27.1	21.4	13.7	12.1	27.0	19.7	28.5	23.7	29.0	27.2	1.070	5.8
	N	36.3	42.6	30.8	38.9	32.5	41.1	39.5	39.4	48.5	41.8	1.335	-0.8
Law	F	6.3	1.4	10.8	2.3	9.3	2.2	10.6	2.5	11.7	3.8	1.839	2.3
	N	7.0	5.1	4.5	2.8	5.8	3.4	8.0	5.1	9.0	5.1	1.288	0.0
Linguistics	F	20.4	33.0	16.8	19.6	13.8	20.0	24.5	39.0	27.0	49.5	1.325	16.6
	N	18.5	47.4	21.2	59.7	24.5	41.4	39.6	46.8	31.3	35.4	1.692	-12.0
Media & communication	F	4.0	10.2	6.0	14.3	12.8	26.7	13.1	26.4	11.3	20.6	2.813	10.4
	N	1.0	3.5	1.0	4.3	5.2	11.3	4.3	7.4	14.0	22.8	14.000	19.3
Philosophy & history of ideas	F	21.0	19.6	23.5	26.9	30.0	37.0	34.7	36.6	26.7	35.9	1.270	16.4
	N	8.8	15.8	7.5	11.6	7.3	12.7	16.3	20.9	16.2	18.4	1.830	2.6
Political science	F	12.5	19.2	21.4	24.9	23.9	27.7	20.6	22.3	24.2	32.8	1.939	13.6
	N	54.1	67.2	39.0	59.7	53.0	64.2	67.3	69.4	51.5	51.5	0.952	-15.7
Psychology	F	155.9	79.1	168.2	81.1	179.2	81.5	220.1	85.8	204.1	87.0	1.309	8.0
	N	104.9	68.9	85.3	64.8	94.7	70.6	106.8	59.9	129.9	68.8	1.238	-0.1
Sociology	F	2.3	6.6	8.0	19.2	11.1	22.0	19.9	38.1	9.0	32.8	3.857	26.2
	N	17.8	34.5	16.7	34.9	23.3	39.5	17.8	30.5	26.8	44.0	1.507	9.5
Theology & religion	F	8.5	10.5	13.0	19.3	14.0	16.5	19.5	19.6	9.7	17.4	1.137	6.9
	N	21.0	19.6	23.3	17.7	14.0	14.7	18.0	16.7	23.5	22.1	1.119	2.5

Table 11 shows that the number of SSH articles included in WoS from both Flanders (+43.0%) and Norway (+26.6%) has consistently and significantly increased between 2005 and 2009. However, the proportion of SSH publications indexed in the WoS increased significantly in Flanders (from 26.1% in 2005 to 40.8% in 2009), whereas the proportion of WoS coverage of Norwegian articles remained stable (32.6% in 2005 and 31.2% in 2009). So although WoS-coverage for Flanders was lower than for Norway in 2005 and 2006, it was clearly higher in 2008 and 2009. At the discipline level, a similar observation can be made. For some disciplines the increase in WoS coverage for Flanders is very remarkable, as well as in number of articles as in proportion. For example, the proportional share of coverage of WoS articles in education & educational research increased from 14.9% in 2005 to 52.1% in 2009, and the coverage of WoS articles in sociology increased from 6.6% in 2005 to 32.8% in 2009. In Norway, however, the proportion of WoS coverage even seems to be decreasing for some disciplines, e.g. political science (-15.7%), comparative literature (-15.3%) and linguistics (-12.0%).

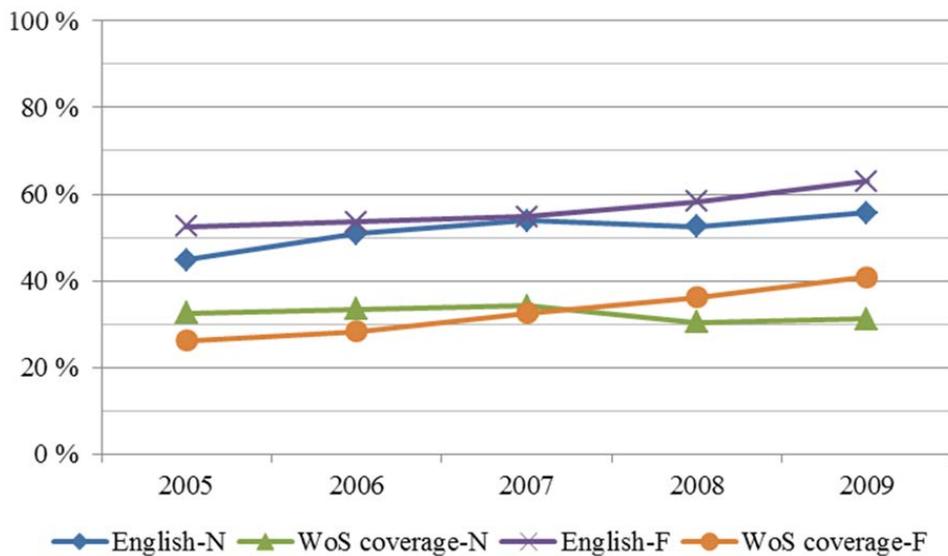
The question arises as to how these different trends can be explained. One possibility might be that Norwegian researchers, having identified their own lists of peer reviewed journals in 2005, are in fact turning away from internationalisation and are satisfied with and rewarded for publishing in more local outlets. In other words, a similar evolution could occur in due time in Flanders. However, publishing in WoS journals is only an approximation of internationalisation. Publishing in English can be considered a more general indicator of internationalisation. Data on the evolution of the language of publications may reinforce the observations regarding WoS coverage. Therefore, Table 12 provides the percentages of articles published in English for the period 2005 to 2009.

**Table 12:** Evolution of publishing in English (number and percentages of fractional articles) for both Flanders and Norway (2005-2009).

Discipline	2005			2006			2007			2008			2009			growth		Δ %
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	in #	%	05-09	
All SSH	F	875.6	52.5	931.1	53.6	993.8	54.7	1093.0	58.3	959.3	62.9	1.096	10.4					
	N	861.1	44.8	892.1	50.8	1132.3	53.9	1219.1	52.5	1402.7	55.7	1.629	11.0					
Business & Finance	F	87.6	85.9	81.6	82.1	96.7	91.0	87.5	88.6	89.0	91.6	1.016	5.7					
	N	99.1	70.5	107.5	79.7	137.5	75.6	140.4	66.7	188.6	72.9	1.903	2.4					
Comparative literature	F	21.5	49.4	31.0	67.4	30.5	62.9	25.8	56.4	23.6	74.7	1.098	25.3					
	N	12.5	16.9	7.0	21.2	20.0	37.4	12.8	14.8	13.0	22.2	1.040	5.4					
Economics	F	66.0	87.6	47.8	79.5	76.6	90.1	73.3	89.3	44.3	89.9	0.671	2.3					
	N	73.5	77.9	74.8	78.6	87.3	81.7	78.5	82.2	67.7	83.3	0.921	5.4					
Education & Educational Research	F	50.4	81.3	58.3	85.5	65.1	79.0	62.8	89.7	65.6	75.8	1.302	-5.5					
	N	64.9	37.1	78.8	45.1	112.0	48.2	121.6	47.6	138.5	46.9	2.135	9.8					
History	F	37.6	29.7	37.3	33.2	34.3	25.0	41.0	34.1	43.0	39.6	1.144	9.9					
	N	34.3	36.7	28.0	31.0	30.0	31.6	44.5	37.0	59.5	42.2	1.733	5.5					
Law	F	92.7	21.2	85.2	18.6	80.6	18.7	84.0	20.1	72.9	23.5	0.786	2.3					
	N	18.0	12.4	32.2	19.4	34.4	18.4	52.1	29.7	63.3	34.7	3.520	22.2					
Linguistics	F	45.1	73.0	58.4	67.9	36.9	52.6	46.8	74.5	45.4	81.1	1.007	8.1					
	N	38.0	89.7	30.2	80.8	56.2	81.5	81.6	81.9	82.4	76.5	2.167	-13.3					
Media & communication	F	19.6	50.2	24.9	59.4	25.7	53.5	31.6	63.7	27.3	51.0	1.393	0.8					
	N	8.0	27.8	15.0	65.2	33.4	71.4	43.7	74.4	48.4	75.6	6.044	47.8					
Philosophy & history of ideas	F	67.3	62.7	54.2	61.9	47.5	58.5	67.2	70.9	54.4	73.4	0.808	10.6					
	N	17.8	28.4	24.5	33.3	21.3	35.1	32.7	39.3	39.7	42.9	2.224	14.5					
Political science	F	25.5	39.1	46.0	53.7	49.9	57.8	50.7	54.9	46.7	63.2	1.831	24.1					
	N	51.9	62.1	47.4	70.9	53.5	62.6	74.8	76.1	70.7	67.7	1.362	5.7					
Psychology	F	172.2	87.4	181.6	87.5	200.1	91.0	225.8	88.3	219.2	93.9	1.273	6.5					
	N	110.3	72.3	100.4	75.5	112.8	83.4	133.1	73.8	152.5	79.5	1.382	7.2					
Sociology	F	11.9	34.0	16.0	38.4	19.1	38.0	27.9	53.3	11.1	42.2	0.933	8.2					
	N	19.8	34.5	21.6	45.1	34.4	56.7	28.3	45.9	40.1	65.3	2.028	30.8					
Theology & religion	F	38.0	46.9	35.5	52.6	48.0	56.5	56.5	56.8	29.0	52.3	0.763	5.3					
	N	36.0	23.4	46.7	32.4	32.3	32.4	43.0	29.4	45.9	39.9	1.275	16.6					

Table 12 shows that SSH publishing in English is almost as widespread in Norway as in Flanders and on the rise in both countries. During the five years studied, the percentage of publications in English increased about 10%. In both countries well over 50% of the articles is now published in English, reflecting increasing internationalisation. At the discipline level too, the use of English is clearly increasing. An expansive growth in the proportion of fractional articles written in English is displayed in Flanders within the disciplines comparative literature (+25.3%) and political Science (+24.1%) and in Norway within the disciplines media & communication (+47.8%), sociology (+30.8%) and law (+22.2%).

From the VABB-SHW data alone one might conclude that WoS coverage and publishing in English go hand in hand and are measures of the same process of internationalisation. However, from the CRISin data it appears that increased internationalisation in terms of publishing in English is also possible without a significant increase in WoS coverage. In sum, publishing in English and WoS coverage cannot be considered two sides of the same coin. Figure 21 illustrates this finding.



**Figure 21:** Trends in use of English and WoS coverage for Flanders (F) and Norway (N) (2005-2009).

The proportions given in Figure 21 are for the whole of SSH publishing in Flanders and Norway. These overall trends disguise differences between disciplines and how they evolve in terms of WoS coverage and publishing in English. When looking closer at the disciplines of economics and philosophy & history of ideas, for example, slightly different trends can be observed. Although Flanders and Norway have produced a similar number of papers in both disciplines, Table 9 also indicates that for Flanders the proportion of WoS coverage for philosophy & history of ideas (30.5%) doubles that of Norway (16.3%). Furthermore in Flanders the proportion of local language use (26.3%) is less than half of the proportion of Norway (60.5%). All in all, though Table 11 and 12 demonstrate that philosophy & history of ideas follows the overall trend of SSH. In Flanders both the use of English as publication language (+10.6%) and the proportion of articles in WoS (+16.4%) are on the rise, whereas in Norway the use of English increases (+14.5%) and the proportion of WoS articles (+2.6%) remains practically the same. In economics, however, both the proportion of WoS coverage (N: 71.8% and F: 53.2%) and local language

use (N: 19.3% and F: 12.0%) are higher in Norway than in Flanders. As articles written in English cover 80.7% and 87.3% of all articles in respectively Norway and Flanders, there is only a small increase noticeable for both countries (N: +5.4%, F: +2.3%). In line with the general observation made in Figure 21, the proportion of WoS coverage rose clearly in Flanders (+12.4%) whereas it remained stable in Norway (-2.5%). In sum, similar evolutions are observed at the discipline level even for disciplines such as economics and philosophy & history of ideas that differ considerably in terms of average WoS coverage and use of English when comparing Flanders and Norway.

## DISCUSSION

In this paper we study journal publication patterns of the SSH in Flanders and Norway using the VABB-SHW and CRISTin databases. We find that between 2005 and 2009, publishing in English has been on the rise in both countries. Currently over 50% of SSH articles in both countries are published in English, illustrating the continuing internationalisation of research efforts. The coverage of the articles by the Web of Science, however, has evolved differently in both countries. Whereas in Norway, the proportion of articles covered by the WoS remained stable at about one in three articles, it has increased for Flanders from one in four to four in ten articles. If one assumes that WoS coverage as well as publishing in English are measures of internationalisation, this is a surprising finding. However, the emphasis that has been placed through the local performance-based funding system on publishing in WoS covered journals has vastly differed in Flanders and Norway. From the start in 2003 until 2010, the Flemish BOF regulation only took WoS-indexed publications (and citations) into account (Debackere & Glänzel, 2004; Debackere & Glänzel, 2008), thus pushing all scholars, including those in the social sciences and humanities, towards the WoS. Locally, this has sparked debate (Loobuyck, Vanheeswijck, Van Herck, Grieten, & Vercauteren, 2008; Schuermans, Meeus, & De Maesschalck, 2010). However, due to lack of data it has been impossible to make accurate statements about developments, leaving the door open for blatant exaggerations such as the imminent disappearance of publications in Dutch. Still, the government took notice and decided in 2008 that all peer reviewed SSH publications should be included, as of 2011, in the BOF-key. In Norway, the government decided from the start of the performance-based funding system in 2005 that for all disciplines, including SSH, all peer reviewed publications, whether included in the WoS or not, should be taken into account (Sivertsen, 2010). Hence Norwegian researchers have not faced additional pressure from their institutions and their departments to publish in WoS covered journals.

The different evolution of WoS coverage of SSH research in Flanders and in Norway is a result that could be expected. Researchers, as all people and professionals, are known to react to incentives (Heywood, Wei, & Ye, 2011). Performance-based funding systems at the university level, however, do not necessarily result in personal incentives that are strong enough to influence behaviour. Nevertheless, this is precisely what we observe, both for Flanders as for Norway. In Flanders, SSH researchers have gradually focussed more on publishing in outlets that are covered by the WoS. In Norway, SSH researchers have focussed on publishing in journals that have been identified as top journals on the so-called level 2, which “includes only the leading and most selective international journals, series and book publishers, and they may not account for more than about 20 per cent of the world’s publications in each field of research” (Sivertsen 2010). In subfields that are well represented in WoS, such as economics, no non-WoS journals and only a small proportion of the WoS journals will be allowed on level 2, while in subfields with few journals indexed in WoS, such as Media &

Communication, there may even be non-WoS journals on level 2. Between 2005 and 2009, the publication activity in Norway on level 1 (the normal level) has increased by 39 per cent, while publication activity on level 2 (the top journals) has increased by 55 per cent (Sivertsen 2010). Norway seems to have avoided the risk that increased productivity mainly occurs in the less significant publication channels, as has been reported in Australia (Butler, 2003). It has been shown that the two level hierarchy of journals in the Norwegian model would give the same distribution of funds as a ranking of journals based on field normalized journal impact. The difference is that the Norwegian model is not restricted to WoS journals (Ahlgren, Colliander, & Persson, 2012).

So it appears that researchers do indeed respond to the incentives included in national performance-based funding systems, presumably because their institutions translate these incentives to the level of departments and even individuals (Gläser & Laudel, 2007). Nevertheless, in a survey among Flemish senior researchers conducted in 2010, only about 30% of SSH postdocs, lecturers and professors admitted that their publication behaviour has been influenced by funding systems such as the BOF-key (Leyman, Vandeveldel, Van Rossem, & Groenvynck, 2011). Research on the impact of ex-post research evaluation systems has shown a mixed record, with some authors arguing that influence is overstated (Osuna, Cruz-Castro, & Sanz-Menéndez, 2011), whereas others have presented comparative evidence on the influence of different systems (Auranen & Nieminen, 2010). Usually, however, where evaluation systems have a real impact, they do indeed influence behaviour in one way or another. And although evaluations at the group level are often presented as the theoretical ideal (Hicks, 2012), the strength of the performance-based research funding systems in Flanders and Norway appears to be that they have a direct influence on the research income of the universities involved. These universities translate the incentives of the system towards departments and individuals, thus influencing publication patterns.

The mechanisms that have resulted in a rapid increase of the proportion of WoS covered SSH articles in Flanders are twofold. On the journal level, researchers seem to have put effort into bringing journal publishing standards of the journals that are dear to them in line with requirements for inclusion in the WoS. This has successfully resulted in the inclusion of 21 journals that are published in Belgium or the Netherlands in which Flemish SSH researchers have published between 2005 and 2009. As shown in Table 10, this includes four journals that account for more than 5% of the Flemish articles in their discipline and that have among their contributors more than 50% who are affiliated to institutions in Belgium and/or the Netherlands. The remaining increase in WoS coverage can be accounted for by the article level, presumably because authors have preferred to submit their articles to WoS covered journals. In Norway no such effort has taken place, or at least it has not resulted in an increase of WoS coverage. Of course, our analysis implies no normative judgement of the evolutions in either Flanders or Norway. Nevertheless the importance placed on WoS coverage does not appear to be relevant to all disciplines if one considers that in the aforementioned Flemish survey of senior researchers only 20.8% of humanities scholars, but 81.6% of social scientists, agreed that the number of WoS publications is an important criterion of research prestige in their field (Leyman et al., 2011).

In sum, the results of this study imply that SSH researchers in Flanders and Norway have responded differently to different performance-based research funding systems that have been implemented in their countries. However, as the possible influences on publication behaviour have been debated to be manifold and intricate, indicating a direct link between the funding system and the publication behaviour requires further research. This is apparent from the limitations of this study. First, as the

implementation of the respective PRFSs is fairly recent only a five year period could be studied. As more longitudinal data become available through the yearly updates of the databases, it will become possible to analyse the impact of changes to the systems. Indeed, the impact of a major change in the Flemish BOF-regulation, i.e. the introduction of the VABB-SHW in 2008, which made this study possible, remains as yet unknown. As for Norway, a closer analysis of the evolution with regard to level 2 publishing might reveal interesting patterns. Second, only journal articles have been studied in the present research. Book publications are important to SSH research, particularly in the humanities, and they are included in the databases in both countries. Including them in future research may deepen our understanding of SSH publication patterns and might shed new light on the findings presented here. Third, we have limited ourselves to comparisons of fractional counts at the author level, which is the counting method implemented in Norway. The Flemish system, however, applies whole counts per university, regardless of the number of co-authors involved. Thus both systems lay different emphasis on co-authorship. This may have resulted in different evolutions in terms of national and international co-authorship patterns, especially in the SSH where the number of authors is traditionally limited. Therefore a comparison of the SSH output on the basis of the Flemish whole counting method is needed in order to further clarify our findings. Last but not least, the comparative study of the impact of PRFSs would benefit both from more breadth and more depth, i.e. the involvement of more countries and the use of a plurality of research methods (cf. (Gläser & Laudel, 2007; Lewis & Ross, 2011)).

## **CONCLUSION**

The use of English is clearly on the rise in peer reviewed journal publishing in the social sciences and humanities in Flanders and Norway. In the period 2005-2009 more than half of the articles are published in English. Although important differences between disciplines can be observed, almost all disciplines are increasing their percentage of output in English as part of an on-going process of internationalisation. The coverage of articles in the Web of Science, however, appears to evolve independently of the increasing use of English. While no increase in proportion of WoS coverage is observed for Norwegian SSH research, a strong increase is observed for Flemish SSH research. Two mechanisms have been investigated and (partially) do explain the latter finding: SSH researchers in Flanders more often publish their articles in WoS-included journals and the publishers of the WoS have expanded their indexation with journals with strong local ties in Flanders. A plausible explanation for the observed different evolutions in Flanders and Norway is the fact that until 2010 only publications (and citations) indexed in the WoS contributed to the Flemish performance-based funding system. In contrast, Norway opted from the start of its performance-based funding system in 2005 to include WoS covered and non-WoS covered scholarly publications, hence providing no particular incentives for publishing in WoS covered journals. These different incentive structures have resulted in somewhat different evolutions of SSH publication patterns in the two countries.

## REFERENCE LIST

- Ahlgren, P., Colliander, C., & Persson, O. (2012). Field normalized citation rates, field normalized journal impact and Norwegian weights for allocation of university research funds. *Scientometrics*, DOI 10.1007/s11192-012-0632-x.
- Archambault, E., Vignola-Gagne, E., Côté, G., Larivière, V., & Gingras, Y. (2006). Benchmarking scientific output in the social sciences and humanities: The limits of existing databases. *Scientometrics*, 68, 329-342.
- Auranen, O. & Nieminen, M. (2010). University research funding and publication performance - An international comparison. *Research Policy*, 39, 822-834.
- Butler, L. (2003). Explaining Australia's increased share of ISI publications-the effects of a funding formula based on publication counts. *Research Policy*, 32, 143-155.
- Debackere, K. & Glänzel, W. (2004). Using a bibliometric approach to support research policy making: The case of the Flemish BOF-key. *Scientometrics*, 59, 253-276.
- Debackere, K. & Glänzel, W. (2008). Evidence-based bibliometrics: A decade of bibliometrics-based science policy in Flanders. In J. Gorraiz & E. Schiebel (Eds.), *10th International Conference on Science and Technology Indicators* (pp. 123-125). Vienna, Austria: Austrian Research Centres.
- Engels, T. C. E., Ossenblok, T. L. B., & Spruyt, E. H. J. (2012). Changing publication patterns in the social sciences and humanities, 2000-2009. *Scientometrics*, DOI 10.1007/s11192-012-0680-2.
- Gläser, J. & Laudel, G. (2007). Evaluation without evaluators. In R. Whitley & J. Gläser (Eds.), *The changing governance of the sciences. The advent of research evaluation systems* (pp. 127-151). Dordrecht: Springer Science.
- Heywood, J. S., Wei, X., & Ye, G. (2011). Piece rates for professors. *Economics Letters*, 113, 285-287.
- Hicks, D. (1999). The difficulty of achieving full coverage of international social science literature and the bibliometric consequences. *Scientometrics*, 44, 193-215.
- Hicks, D. (2012). Performance-based university research funding systems. *Research Policy*, 41, 251-261.
- Hicks, D. & Wang, J. (2009). Towards a bibliometric database for the social sciences and humanities. *A European scoping project (Appendix 1 to Martin et al., 2010)* Arizona: School of Public Policy: Georgia University of Technology.
- Larivière, V. & Macaluso, B. (2011). Improving the coverage of social science and humanities researchers' output: The case of the érudit journal platform. *Journal of the American Society for Information Science & Technology (Jasist)*, 62, 2437-2442.
- Lewis, J. M. & Ross, S. (2011). Research funding systems in Australia, New Zealand and the UK: Policy settings and perceived effects. *Policy & Politics*, 39, 379-398.
- Leyman, A., Vandeveldel, K., Van Rossem, R., & Groenvynck, H. (2011). *Senior onderzoekers aan het woord. De resultaten van de 'Survey of senior researchers' aan de Vlaamse universiteiten*. (Rep. No. 4). Ghent: Human Resources in Research (HR<sup>2</sup>).
- Loobuyck, P., Vanheeswijck, G., Van Herck, W., Grieten, E., & Vercauteren, K. (2008). *Welke universiteit willen wij (niet)?* Gent: Academia Press.
- Nederhof, A. J. (2006). Bibliometric monitoring of research performance in the social sciences and the humanities: A review. *Scientometrics*, 66, 81-100.
- Osuna, C., Cruz-Castro, L., & Sanz-Menéndez, L. (2011). Overturning some assumptions about the effects of evaluation systems on publication performance. *Scientometrics*, 86, 575-592.
- Schneider, J. W. (2009). An outline of the bibliometric indicator used for performance-based funding of research institutions in Norway. *European Political Science*, 8, 364-378.
- Schuermans, N., Meeus, B., & De Maesschalck, F. (2010). Is there a world beyond the web of science? Publication practices outside the heartland of academic geography. *Area*, 42, 417-424.
- Sivertsen, G. (2010). A performance indicator based on complete data for the scientific publication output at research institutions. *ISSI Newsletter*, 6, 22-28.

Whitley, R. (2007). Changing governance of the public sciences. In R. Whitley & J. Gläser (Eds.), *The changing governance of the sciences. The advent of research evaluation systems.* (pp. 3-27). Dordrecht: Springer Science.

## 8.4 Patterns of co-authorship in journal articles in the SSH (2000-2010) (STI-proceedings, 2012)

### Reference

Ossenblok, T.L.B., Verleysen, F.T., Engels, T.C.E. (2012). Patterns of co-authorship in journal articles in the SSH (2000-2010). *Proceedings of the 17th international conference on science and technology (STI)*, 640-650

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### KEYWORDS

Co-authorship, social sciences and humanities, Flanders, whole count, fractional count

### ABSTRACT

This paper analyses co-authorship in Flemish social sciences and humanities (SSH) from the period 2000-2010, based on a full coverage bibliometric database, the VABB-SHW. Combining whole and fractional calculations on co-authorship occurrence, our findings indicate that both domestic and international collaborative publishing in the SSH is increasing, though considerable differences between disciplines remain. We further demonstrate that multi-authored Flemish SSH articles in journals indexed in the Web of Science (WoS) generally have a higher (international) co-authorship count and growth rate than those in non-WoS journals, indicating the need to include non-WoS data when studying co-authorship in the SSH.

## INTRODUCTION

This paper analyses patterns of co-authorship based on a full-coverage set of bibliographic data from an eleven year period (2000-2010) of SSH publications in Flanders. Flanders is the northern Dutch speaking part of Belgium, a country with comparatively strong traditions in scientific and scholarly research collaboration (Larivière, Gingras, & Archambault, 2006; Glänzel & Schubert, 2005). Quantifying joint publications -or co-authorships- yields insight into the broader topic of research collaboration. Regardless of some important caveats concerning co-authorship bibliometrics (Katz & Martin, 1997; Laudel, 2002), an important asset of research on co-authorship is its comparability. Basic metrics and their derived measures of collaboration (Egghe, 1991; Liao & Yan, 2012; Rousseau, 2011) are quite easily calculated and compared regardless of the underlying characteristics of the collaborative process. Prior research has demonstrated that scientific collaboration through co-authorship is internationally on the rise, even though important differences between disciplines remain. Equally broadening is the geographical range of such collaborations, albeit not at the same rate in every country under study (Benavent-Pérez, Gorraiz, & Gumpenberger, 2012; Newman, 2004; Glänzel & Schubert, 2004; Wagner & Leydesdorff, 2005). For the social sciences and humanities (SSH), which traditionally have been less inclined than the sciences to co-author publications, similar trends have been demonstrated, albeit tentatively (Ardanuy, 2012; Cronin, Shaw, & La Barre, 2003; Larivière et al., 2006). However, the validity of these results is uncertain because the major citation databases such as Web of Science (WoS) and Scopus focus on indexing English language articles in international journals at the expense of publications in other languages and of other types (Hicks, 2004; Larivière & Macaluso, 2011; Sivertsen & Larsen, 2012). As a result the observed frequency of co-authorship may be positively biased (Mali, Kronegger, Doreian, & Ferligoj, 2012).

The data set used for this paper is the Flemish Academic Bibliographic Database for the Social Sciences and Humanities ('Vlaams Academisch Bibliografisch Bestand voor de Sociale en Humane Wetenschappen' or VABB-SHW). The VABB-SHW was constructed to achieve full bibliographic coverage from the year 2000 onwards of peer reviewed academic publications in Flemish SSH. As such the VABB-SHW supplements publication data obtained from the WoS and is used in the Flemish performance-based university research funding system (PRFS), hence containing both WoS-indexed (the VABB-WoS data subset) and non-WoS-indexed peer reviewed publications (the VABB-GP subset; see, for a full account, (Engels, Ossenblok, & Spruyt, 2012)). Particularly relevant for this paper is the fact that the Flemish PRFS, the BOF-key, encourages collaboration through its use of whole counts, i.e. giving each institution full credit for an article which bears its name and address, as opposed to systems that use fractional counts, i.e. counting an article as a single unit and fractionalizing the publication credit (Aksnes, Schneider, & Gunnarsson, 2012; Butler, 2010; Ossenblok, Engels, & Sivertsen, 2012).

In this paper we investigate how (international) collaborative publishing in Flemish SSH has evolved from 2000 to 2010. In particular we will address four related subtopics: 1° Has the proportion of multi-authored articles changed over time and does it differ between the VABB-WoS and the VABB-GP?, 2° How has the average number of authors per paper evolved?, 3° What is the proportion of internationally co-authored papers?, and 4° What is the contribution of the international co-authors to these papers?

## DATA AND METHODOLOGY

Our data set consists of 29 348 Flemish peer reviewed journal articles from the period 2000-2010. Although the VABB-SHW database contains books, edited books, chapters and proceedings papers as well, in this paper we present data regarding journal articles as they constitute the bulk of our available bibliographic data, guaranteeing robustness of the results. In addition, journal articles are the only major (i.e. in the SSH) publication type for which we presently dispose of data from the WoS, making it possible to distinguish at the record level between WoS-indexed journal articles (VABB-WoS) and those in non-indexed journals (VABB-GP). This allows for the aforementioned comparison of the two subsets and their possibly divergent patterns of co-authorship.

Another feature of the VABB-SHW data model is the classification of each journal article into one of 16 disciplines and 3 general categories within Flemish SSH, based on departmental author affiliation. Flemish academic authors (i.e. affiliated with one of the five Flemish universities) and international contributors to a publication included in VABB-SHW are distinguishable through the use of unique author codes.

In a first step of data processing the proportion of multi-authored articles within the two subsets (VABB-GP and VABB-WoS) was determined for the social sciences and for the humanities as well as for ten disciplines with a yearly (rounded) output of at least one hundred articles over the eleven year time span. These ten disciplines consist of six social sciences (economics & business, educational sciences, political science, psychology, social health sciences and sociology) and four humanities (history, law, linguistics and philosophy). The VABB-SHW data model attributes an article to a discipline when at least one of its authors has a departmental affiliation to that same discipline. This means that one publication can belong to more than one discipline and to both social sciences and humanities at the same time.

A second step consisted of calculating average author counts per article (Collaboration Index or CI) and the Revised Collaborative Coefficient (RCC). The latter is a measure of collaboration represented by a value between 0 and 1, 0 corresponding to minimum collaboration, i.e. only single-authored papers, and 1 to maximal collaboration, i.e. only multi-authored papers. The RCC takes into account the total number of papers and authors as well as the total number of papers having a certain number of authors. (see for a full account: Liao & Yan, 2012; Egghe, 1991; Rousseau, 2011)

In a third step VABB-SHW whole counts were recalculated into fractional counts, as author fractions are indispensable for determining the share of international co-authors in each multi-authored article.

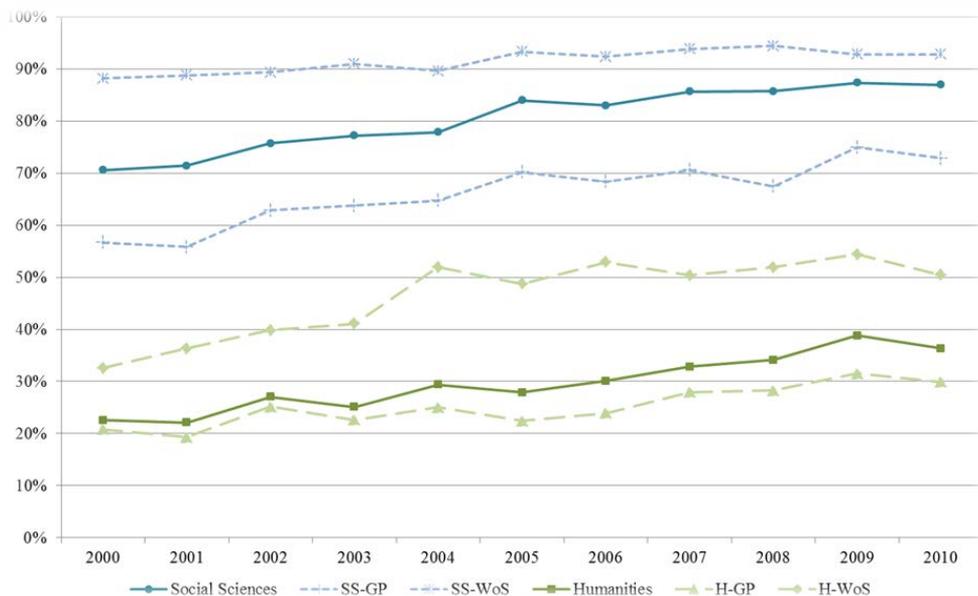
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<sup>40</sup> In our analysis 'international' also denotes authors belonging to research institutions of the French and German communities in Belgium. As a federation, Belgium is the only EU member state where research policies are fully decentralized across the regional governments, enjoying complete autonomy in these matters (Coryn, 2008). As the VABB-SHW was constructed for use in the regional PRFS, at present, data on institutional author affiliation is only collected for the five Flemish universities. Consequently, in our VABB-SHW data Belgian inter-regional collaboration is not visible.

## RESULTS

### *Multi-author articles*

An easily interpretable measure of the degree of collaboration through publications of Flemish SSH researchers is the proportion of articles written by more than one author. For our total data set, this proportion equals 82.1% for the social sciences (N= 16042) and 30.2% for the humanities (N= 12540). This confirms previous research showing that multi-authorship occurrence is considerably higher in the social sciences than in the humanities (Larivière et al., 2006). Figure 22 presents the evolution of this proportion for the social sciences and the humanities, as well as for their respective subsets (GP and WoS).

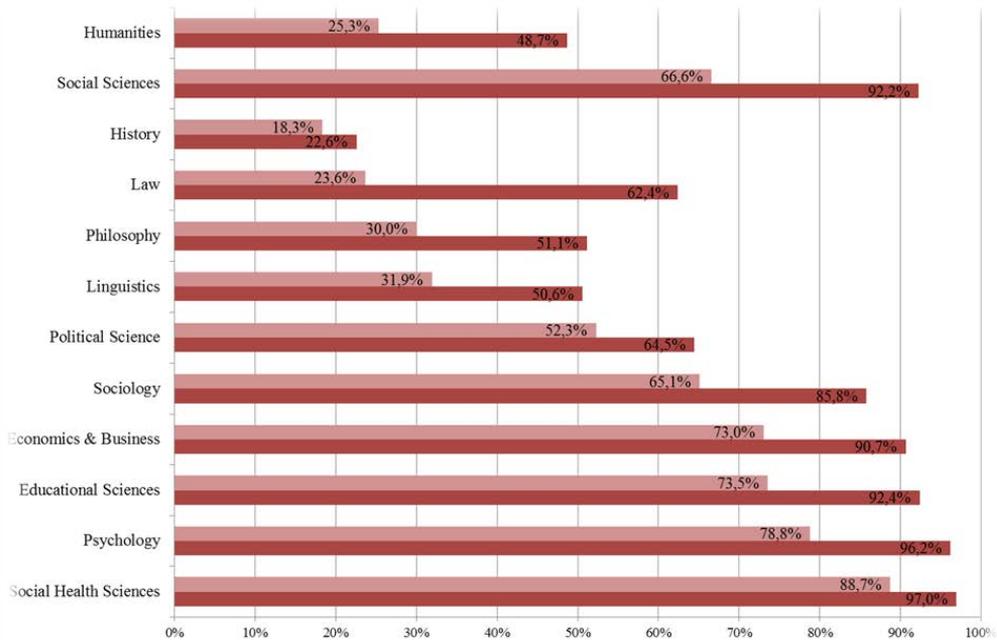


**Figure 22:** Proportion of multi-author articles in VABB-SHW, by social sciences and humanities (2000-2010).

As shown in Figure 22, between 2000 and 2010, the proportion of co-authored articles has increased for both the social sciences (+16.4%) and the humanities (+13.7%). Thus, although the proportion of multi-authored articles is much larger in the social sciences, the growth rates for the social sciences and the humanities are similar. The implication of the increase shown in Figure 22 is a sharp decrease of single authored SSH articles in the period under study: in 2000 about half of all articles were published by one individual, in 2010 this proportion has fallen to roughly one third. Furthermore, Figure 22 indicates a discrepancy between the subsets GP and WoS, showing for both the social sciences and the humanities a larger proportion of co-authored articles for WoS than for GP. However, whereas humanities-WoS shows a sharper increase (+17.9%) than humanities-GP (+9.1%), the inverse holds for social sciences, where GP increase (+16.1%) exceeds that of WoS (+4.6%). humanities scholars appear to have stepped up their collaborative efforts regarding publications in WoS-journals in particular, while social scientists have done the same for GP approved journals, as their WoS articles

where already to a large extent the product of collaboration. The average evolution for the humanities is close to that of its GP subset, as the latter is more substantial in size than its WoS counterpart.

Figure 23 shows the co-authorship proportion within both our data subsets, the VABB-GP and the VABB-WoS, for the social sciences and for the humanities as a whole and for the 10 selected disciplines.



	Humanities	Social Sciences	History	Law	Philosophy	Linguistics	Political Science	Sociology	Economics & Business	Educational Sciences	Psychology	Social Health Sciences
VABB-GP n	2506	4240	153	1000	260	345	462	526	1187	542	546	662
VABB-WoS n	1282	8923	51	98	359	312	185	586	2310	607	2455	2483

**Figure 23:** Proportion of multi-author articles included in VABB-WoS and VABB-GP, by discipline.

It is clear that articles in WoS-covered journals are more likely to have multiple authors than articles included in VABB-GP. For the whole of social sciences, 92.2% of WoS-indexed (n=8923) and 66.6% of GP-approved articles (n=4240) are written in co-authorship. For humanities these proportions are respectively 48.7% (n=1282) and 25.3% (n=2506). Differences between VABB-WoS and VABB-GP for the various disciplines are considerable as well: they are smallest for history, social health sciences and political science, and largest for law, philosophy, and sociology (see Figure 23). Possible explanations of GP-WoS differences are manifold, ranging from the specificity of the various research fields (e.g. law counting a smaller number of WoS-indexed journals, publishing mainly on international or comparative law) to the journal landscape for fields and disciplines (journals possibly favouring collaborative or comparative research outputs transcending national or local topics), to the publication strategies of SSH researchers. Further research could delve deeper into this complex matter. For now, it has sufficiently been demonstrated that the study of co-authorship in the SSH requires additional data to supplement counts based on the WoS, at least in the case of Flanders.

### **Number of authors per article**

An analysis of the average number of authors per journal article (Collaboration Index, CI) and of the Revised Collaborative Coefficient (RCC) per discipline provides a further indication of how co-authorship in Flemish SSH has evolved during the years 2000-2010 and to what degree the ten disciplines engage in research collaboration through publications. The RCC in particular is considered a superior measure of collaboration through co-authorship. Besides capturing the degree of research collaboration and expressing it in a mathematically straightforward way (a value between 0 and 1) allowing for easy comparison (Egghe, 1991), the RCC correlates significantly with aspects of research 'quality' frequently associated with collaboration (Bukova, 2010; Katz & Martin, 1997). For example, RCC values have been found to correlate with journal impact factor and citation scores (Liao and Yen, 2012). Table 13 presents an overview of the observed changes and the RCC per discipline.

**Table 13:** Average number of authors per article (Collaboration Index, CI) and Revised Collaborative Coefficient (RCC), by discipline (2000-2010).

<b>Discipline</b>	<b>RCC</b>	<b>CI 2000-2010</b>	<b>CI 2000</b>	<b>CI 2010</b>	<b>Slope* 2000-2010</b>	<b>R<sup>2</sup></b>
Humanities	0.2	1.7	1.4	1.8	0.05	0.85
Social sciences	0.6	3.6	2.8	4.0	0.13	0.97
History	0.1	1.3	1.3	1.4	0.01	0.05
Law	0.1	1.4	1.3	1.5	0.03	0.55
Linguistics	0.2	1.8	1.5	2.0	0.05	0.57
Philosophy	0.2	1.9	1.4	1.9	0.06	0.45
Political science	0.3	1.9	1.4	2.1	0.06	0.80
Sociology	0.5	3.3	2.2	3.6	0.16	0.90
Economics & business	0.5	3.0	2.6	3.3	0.08	0.92
Educational sciences	0.5	3.1	2.9	3.4	0.05	0.59
Psychology	0.6	4.0	2.9	4.5	0.16	0.85
Social health sciences	0.7	5.5	4.5	5.8	0.14	0.83

\* SLOPE: The slope has been calculated on the CI of each year for the given period (2000-2010)

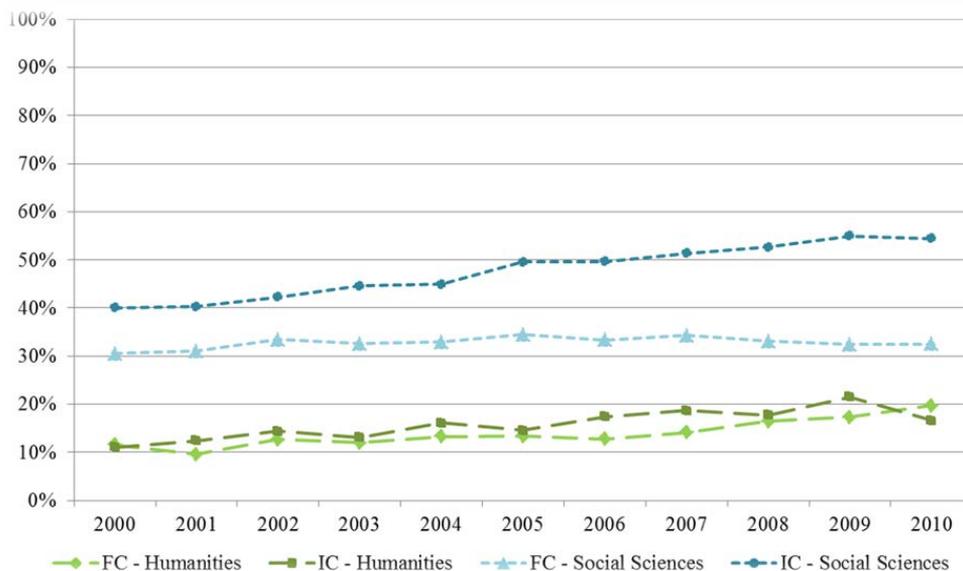
Table 13 shows a considerable discrepancy between the social sciences and the humanities. CI values for 2000-2010 indicate that on average a social science article has 1.9 authors more than a humanities article. The RCC is 0.6 and 0.2 respectively. This confirms the higher degree of collaboration in social sciences concluded from multi-author article proportions in figures 22 and 23. The steepness, expressed by the slope, of the 2000-2010 CI-increase is not equally pronounced for all social science disciplines, though the increase for the social sciences as a whole has been steeper than for the humanities. Sociology, psychology and social health sciences are the most collaborative and fastest

evolving individual disciplines, history and law seem to adhere much more to the ‘lone wolf’ model of traditional humanities.

### **Internationality of Collaboration**

In the remaining part of this paper, we investigate the internationality versus domesticity of Flemish SSH multi-authored articles. Leaving aside all single authored articles from our data set, two measures of internationality will be presented: 1° the proportion of internationally co-authored papers, 2° the international author fraction per paper (international, i.e. also comprising co-authors from the French and German speaking communities in Belgium).

Figure 24 presents the proportion of domestic Flemish collaborations (i.e. amongst only Flemish authors) (FC) and international collaborations (i.e. minimum one international author) (IC), both for the social sciences and the humanities.



**Figure 24:** Proportion of international and Flemish domestic multi-author articles, by social sciences and humanities (2000-2010).

The proportion of co-authored papers is increasing considerably sharper for social science international collaborations (IC–social sciences) than for humanities international collaboration (IC–humanities). Domestic Flemish co-authorship seems to be stable in the social sciences (FC-social sciences) but is on the rise in the humanities (FC-humanities). While humanities researchers appear to increase their collaborative efforts irrespective of their national/international character, social scientists seem to focus their effort on international co-publications.

The question to what degree this aspect of growing international collaboration is matched by an increase in the average international article fraction (i.e. the share of international co-authors per paper) is addressed in table 14, which provides an overview of the evolution of international article fractions per discipline for multi-authored papers.

**Table 14:** International fraction in multi-author articles, by discipline (2000-2010).

Discipline	2000-2010	2000	2010	Slope*	R <sup>2</sup>
Humanities	0.27	0.24	0.24	0.00	0.02
Social sciences	0.30	0.28	0.33	0.01	0.87
Economics & business	0.30	0.30	0.31	0.00	0.17
Educational sciences	0.19	0.30	0.20	-0.01	0.28
History	0.24	0.21	0.13	-0.01	0.13
Law	0.26	0.24	0.24	0.00	0.09
Linguistics	0.27	0.23	0.22	-0.01	0.18
Philosophy	0.27	0.14	0.31	0.01	0.53
Political science	0.20	0.21	0.25	0.01	0.24
Psychology	0.29	0.25	0.36	0.01	0.65
Social health sciences	0.36	0.32	0.38	0.01	0.87
Sociology	0.28	0.20	0.30	0.01	0.82

\* SLOPE: The slope has been calculated on the average fractional count of each year for the given period (2000-2010).

Perhaps surprisingly, Table 14 shows that although the 2000-2010 average international article fraction ranges from a considerable 1:5 to 1:3, for most disciplines there is no substantial increase in the share of international co-authors per article over time. For educational sciences, history and linguistics, there even has been a minor decrease of the international author fraction. Neither does there appear to be a meaningful distinction between the social sciences and the humanities, as educational sciences (0.19), political science (0.20) and sociology (0.28) show international fractions below or about equal to those of law (0.26), linguistics (0.27) and philosophy (0.27). Consequently, the trend towards more international collaboration in Figure 24 does not seem to result in the involvement of, on average, more international contributors. Although a higher proportion of multi-author articles results from an international collaboration, the average (measurable) contribution of international authors to these articles is not growing.

## DISCUSSION AND CONCLUSION

Based on full coverage VABB-SHW data for the period 2000-2010 this paper demonstrates the increasing occurrence of co-authorship within Flemish SSH article publications. Measured both by the increasing proportion of multi-authored articles and the growing average number of authors per article, the evolution towards more collaborative publications is manifest. This confirms international trends for SSH research (Ardanuy, 2012; Cronin et al., 2003; Larivière et al., 2006) However, in spite of this general increase of Flemish SSH co-authorship proportions, considerable differences remain: on average the social sciences have a higher proportion and growth rate of co-authored articles than the

humanities. Differences also exist between co-authorship occurrence in our two data subsets, VABB-WoS and VABB-GP. For all disciplines, WoS-indexed journals show a higher co-authorship proportion than the GP-approved journals, indicating the need for additional publication data to supplement co-authorship counts obtained from the WoS.

Internationality of collaborative publishing in Flemish SSH is on the rise when measured by the proportion of internationally co-authored articles. This is not the case when one considers the international author fraction per article. In other words, more internationally co-authored articles are published, but this does not imply that the average (measurable) contribution of international authors to these articles is significantly growing.

In comparison with data available for other countries (e.g. Canada, (Larivière *et al.*, 2006)) the proportion of Flemish SSH collaborations, especially in the social sciences, is relatively high, coming close to results more typical of the natural and biomedical sciences. Apart from a wider phenomenon of Belgian co-authorship proportions in various fields ranking amongst the highest in the world (Glänzel *et al.*, 2005), the high percentages can partially be explained by the introduction of the Flemish PRFS in 2003, which, through the use of a whole instead of a fractional counting schema has actively encouraged universities to collaborate in research. Between 2003 and 2010, this incentive has only been in place for co-authoring articles in WoS-indexed journals, as only these were then used in the PRFS for calculation of research funding (Engels *et al.*, 2012). It is, however, not unlikely that the counting schema used during this period for WoS-indexed publications has had an influence on Flemish scholarly publication culture in general, thereby stimulating co-authorship for non-WoS-indexed journal articles as well. As the universities after 2003 in all likelihood in their own right installed parallel publication incentives encouraging collaboration through co-authorship (Gläser & Laudel, 2007), this seems even more probable.

All in all, the findings presented here offer a first insight into research collaboration through co-authorship in Flemish SSH. Future VABB-SHW-based research on co-authorship will broaden the picture by focussing on different publication types, foremost authored and edited books. This will provide a more complete picture of collaborative publication practices in the SSH. For edited books such an analysis would probably prove to be methodologically more challenging, given the fact that collaboration in book publications, in particular in edited books with the role differentiation between editors and chapter contributors, is more complex. Ideally, data from the WoS' recently introduced Book Citation Index (Adams & Testa, 2011) can be used to determine whether the observed difference between our WoS-indexed and non-WoS-indexed journal article subsets is equally valid for book publications. Ultimately, when VABB-SHW-data will be contrasted with comparable data from other countries, the impact of the Flemish performance-based research funding system based on whole counts of publications can be compared to a fractional counting system (Sivertsen & Larsen, 2012; Ossenblok *et al.*, 2012). This would contribute greatly to our understanding not only of actual collaborative practices in the SSH, but also to the incentives encouraging researchers to further engage in them.

## REFERENCE LIST

- Adams, J. & Testa, J. (2011). Thomson Reuters book citation index. In E. Noyons, P. Ngulube, & J. Leta (Eds.), *The 13th conference of the International Society for Scientometrics and Informetrics* (pp. 13-18). Durban, South Africa: ISSI, Leiden University and University of Zululand.
- Aksnes, D. W., Schneider, J. W., & Gunnarsson, M. (2012). Ranking national research systems by citation indicators. A comparative analysis using whole and fractional counting methods. *Journal of Informetrics*, 6, 36-43.
- Ardanuy, J. (2012). Scientific collaboration in library and information science viewed through the web of knowledge: The Spanish case. *Scientometrics*, 90, 877-890.
- Benavent-Pérez, M., Gorraiz, J., & Gumpenberger, C. (2012). The different flavors of research collaboration: A case study of their influence on university excellence in four world regions. *Scientometrics*, DOI 10.1007/s11192-012-0638-4.
- Bukova, H. (2010). Studying research collaboration: A literature review. *Sprouts Working Papers on Information Systems*, 10(3), <http://sprouts.aisnet.org/10-3>.
- Butler, L. (2010). Impact of performance-based research funding systems: A review of the concerns and the evidence. In OECD (Ed.), *Performance-based funding for public research in tertiary education institutions: Workshop proceedings* (pp. 127-165). Paris: OECD-publishing.
- Cronin, B., Shaw, D., & La Barre, K. (2003). A cast of thousands: Co-authorship and subauthorship collaboration in the 20th century as manifested in the scholarly journal literature of Psychology and Philosophy. *Journal of the American Society for Information Science and Technology (Jasist)*, 54, 855-871.
- Egghe, L. (1991). Theory of collaboration and collaborative measures. *Information processing and management*, 27, 177-202.
- Engels, T. C. E., Ossenblok, T. L. B., & Spruyt, E. H. J. (2012). Changing publication patterns in the social sciences and humanities, 2000-2009. *Scientometrics*, DOI 10.1007/s11192-012-0680-2.
- Glänzel, W. & Schubert, A. (2004). Analysing scientific networks through co-authorship. In H.F.Moed, W. Glänzel, & U. Schmoch (Eds.), *Handbook of quantitative science and technology research: The use of publication and patent statistics in studies on S&T systems* (pp. 257-276). Dordrecht: Kluwer Academic Publishers.
- Glänzel, W. & Schubert, A. (2005). Domesticity and internationality in co-authorship, references and citations. *Scientometrics*, 65, 323-342.
- Gläser, J. & Laudel, G. (2007). Evaluation without evaluators. In R.Whitley & J. Gläser (Eds.), *The changing governance of the sciences. The advent of research evaluation systems* (pp. 127-151). Dordrecht: Springer Science.
- Hicks, D. (2004). The four literatures of social science. In H.F.Moed, W. Glänzel, & U. Schmoch (Eds.), *Handbook of quantitative Science and Technology Research: The use of publication and patent statistics in studies of S&T systems* (pp. 473-496). Dordrecht: Kluwer Academic.
- Katz, J. S. & Martin, B. R. (1997). What is research collaboration? *Research Policy*, 26, 1-18.
- Larivière, V., Gingras, Y., & Archambault, E. (2006). Canadian collaboration networks: A comparative analysis of the natural sciences, social sciences and the humanities. *Scientometrics*, 68, 519-533.
- Larivière, V. & Macaluso, B. (2011). Improving the coverage of social science and humanities. Researchers' output: The case of the érudit journal platform. *Journal of the American Society for Information Science & Technology (Jasist)*, 62, 2437-2442.
- Laudel, G. (2002). What do we measure by co-authorship? *Research Evaluation*, 11, 3-15.
- Liao, C. H. & Yan, H. R. (2012). Quantifying the degree of research collaboration: A comparative study of collaborative measures. *Journal of Informetrics*, 6, 27-33.
- Mali, F., Kronegger, L., Doreian, P., & Ferligoj, A. (2012). Dynamic scientific co-authorship networks. In A.Scharnhorst, K. Borner, & P. van den Besselaar (Eds.), *Models of Science Dynamics. Understanding Complex Systems* (pp. 195-232). Heidelberg: Springer.

- Newman, M. E. J. (2004). Co-authorship networks and patterns of scientific collaboration. *Proceedings of the National Academy of Sciences of the United States of America*, 101(10), 5200-5205.
- Ossenblok, T. L. B., Engels, T. C. E., & Sivertsen, G. (2012). The representation of the social sciences and humanities in the Web of Science. A comparison of publication patterns and incentive structures in Flanders and Norway (2005-2009). *Research Evaluation*, 21(4), 280-290.
- Rousseau, R. (2011). Comments on the modified collaborative coefficient. *Scientometrics*, 87, 171-174.
- Sivertsen, G. & Larsen, B. (2012). Comprehensive bibliographic coverage of the social sciences and humanities in a citation index: an empirical analysis of the potential. *Scientometrics*, doi:10.1007/s11192-011-0615-3.
- Wagner, C. S. & Leydesdorff, L. (2005). Mapping the network of global science: comparing international co-authorships from 1990 to 2000. *International journal of Technology and Globalisation*, 1, 185-208.

## 8.5 Co-authorship of journal articles and book chapters in the SSH (2000-2010) (JASIST, 2014)

### Reference

Ossenblok, T.L.B., Verleysen, F.T., & Engels, T.C.E. (2014). Co-authorship of journal articles and book chapters in the SSH (2000-2010). *Journal of the American Society for Information Science and Technology (Jasist)*. 65(5), p. 882-897

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### KEYWORDS

Co-authorship, social sciences and humanities, Flanders, collaboration, articles, book chapters

### ABSTRACT

We analyse co-authorship patterns in social sciences and humanities (SSH) for the period 2000-2010. The basis for the analysis is the VABB-SHW, a comprehensive bibliographic database of peer reviewed publications in the SSH by researchers affiliated with Flemish universities. Combining data on journal articles and book chapters, our findings indicate that collaborative publishing in the SSH is increasing, though considerable differences between disciplines remain. Conversely, we observe a sharp decline in single-author publishing. We further demonstrate that co-authored SSH articles in journals indexed in the Web of Science (WoS) generally have a higher number of co-authors and increase thereof than those in non-WoS journals or than book chapters. This illustrates the need to include non-WoS data and book chapters when studying co-authorship in the SSH.

## INTRODUCTION

This article analyses the evolution of co-authorship in the social sciences and humanities (SSH) in Flanders, the northern Dutch speaking part of Belgium, based on a full-coverage set of bibliographic data from an eleven year period (2000-2010).

Co-authorship is one aspect of research collaboration. In spite of some caveats concerning co-authorship bibliometrics and their precise relationship to collaboration (Katz & Martin, 1997; Laudel, 2002), an important asset of co-authorship analysis remains its comparability. Basic metrics and their derived measures of collaboration are quite easily calculated and compared regardless of the underlying characteristics of the collaborative process (Egghe, 1991; Liao & Yan, 2012; Rousseau, 2011).

Scientific collaboration through co-authorship is internationally on the rise, even though important differences between disciplines remain (Benavent-Pérez, Gorraiz, & Gumpenberger, 2012; Newman, 2004; Glänzel & Schubert, 2004; Wagner & Leydesdorff, 2005; Kyvik, 2003; Piro, Aksnes, & Rorstad, 2013). For the social sciences and humanities (SSH), which have adhered more than the sciences to single-author publications, similar trends have been demonstrated, albeit tentatively (Endersby, 1996). However, the validity of these results is uncertain because the major citation databases used for most co-authorship research, Web of Science (WoS) and Scopus, rely on indexing mostly English language articles in international journals at the expense of publications in other languages and of other types, foremost books (Hicks, 2004; Archambault, Vignola-Gagne, Côté, Larivière, & Gingras, 2006; Piro et al., 2013). Consequently, the observed frequency of co-authorship in citation index-based bibliometrics may be positively biased (Beaver, 2001; Mali, Kronegger, Doreian, & Ferligoj, 2012). In this article, we will address this methodological issue.

As identified by previous research, there are multiple factors influencing research collaboration and co-authorship. Some structural elements seem important in explaining collaboration behaviour. Belgium, for instance, has since long ranked among the top countries regarding relative frequency of international research collaboration (Glänzel & Schubert, 2005). This could well be explained by the trilingual character and the small size and central geographical location of the country. Research collaboration, however, is also subject to change. On the one hand there are factors changing the research, publication and dissemination contexts, thereby indirectly altering collaboration behaviour as well. Examples of such factors are the increasing mobility of researchers and the new communication and information technologies (Melin, 2000), facilitating both the exchange of quantitative (sometimes computer-generated) data (Borgman, 2009) and collaboration between geographically dispersed colleagues (Beaver, 2001; Kretschmer & Aguillo, 2004), or enhancing the impact and visibility of co-authored articles in citation indexes (Beaver, 2001; Katz & Martin, 1997). In addition, however, other factors do not just facilitate collaboration and co-authorship, but actually offer researchers direct incentives to collaborate through joint publications. Output-based research-funding offers researchers one of the most directly tangible publication incentives (Butler, 2003a, 2003b; Ossenblok, Engels, & Sivertsen, 2012). Particularly relevant for our case is the fact that the Flemish performance-based research funding system (PRFS), the BOF-key, actively encourages co-authorship through its use of whole counts, i.e. giving each institution full credit for an article which bears its name and address. This is opposed to systems that use fractional counts, i.e. counting an

article as a single unit and fractionalizing the publication credit (Butler, 2010; Aksnes, Schneider, & Gunnarsson, 2012; Ossenblok et al., 2012).

It is our hypothesis that scholarly collaboration as measured through co-authorship in Flanders has increased during the decade 2000-2010. The factors outlined above (and others) have most likely played a role in altering collaboration behaviour of scholars worldwide, hence including those in Flanders. At any rate, the lower starting point for the SSH regarding the prevalence of collaboration means there has been plenty of room for growth in co-authored publications. Moreover, we expect this trend towards more collaboration in the SSH to be even more pronounced in Flanders due to the influence of the Flemish PRFS on co-authorship. On the whole, although we expect most or all individual SSH disciplines to have increased their collaborative efforts, we are aware of the persistence of disciplinary cultures regarding authorship. Views on what it means to be an author or co-author vary across fields (Cronin, Shaw, & La Barre, 2003; Birnholtz, 2006) and will reflect in different research and collaboration patterns (Biagioli & Galison, 2003).

The data analysed for this article originates from the Flemish Academic Bibliographic Database for the Social Sciences and Humanities ('Vlaams Academisch Bibliografisch Bestand voor de Sociale en Humane Wetenschappen' or VABB-SHW). The VABB-SHW was constructed in 2008-2010 to achieve full bibliographic coverage from the year 2000 onwards of peer reviewed academic SSH publications by researchers affiliated with Flemish universities. As such the VABB-SHW supplements publication data previously obtained solely from the WoS and is used in the Flemish performance-based research funding system (PRFS) for the universities (see, for a full account in Engels, Ossenblok, & Spruyt, 2012).

In the following we first present the evolution of co-authorship as evident from SSH journal articles and book chapters by Flemish researchers in the period 2000-2010. The prevalence of co-authorship versus single-author publishing for articles and book chapters will be examined, both at the aggregate level of the social sciences (SS) and the humanities (H), as at that of individual disciplines. We then present and compare measures of collaboration per discipline and publication type. Additionally, it is of interest to determine to what extent co-authorship in book chapters differs or not from that in journal articles. We conclude with a discussion on the regional PRFS influencing co-authorship patterns and the methodological necessity to include non-WoS data when analysing co-authorship in the SSH.

## DATA AND METHODOLOGY

The data set used for this article consists of bibliographic information on 27,774 peer reviewed journal articles and 4,511 book chapters from the period 2000-2010 and registered in the VABB-SHW ([www.ecoom.be/en/vabb](http://www.ecoom.be/en/vabb)). These publications originated in 16 SSH disciplines and 2 general categories, of which 11 SSH disciplines were selected on the basis of a minimum of a hundred yearly publications. Publications are assigned to one or more disciplines according to the author(s) affiliation(s). These disciplines are in the humanities: history; law; linguistics; literature; philosophy; and in the social sciences: economics & business<sup>41</sup>; educational sciences; political science; psychology; social health sciences; sociology. The VABB-SHW consists of two subsets, the VABB-WoS and the VABB-GP. The VABB-WoS contains all VABB journal articles and proceedings papers that are also indexed in one or more of the WoS journal or proceedings databases, i.e. the Science Citation Index Expanded,

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<sup>41</sup> Including library and information science, as researchers in this field are affiliated with the economics & business departments of the Flemish universities.

the Social Science Citation Index, the Arts & Humanities Citation Index, the Conference Proceedings Citation Index-Science and/or the Conference Proceedings Citation Index-Social Sciences and Humanities. The VABB-GP contains all VABB-approved publications that are not indexed in one of the aforementioned WoS databases. 'GP' stands for Gezaghebbende Panel (or Authoritative Panel), an independent body of academic experts entrusted by the Flemish government to uphold and set the criteria for inclusion of publications in the VABB-SHW. This includes making a selection of publication channels (journals and publishers) that apply peer review (Engels et al., 2012). The analyses presented here take all VABB-WoS journal articles (n=12,053) and all VABB-GP journal articles and book chapters (n=20,232) into account.

**Table 15:** Number of journal articles (@) and book chapters (BC) per discipline for VABB-WoS and VABB-GP (2000-2005 and 2006-2010).

	2000-2005			2006-2010			total
	@WoS	@GP	BC GP	@WoS	@GP	BC GP	
Humanities	979	5,240	1,431	1,655	4,668	1,848	1,5821
Social sciences	3,469	3,317	607	6,205	3,054	697	1,7349
Economics & business	936	854	224	1,612	771	182	4,579
Educational sciences	202	366	56	455	371	92	1,542
History	71	422	90	156	413	197	1,349
Law	61	2,270	193	96	1,961	216	4,797
Linguistics	199	568	289	418	513	385	2,372
Literature	69	393	199	117	347	273	1,398
Philosophy	290	474	186	412	392	217	1,971
Political science	66	434	95	221	450	175	1,441
Psychology	845	381	77	1,707	312	58	3,380
Social health sciences	1,003	397	32	1,558	349	17	3,356
Sociology	213	453	63	470	355	79	1,633

Table 15 presents the number of publications included in the analysis presented in this article. The data were divided in two periods, 2000-2005 and 2006-2010, to allow robust comparisons of co-authorship over time. Previous research has shown that the increase in total number of publications is the strongest for the social sciences and its corresponding disciplines. Furthermore, the increase for the whole of the SSH is most pronounced for the articles included in VABB-WoS (@WoS) (Engels et al., 2012), which is mainly due to an increase in WoS publishing and an increase in journal coverage by the

WoS (Ossenblok et al., 2012). Table 15 indicates that book chapters (BC GP) are fewest in number for the social sciences as a whole and the corresponding disciplines. For the humanities, however, book chapters mostly outnumber articles in VABB-WoS. This illustrates the importance of book chapters, and hence books, as a publication type for the humanities (Hicks, 2004).

Table 15 totals for the social sciences and the humanities do not equal, respectively, the sum of the listed social sciences (economics & business, educational sciences, political science, psychology, social health sciences, and sociology) and humanities (history, law, linguistics, literature, and philosophy) disciplines. This is explained firstly by the fact that disciplinary attribution of a publication in the VABB-SHW is determined by the author(s) affiliation(s) with an SSH unit (research group, research centre, institute or department), which means that a publication can belong to more than one discipline and, in rare cases (2.9%), both to the social sciences and the humanities. Secondly, disciplines that represent less than a 100 articles and chapters per year (i.e. archaeology, art history, communication studies, criminology, theology), as well as the two general categories, SS-general and H-general, are not included in Table 15 as the analysis of co-authorship patterns of these disciplines would be too vulnerable to small fluctuations. However, in the totals for SS and H, these disciplines and categories are included.

As a first step of data processing we determined the proportion of co-authored publications. We then grouped the publications by number of authors, for the social sciences and the humanities, as well as for individual disciplines. A next step consisted of calculating two measures of collaboration based on co-authorship: the Collaborative Index (CI) and the Revised Collaborative Coefficient (RCC). The CI is fairly basic and easily interpretable as it denotes

$$= \frac{\sum_{j=1}^q j f_j}{N}$$

where N= total number of papers, j= number of authors per paper and fj= number of papers having j authors in the collection and q= the max number of authors in a single paper. This comes down to the average number of authors per publication, which, however, makes the CI sensitive to outliers. Another drawback of the CI is its limited interpretability and comparability between disciplines as there is no upper limit. The RCC on the other hand presents the amount of collaboration by a value between 0 and 1 - 0 corresponding to minimum collaboration, i.e. only single-authored papers, and 1 to maximal collaboration, i.e. a theoretical maximum of co-authored papers. The RCC also takes into account the total number of papers and authors as well as the total number of papers having a certain number of authors (Egghe, 1991; Liao & Yan, 2012; Rousseau, 2011). The RCC is calculated as

$$= \left( \frac{n}{n-1} \right) \left\{ 1 - \frac{\sum_{j=1}^q (1/j) f_j}{N} \right\}$$

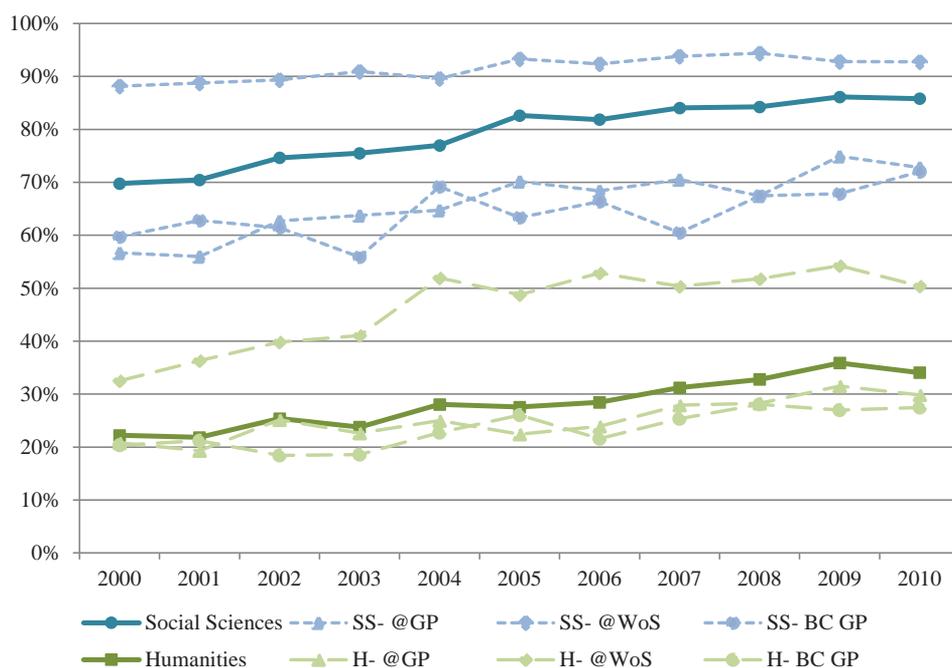
Where, in addition to the CI formula, n= total number of authors in the collection. Interestingly, the RCC also correlates significantly with aspects of 'research quality' frequently associated with collaboration (Bukvova, 2010; Katz & Martin, 1997). For example, RCC values have been found to correlate with journal impact factors and citation scores (Liao & Yan, 2012). In a final step we calculated the chi-square ( $\chi^2$ ) goodness of fit to show if there is a statistical significant evolution in the distribution of the number of authors per publication between the two periods under study. Therefore we calculated the  $\chi^2$  based on the observed number of publications per number of authors for the second period (2006-2010) and the expected number for this period based upon the proportion of publications

per number of authors for the first period (2000-2005). Whenever the expected values were less than 5 or the total of the expected values was less than 50, we did not calculate the  $\chi^2$  as in those cases the  $\chi^2$  is not reliable. Because of the limited occurrence of co-authorship in the humanities, the publications were grouped as single authored, duo authored, trio authored and multiple authored in view of the analyses at the discipline level. Hence in these analyses there are three degrees of freedom (DF) and the  $\chi^2$  is significant when it exceeds 7.81. For the social sciences co-authorship was more frequent and hence the occurrence of publications authored with four and with five could also be studied. Hence there are five DF and the observed evolution is statistically significant when the  $\chi^2$  exceeds 11.07.

## RESULTS

### *Co-authorship occurrence*

One of the most directly apprehensible measures of the degree of collaboration through co-authorship is the proportion of publications written by more than one author. For our data set, this proportion equals 80.8% of the social sciences (N= 17,349) and 28.9% of the humanities (N= 15,821) publications (i.e. articles and book chapters). These proportions are in line with previous research showing that co-authorship occurrence is usually more frequent in the social sciences than in the humanities (Larivière, Gingras, & Archambault, 2006). Figure 25 presents the evolution of this proportion for the social sciences and the humanities, as well as for the subsets VABB-WoS and VABB-GP (articles as well as book chapters).



**Figure 25:** Proportion of co-authored publications, of co-authored WoS-indexed articles (@WoS), of co-authored GP-approved articles (@GP), and of co-authored GP-approved book chapters (BC GP), by Social Sciences and Humanities (2000-2010).

As can be observed from Figure 25, there is indeed a considerable discrepancy between the social sciences (SS) and the humanities (H) regarding the share of co-authored publications: between 2000 and 2010 the proportion for the social sciences has evolved from 69.9% to 85.8%, whereas for the humanities the proportion remains well below 40%. Still, the 11-year increase in proportion of co-authored papers for the social sciences and the humanities is rather similar with respectively +16.0% (SS) and +11.8% (H). The most basic implication of this growth in co-authoring is a sharp decrease of single-authored SSH publications in the period under study: in 2000 about half (55.6%) of all articles and book chapters were published by one individual, in 2010 this share has fallen to one third (36.8%). In addition, Figure 25 indicates a difference between the subsets VABB-WoS and VABB-GP, showing for both the social sciences and the humanities a larger proportion of co-authored publications for VABB-WoS (only articles; @WoS) than for VABB-GP (articles as well as book chapters; @GP and BC GP). However, whereas the number of co-authored humanities' articles in VABB-WoS (H-@WoS) shows an initially more pronounced increase (+17.9%) than that of humanities co-authored articles and book chapters in VABB-GP (H-@GP; +9.1% and H-BC GP; +7.1%), the inverse holds for social sciences, where the increase in number of co-authored articles in VABB-GP (SS-@GP; +16.1%) and for book chapters (SS-BC GP; +12.3%) exceeds that of co-authored articles in VABB-WoS (SS-@WoS; +4.6%). Humanities scholars thus appear to have increased their collaborative efforts regarding publications in WoS journals in particular, while social scientists have done the same for GP approved journals and book chapters. The average evolution for the humanities is close to that of its GP subset, as the number of articles therein (H-@GP) is more substantial than in its WoS counterpart (H-@WoS), largely due to low WoS coverage of humanities journals.

An analysis of individual disciplines, represented in the appendix, provides more detail regarding the disciplinary trends underpinning Figure 25. The individual social science disciplines show varying results. The most collaborative SS discipline is social health sciences with 95% of all publications being co-authored, followed by psychology (91.5%). The least collaborative SS discipline is political science (53.5%), followed by sociology (72.5%). The SS discipline showing the most pronounced evolution over the two sub periods 2000-2005 and 2006-2010 is, however, political science (+15%). Inversely, the most stable discipline has been social health sciences (+2%).

Contrary to the individual SS disciplines, every humanities discipline shows a co-authorship occurrence in less than 50% of its publications. The most collaborative is linguistics (37.5%), followed by philosophy (35.5%), the least collaborative is literature (18.5%), followed by history (20.5%). The strongest evolution towards more co-authorship over the two sub periods is shown by linguistics (+11%). History (+5%) is the most stable.

### Number of authors per publication

In this section we group publications by number of authors. In Figure 26 and 27 we distinguish between single-authored publications, publications with two authors, three authors, four authors, five authors and publications with six to twenty authors. This fine-grained grouping allows for a more comprehensive understanding of the evolution of co-authorship patterns. Furthermore we divide the data into two time periods, i.e. 2000-2005 and 2006-2010, and look at the evolution of all publications (total) and of the different publication types (@WoS, @GP and BC GP) of both the social sciences and the humanities and of 11 corresponding disciplines (Figure 28 in appendix).

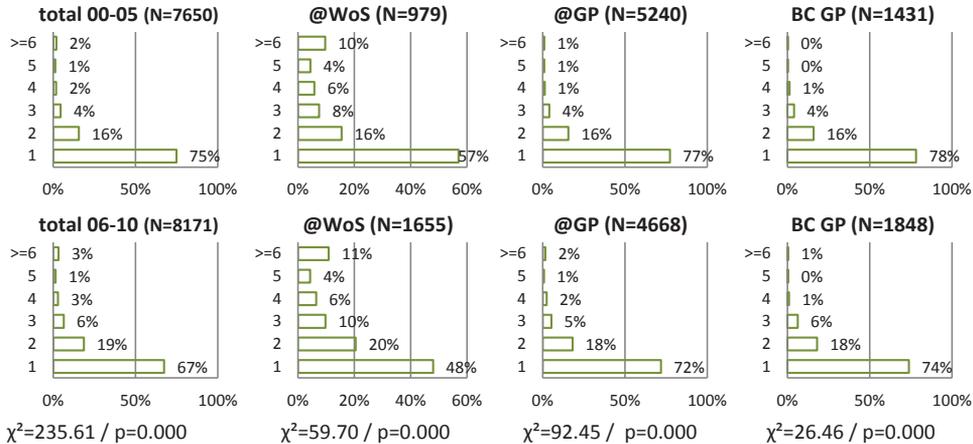
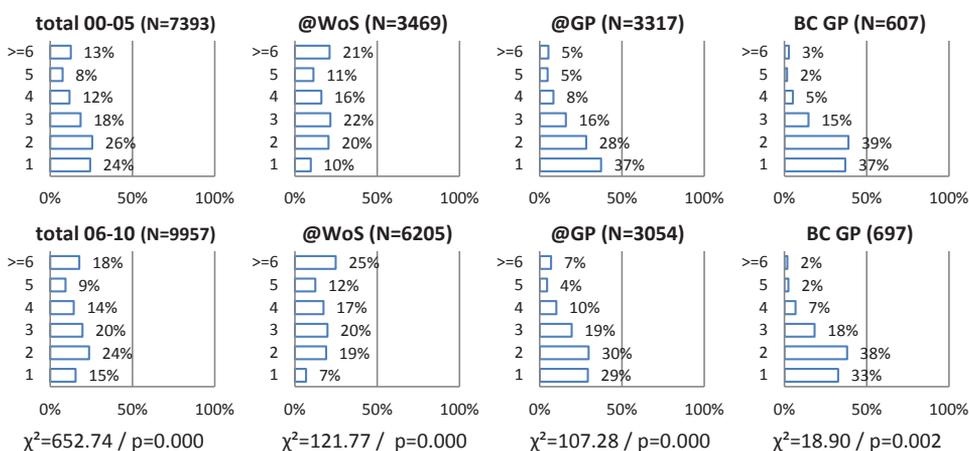


Figure 26: Grouping of humanities publications per number of authors (2000-2005 and 2006-2010).

Figure 26 and 27 demonstrate the aforementioned decline of the proportion of single-authored articles and book chapters in the SSH, with for the humanities a decline of -7.5% ( $n_{00-05}=5733$ ;  $\Delta n=224$ ) and for the social sciences a decline of -8.8% ( $n_{00-05}=1795$ ;  $\Delta n=255$ ). The humanities display a corresponding increase in proportion and number of articles and book chapters with more than one author, i.e. with two (+3.0%;  $n_{00-05}=1196$ ;  $\Delta n=328$ ), three (+1.9%;  $n_{00-05}=337$ ;  $\Delta n=182$ ), four (+1.1%;  $n_{00-05}=139$ ;  $\Delta n=98$ ), five (+0.2%;  $n_{00-05}=99$ ;  $\Delta n=19$ ) and six or more (+1.3%;  $n_{00-05}=148$ ;  $\Delta n=118$ ) authors per publication. The social sciences, however, manifest along with a decrease in proportion

and number-of single-authored publications a slight decrease in the proportion of publications with two authors (-1.9%;  $n_{00-05}=1886$ ;  $\Delta n=467$ ). A corresponding increase is apparent in the proportion and number of articles and book chapters with three (+1.1%;  $n_{00-05}=1364$ ;  $\Delta n=581$ ), four (+2.7%;  $n_{00-05}=864$ ;  $\Delta n=568$ ), five (+1.7%;  $n_{00-05}=559$ ;  $\Delta n=364$ ), and, in particular, six or more authors (+5.0%;  $n_{00-05}=925$ ;  $\Delta n=839$ ). In this regard it is relevant to note that author counts of 11 to 20 for the social sciences, though limited in numbers ( $n_{00-05}=108$ ;  $\Delta n=204$ ), appear mostly (+6.0%) in the 2006-2010 period. This illustrates very clearly the ongoing evolution towards larger author numbers in both humanities and social sciences. Moreover, for both the social sciences ( $\chi^2(5, N=9957) = 652.74, p=.000$ ) and the humanities ( $\chi^2(5, N=8171) = 235.61, p=.000$ ) the chi-square test shows a significant difference between the observed number of publications per number of authors for the second period (total 06-10) and the expected number for this period based upon the proportion of publications per number of authors for the first period (total 00-05). Thus the evolution towards more authors per publication is significant for both the social sciences and the humanities.



**Figure 27:** Grouping of social sciences publications per number of authors (2000-2005 and 2006-2010).

Let us now turn to the different publication types. For the social sciences the evolution towards publications with more than one author is proportionally the strongest for the articles in VABB-GP (@GP; +8.1%;  $n_{00-05}=3317$ ), and more moderate for articles in VABB-WoS (@WoS; +3.1%;  $n_{00-05}=3317$ ) and book chapters (BC GP; +4.4%;  $n_{00-05}=607$ ). For the humanities, the evolution towards larger author numbers is slightly different. The most notable increase of author numbers has occurred for articles in VABB-WoS (+9.0%;  $n_{00-05}=979$ ), not for articles in VABB-GP (+5.5%;  $n_{00-05}=5240$ ). At +4.5% the increase for book chapters with more than 1 author in the humanities is comparable to that for the social sciences (SS  $n_{00-05}=607$ ; H  $n_{00-05}=1431$ ). However, as mentioned before (see Table 15) and shown in Figure 26, for both the social sciences and the humanities, the number of articles in VABB-WoS more than doubled (+114.6%) over the two periods whereas the number of publications in VABB-GP (@ and BC; +10.5% and +37.8%) grew only moderately. In addition, for the social sciences the number of articles in VABB-WoS outnumbers the articles (with a factor of 1.5) and book chapters (with a factor of 7.4) in VABB-GP, whereas for the humanities the number of articles in VABB-GP more than triples both of the other two publication types (@WoS with a factor of 3.8 and BC with a factor of 3.0). In sum, the trend towards more collaboration is more manifest for articles in VABB-GP for the social sciences and for articles in VABB-WoS for the humanities. However,

due to the large difference in number of articles per publication type, and the already high collaboration rate within VABB-WoS, for both social sciences and humanities collaboration remains strongest within VABB-WoS (see also Figure 25).

Figure 26 and 27 also illustrate the differences between and within the types. However, a decrease in the proportion of single-authored publications is noticeable for all publication types. In addition, the chi-square test shows for all publication types a significant different distribution for the observed and the expected number of publications between the two periods under study. For the humanities the distribution for all three publication types shows a clear skew with a large proportion of single-authored publications and a smaller proportion and a gradual decline for each additional author per publication. In contrast, for the social sciences we notice clear differences in distribution between the publication types. Both the GP-approved articles and book chapters have an almost equal proportion of one and two authored papers with a gradual decline for each additional author per publication. However, the WoS-indexed articles show a flat distribution with a small drop for the proportion of single-authored papers and a small peak for the papers with six or more authors. All in all, where humanities' researchers publish overall more by themselves than together, social science researchers publish mostly with one or two authors for publications included in VABB-GP and with three or more authors for publications included in VABB-WoS.

At the same time, both similarities and differences between individual SSH disciplines are distinguishable (see appendix). For most disciplines a difference between the two periods is visible. The increase in co-authored publications varies between 2.5% (Social Health Sciences) and 14.5% (Political Science) of co-authored publications over the two periods. In every single discipline under study belonging to the social sciences, the co-authorship proportion is considerably larger for WoS-indexed articles than for GP-approved articles and book chapters. However, of the disciplines belonging to the humanities, history and literature do not show an explicit dominance of co-authored WoS-indexed articles, but display a general trend of a high proportion of single-authored papers for all publication types. Both disciplines have the highest proportion of single-authored publications in VABB-WoS. Moreover, the co-authorship pattern of history publications deviates from that of all other disciplines in that it is the sole discipline for which co-authorship in 2006-2010 is more common in book chapters than in articles in VABB-WoS. This finding corroborates research showing that historians operate mostly solitary in their research and ensuing publications (Verleysen & Engels, 2012). The distribution of the proportion of publications per number of authors per publication type for both the humanities and the social sciences is followed by most of their corresponding disciplines. Law, political science and social health sciences, however, manifest a distinct pattern with regard to co-authorship of WoS-indexed articles. Law shows a rather flat distribution for the WoS-indexed articles, albeit very small in number, hence showing no explicit single-author publication behaviour for VABB-WoS articles like most humanities disciplines. The distribution of WoS-indexed articles for both political science and social health sciences does not follow the general trend of the flat distribution of social sciences as the first shows a rather negative relation, i.e. the less authors per publication the larger the proportion of publications, whereas social health sciences displays a positive relation, i.e. the more authors per publication, the larger the proportion of publications.

### ***Co-authorship measures***

The degree to which co-authorship is in fact indicative of research collaboration can be expressed in several ways. Here we present two existing measures: the Collaborative Index (CI) and the Revised Collaborative Coefficient (RCC) (Egghe, 1991; Liao & Yan, 2012; Rousseau, 2011). An analysis of CI and RCC values per discipline provides a further indication of how co-authorship of SSH articles and book chapters has evolved during the years 2000-2010, and to what degree social scientists and humanities scholars working in Flanders engage in research collaboration. Table 16 presents an overview of CI and RCC values per discipline and publication type for the years 2000-2005 and 2006-2010.

Unsurprisingly, the CI and RCC values point towards an increasing degree of collaboration in general, both for the social sciences and the humanities. When comparing the aggregated social sciences to the humanities, it is notable how the CI values of the social sciences are considerably higher than those of the humanities. This is especially the case for the WoS-indexed articles, for which in the period 2006-2010 the average number of authors (CI) exceeds that of the humanities by two. The corresponding divergence in RCC values indeed points to a general stronger collaboration in the social sciences. At the level of the disciplines too, most CI and RCC values indicated increased collaboration. However, in the case of history, which manifests relatively low CI and RCC values, the CI of the more recent WoS-indexed articles is the lowest, indicating a decrease (-0.25), rather than an increase, in the average number of authors per paper. For linguistics the CI of the WoS articles is stable over the two periods. However, for both disciplines the RCC values remain the same, indicating no increase in collaboration for WoS-indexed articles. Overall, the lowest CI and RCC values for all three publication types are noted for literature. Philosophy and Literature are the only disciplines showing rather stable CI- and RCC-values for articles-GP. At the other end of the scale, the most collaborative discipline is Social Health Sciences. Here we observe increasing CI and RCC values for articles, but not for book chapters, which are very small in number (cfr. Table 15). The other disciplines show values in a range between the two opposites of Literature and social health sciences, whereby all social sciences disciplines, except political sciences, show higher CI and RCC values than the humanities disciplines. Of the social science disciplines studied here, political science appears to be the least collaborative.

In sum, collaborative publication practices in the SSH vary to a considerable extent between disciplines, and both WoS-inclusion and publication type are factors of importance in explaining the co-authorship characteristics of various fields of research.

**Table 16:** Collaborative Index (CI) and Revised Collaborative Coefficient (RCC) for WoS-indexed articles, GP-approved articles and GP-approved book chapters (2000-2005 and 2006-2010).

	"@ WoS		"@ GP		BC GP	
	CI	RCC	CI	RCC	CI	RCC
<b>Humanities</b>						
00-05	2.38	0.29	1.37	0.13	1.30	0.12
06-10	2.54	0.35	1.50	0.16	1.39	0.15
<b>Social sciences</b>						
00-05	4.03	0.64	2.38	0.39	2.07	0.36
06-10	4.46	0.67	2.69	0.45	2.15	0.40
<b>Economics &amp; business</b>						
00-05	3.08	0.57	2.32	0.10	1.23	0.11
06-10	3.42	0.61	2.61	0.11	1.36	0.16
<b>Educational sciences</b>						
00-05	3.55	0.61	2.49	0.12	1.36	0.17
06-10	3.78	0.66	2.62	0.15	1.42	0.18
<b>History</b>						
00-05	1.66	0.13	1.25	0.16	1.43	0.18
06-10	1.41	0.14	1.32	0.22	1.58	0.22
<b>Law</b>						
00-05	2.66	0.34	1.28	0.09	1.15	0.06
06-10	3.34	0.48	1.38	0.09	1.21	0.07
<b>Linguistics</b>						
00-05	2.36	0.32	1.46	0.17	1.20	0.09
06-10	2.34	0.33	1.67	0.17	1.29	0.12
<b>Literature</b>						
00-05	1.26	0.08	1.25	0.26	1.49	0.22
06-10	1.43	0.14	1.23	0.34	1.79	0.33
<b>Philosophy</b>						
00-05	2.32	0.28	1.47	0.38	1.73	0.31
06-10	2.70	0.38	1.44	0.44	2.14	0.38
<b>Political science</b>						
00-05	1.98	0.35	1.72	0.42	2.06	0.40
06-10	2.22	0.40	1.93	0.49	2.43	0.45
<b>Psychology</b>						
00-05	3.74	0.65	2.90	0.45	2.04	0.38
06-10	4.44	0.69	3.33	0.48	2.11	0.39
<b>Social health sciences</b>						
00-05	5.50	0.75	4.09	0.50	2.51	0.46
06-10	6.09	0.78	4.80	0.56	2.53	0.51
<b>Sociology</b>						
00-05	3.94	0.56	2.28	0.64	4.31	0.70
06-10	4.46	0.64	2.59	0.67	3.12	0.62

## DISCUSSION

In this article, we studied co-authorship patterns of the SSH in Flanders using the VABB-SHW database. Currently, within the humanities over one in three and within the social sciences over four in five of all publications, including articles in WoS-indexed journals, in GP-approved journals and book chapters with GP-approved publishers, have been published with more than one author. Furthermore, we find that between 2000 and 2010 co-authorship has been on the rise for all publication types, illustrating the continuing expansion of research collaboration. However, the degree of collaboration for both the social sciences and humanities and their corresponding disciplines varies between the different publication types, with a main difference between publications included in the WoS and those not. Whereas for the social sciences more than 90% and for the humanities almost 50% of all WoS-indexed articles is written in collaboration, the proportion for GP articles and book chapters remains well below 75% for the social sciences and below 30% for the humanities. In addition, where humanities scholars appear to have increased their collaborative efforts regarding publications in WoS-indexed journals in particular, social scientists, already collaborating highly when publishing in WoS journals, have done the same for GP-approved journals and book chapters.

In Flanders, the local PRFS stimulates co-authorship, also in the SSH. From 2003 onwards, when WoS-indexed publications were first taken into account, the publication-based part of the Flemish PRFS has opted for a whole-count schema, i.e. full credit counting per university, as opposed to the fractional counting method used in e.g. Norway, where the credit for a publication is distributed among all contributing institutions (Engels et al., 2012; Schneider, 2009; Sivertsen, 2010). It is likely that this incentive for co-authoring WoS-indexed publications has had a spill over effect upon the publications outside of the WoS, and hence on the VABB-GP-approved publications published prior to 2010. From 2010 onwards, with the advent of the VABB-SHW, this stimulus-by-whole-counts was explicitly extended to non-WoS peer reviewed publications as well (Engels et al., 2012). That PRFSs can indeed have a measurable impact on publication practices has been demonstrated before (Butler, 2003a, 2003b, 2010). In a recent comparative analysis of Flemish and Norwegian SSH publication data the impact of the incentive the Flemish PRFS created for publishing in WoS-indexed SSH journals is clearly visible (Ossenblok et al., 2012).

The observed differences between SSH disciplines could be expected as previous research already showed substantially different collaboration patterns between and within the social sciences and humanities (Larivière et al., 2006; Piro et al., 2013). There is a marked contrast between more collaborative SSH disciplines (e.g. social health sciences and psychology) and less collaborative ones (e.g. literature and history). At the same time, the growth rate of collaboration varies across disciplines. In part, this is probably due to the varying starting positions of individual disciplines in 2000, when our measurement commences. All in all, important differences between disciplines remain observable, both when counting co-authorship occurrence, as when comparing specific measures of collaboration like the CI and the RCC.

When comparing our results to other studies, it appears that in Flanders the proportion of co-authored articles is relatively high. In Canada, for example, the proportion of co-authored articles in WoS articles in the social sciences for the year 2002 stood at almost 70%; in the humanities it was closer to 10% (Larivière et al., 2006). For Flanders, however, the corresponding percentages for 2002 are about 90% for the social sciences and about 40% for the humanities. Even when allowing for a considerable

increase in co-authoring over the last decade, the Canadian percentages are likely to remain well below that for Flanders.

In sum, the results of this study imply that over the last decade SSH researchers are collaborating more for both the WoS articles and the non-WoS articles and book chapters. However, the collaboration in WoS articles is higher than that in non-WoS articles for all disciplines under study, indicating the need for additional data when investigating collaboration patterns of SSH researchers. The possible influence of the Flemish PRFS in this regard needs further investigation, as the incentives to collaborate and the contextual changes that facilitate increased co-authoring are manifold (Beaver, 2001; Katz & Martin, 1997; Kretschmer & Aguillo, 2004). This brings us to the limitations of this study. First, the period under study is limited compared to research using WoS-data only. As the VABB-SHW database is updated yearly, however, more longitudinal data will be available in the future. Second, international comparisons are needed in order to pinpoint the influences of PRFSs. By isolating the differences in PRFSs, the effects of these differences can be distinguished and compared. Third, more research regarding the importance of books, especially in the humanities, is needed. In this article we present results on co-authorship of non-WoS journal articles and of book chapters, which is an achievement in comparison with most studies on SSH co-authorship. However, monographs and edited books need to be brought into the picture as well in order to better understand collaboration in the SSH. In particular, new measures of collaboration are needed to capture the complex collaboration pattern involved in the publication of edited books (Ossenblok & Engels, 2012).

More research on co-authorship and collaboration in the SSH is clearly called for. Additional studies at the national level would certainly enhance the possibilities for international comparison. To this end, both WoS-data and, where available, non-WoS data should be included to corroborate our own findings regarding the bias resulting from the use of WoS data only. Additionally, multiple publication types should be included in future research. Given the importance of books in the SSH, the inclusion of monographs and chapters besides articles is essential if we are to gain full insight into the diverse patterns of collaboration in the SSH. With the advent of the WoS' Book Citation Index (Adams & Testa, 2011), and the ongoing expansion of PRFS-embedded bibliographic databases in several countries (Hicks, 2012) this should prove feasible. To accurately explain differences in the observed patterns of co-authorship, more analyses of the incentive structures influencing researchers' publication behaviour are needed. The comparative study of PRFSs is an important element of this.

## **CONCLUSION**

Co-authorship of articles and book chapters published by social sciences and humanities researchers affiliated with Flemish universities is on the rise. In the timeframe under study, the years 2000-2010, the overall proportion of co-authored publications has increased by 16% for the social sciences and by 11.8% for the humanities. This corresponds with a steep drop of the observed frequency of single-author publishing from about half of all publications in the year 2000 to about one third in 2010. A central finding of our study is the 15-20% difference in the prevalence of co-authorship between WoS data (articles) and non-WoS data (articles as well as book chapters). This indicates the need to include non-WoS data when studying co-authorship patterns in the SSH. In all SSH disciplines, the increase of co-authoring goes hand in hand with growing author numbers per publication. However, differences between and within the SSH as practiced in Flanders remain considerable. The proportion of co-

authored SSH publications is high and is probably partly due to the incentives for co-authorship provided by the Flemish PRFS.

#### **ACKNOWLEDGEMENT**

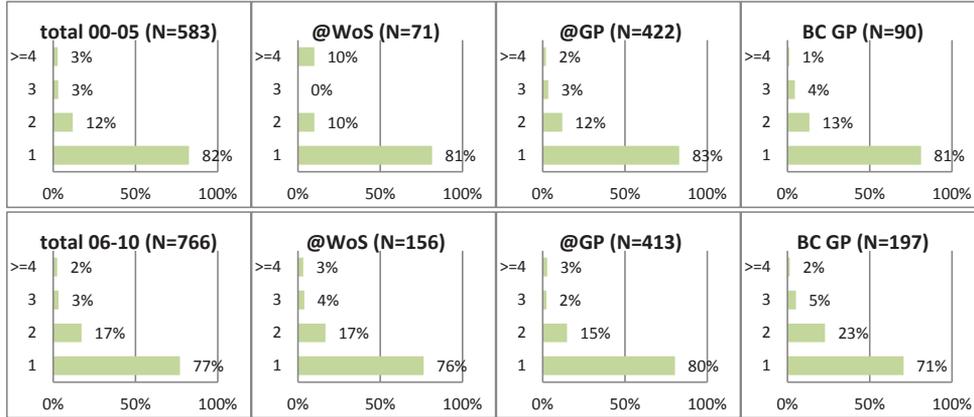
The authors thank all colleagues who helped in setting up the VABB-SHW database. We are also grateful to the Flemish Government for providing an adequate legal framework and funding.

**APPENDIX**

Figure 28: Proportion of classes of publications per number of authors – per discipline (2000-2005 and 2006-2010)

**Humanities**

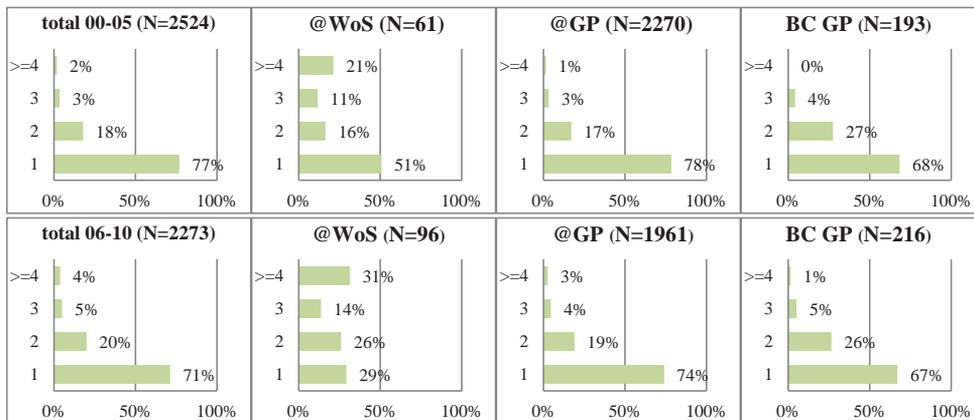
**History**



$\chi^2=23.46 / p=0.000$

$\chi^2=6.20 / p=0.000$

**Law**

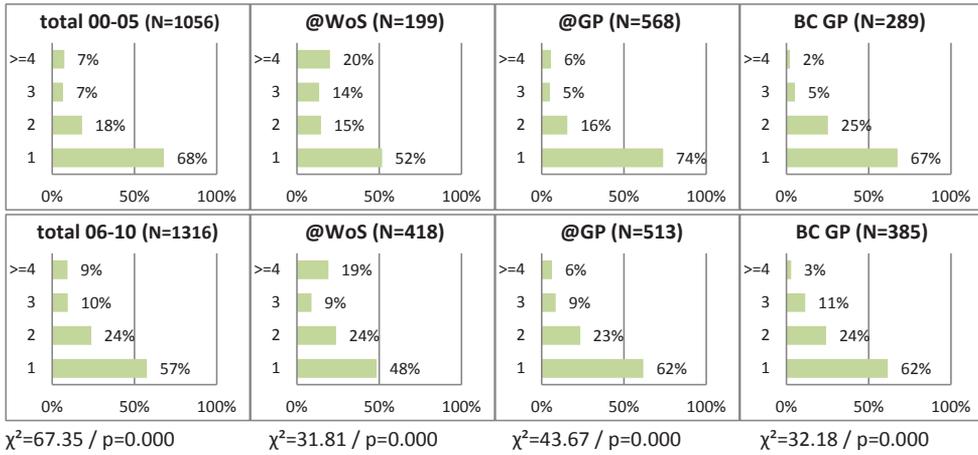


$\chi^2=79.17 / p=0.000$

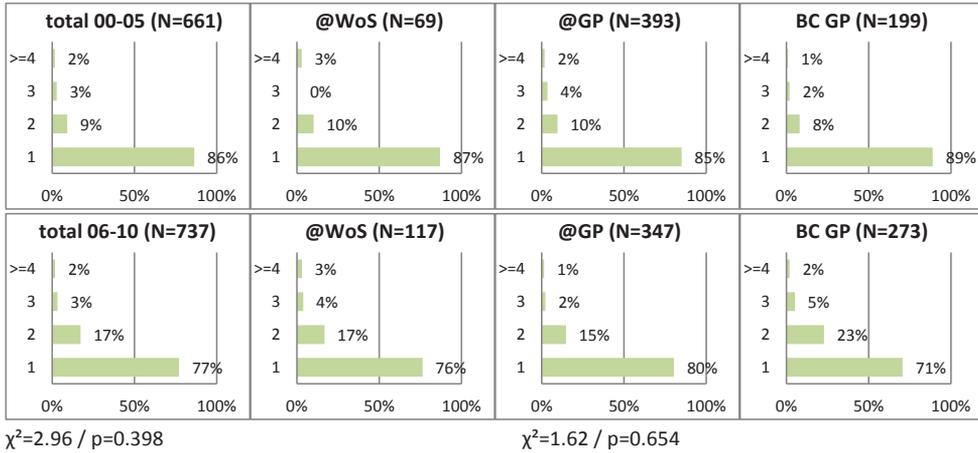
$\chi^2=19.11 / p=0.000$

$\chi^2=41.82 / p=0.000$

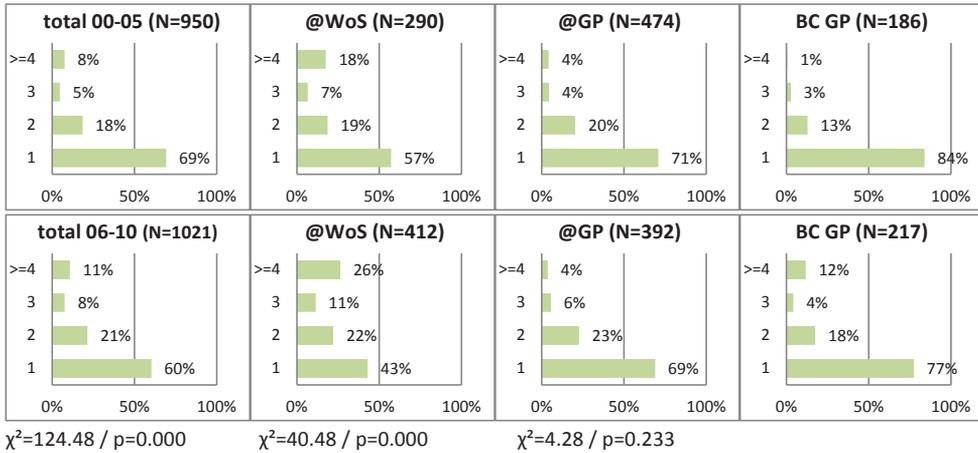
Linguistics



Literature

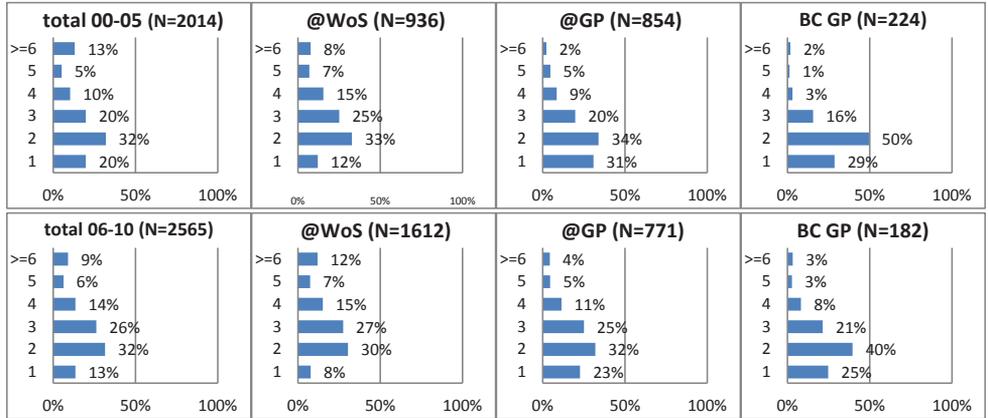


Philosophy



**Social Sciences**

**Economics & business**

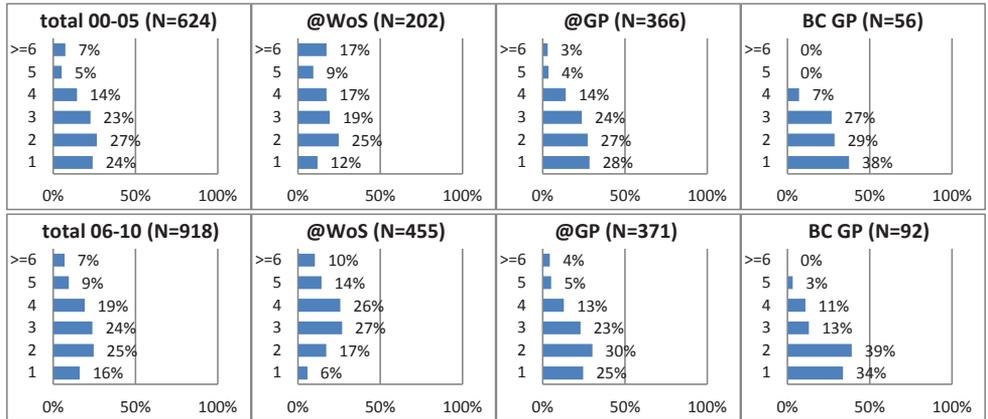


$\chi^2=233.57 / p=0.000$

$\chi^2=68.14 / p=0.000$

$\chi^2=50.05 / p=0.000$

**Educational sciences**

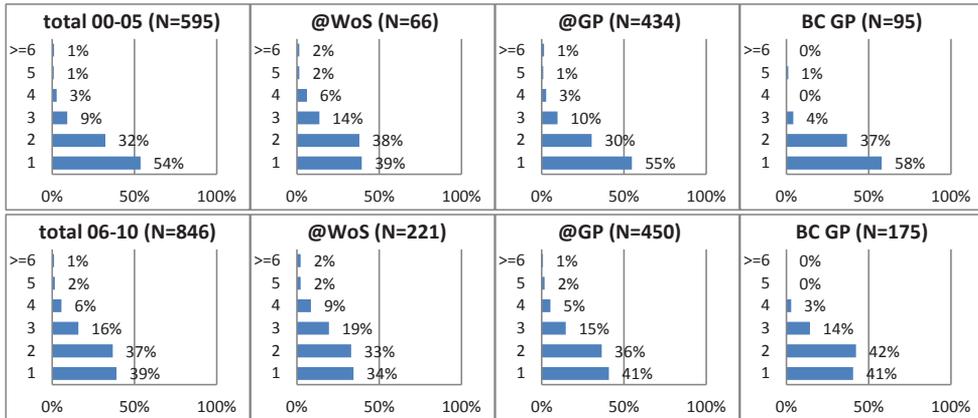


$\chi^2=73.01 / p=0.000$

$\chi^2=81.34 / p=0.000$

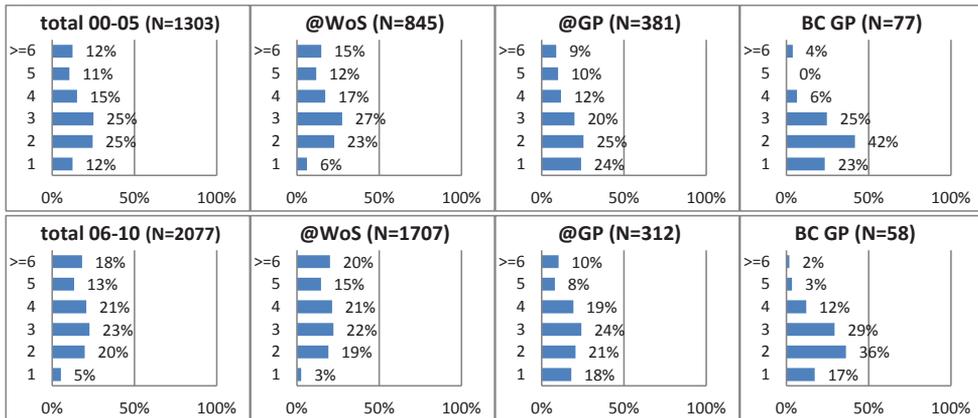
$\chi^2=8.15 / p=0.148$

Political science



$\chi^2=108.65 / p=0.000$

Psychology

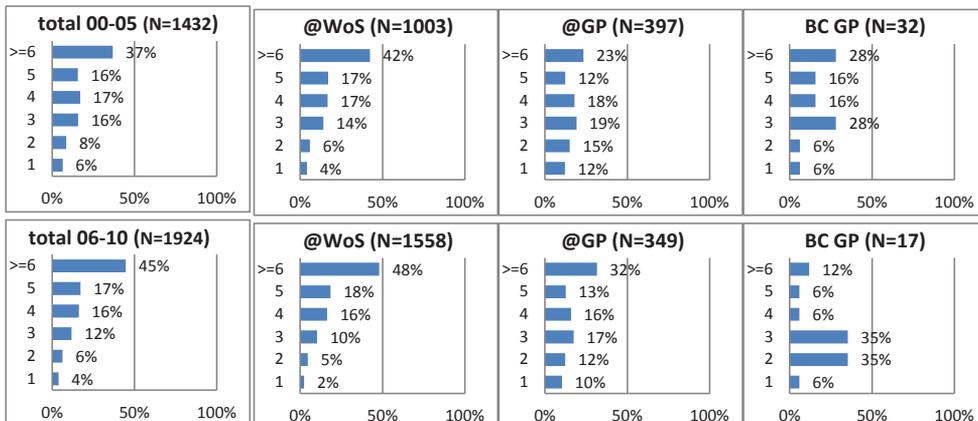


$\chi^2=220.265 / p=0.000$

$\chi^2=121.06 / p=0.000$

$\chi^2=26.59 / p=0.000$

Social Health Sciences

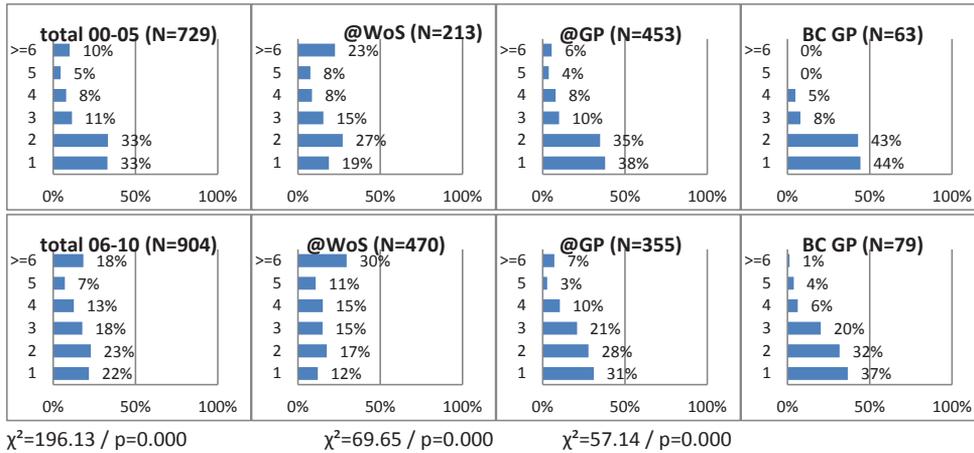


$\chi^2=86.09 / p=0.000$

$\chi^2=45.49 / p=0.000$

$\chi^2=13.87 / p=0.000$

Sociology



REFERENCE LIST

Adams, J. & Testa, J. (2011). Thomson Reuters book citation index. In E. Noyons, P. Ngulube, & J. Leta (Eds.), *The 13th conference of the International Society for Scientometrics and Informetrics* (pp. 13-18). Durban, South Africa: ISSI, Leiden University and University of Zululand.

Aksnes, D. W., Schneider, J. W., & Gunnarsson, M. (2012). Ranking national research systems by citation indicators. A comparative analysis using whole and fractional counting methods. *Journal of Informetrics*, 6, 36-43.

Archambault, E., Vignola-Gagne, E., Côté, G., Larivière, V., & Gingras, Y. (2006). Benchmarking scientific output in the social sciences and humanities: The limits of existing databases. *Scientometrics*, 68, 329-342.

Beaver, D. D. (2001). Reflections in scientific collaboration (and its study): past, present and future. *Scientometrics*, 52, 365-377.

Benavent-Pérez, M., Gorraiz, J., & Gumpenberger, C. (2012). The different flavors of research collaboration: A case study of their influence on university excellence in four world regions. *Scientometrics*, DOI 10.1007/s11192-012-0638-4.

Biagioli, M. & Galison, P. (2003). *Scientific Authorship. Credit and intellectual property in science*. New York; London: Routledge.

Birnholtz, J. P. (2006). What does it mean to be an author? The intersection of credit, contribution, and collaboration in science. *Journal of the American Society for Information Science and Technology (Jasist)*, 57, 1758-1770.

Borgman, C. L. (2009). The digital future is now: A call to action for the humanities. *DHQ: Digital Humanities Quarterly*, 3, 1-21.

Bukvova, H. (2010). Studying research collaboration: A literature review. *Sprouts Working Papers on Information Systems*, 10(3), <http://sprouts.aisnet.org/10-3>.

Butler, L. (2003a). Explaining Australia's increased share of ISI publications-the effects of a funding formula based on publication counts. *Research Policy*, 32, 143-155.

Butler, L. (2003b). Modifying publication practices in response to funding formulas. *Research Evaluation*, 12, 39-46.

Butler, L. (2010). Impact of performance-based research funding systems: A review of the concerns and the evidence. In OECD (Ed.), *Performance-based funding for public research in tertiary education institutions: Workshop proceedings* (pp. 127-165). Paris: OECD-publishing.

- Cronin, B., Shaw, D., & La Barre, K. (2003). A cast of thousands: coauthorship and subauthorship in the 20th century as manifested in the scholarly journal literature of psychology and philosophy. *Journal of the American Society for Information Science and Technology (Jasist)*, 54, 855-871.
- Egghe, L. (1991). Theory of collaboration and collaborative measures. *Information processing and management*, 27, 177-202.
- Endersby, J. W. (1996). Collaborative research in the social sciences: Multiple authorship and publication credit. *Social Science Quarterly*, 77, 375-392.
- Engels, T. C. E., Ossenblok, T. L. B., & Spruyt, E. H. J. (2012). Changing publication patterns in the social sciences and humanities, 2000-2009. *Scientometrics*, 93, 373-390.
- Glänzel, W. & Schubert, A. (2004). Analysing scientific networks through co-authorship. In H.F.Moed, W. Glänzel, & U. Schmoch (Eds.), *Handbook of quantitative science and technology research: The use of publication and patent statistics in studies on S&T systems* (pp. 257-276). Dordrecht: Kluwer Academic Publishers.
- Glänzel, W. & Schubert, A. (2005). Domesticity and internationality in co-authorship, references and citations. *Scientometrics*, 65, 323-342.
- Hicks, D. (2004). The four literatures of social science. In H.F.Moed, W. Glänzel, & U. Schmoch (Eds.), *Handbook of quantitative Science and Technology Research: The use of publication and patent statistics in studies of S&T systems* (pp. 473-496). Dordrecht: Kluwer Academic.
- Hicks, D. (2012). Performance-based university research funding systems. *Research Policy*, 41, 251-261.
- Katz, J. S. & Martin, B. R. (1997). What is research collaboration? *Research Policy*, 26, 1-18.
- Kretschmer, H. & Aguillo, I. F. (2004). Visibility of collaboration on the web. *Scientometrics*, 61, 405-426.
- Kyvik, S. (2003). Changing trends in publishing behaviour among university faculty, 1980-2000. *Scientometrics*, 58, 35-48.
- Larivière, V., Gingras, Y., & Archambault, E. (2006). Canadian collaboration networks: A comparative analysis of the Natural Sciences, Social Sciences and the Humanities. *Scientometrics*, 68, 519-533.
- Laudel, G. (2002). What do we measure by co-authorship? *Research Evaluation*, 11, 3-15.
- Liao, C. H. & Yan, H. R. (2012). Quantifying the degree of research collaboration: A comparative study of collaborative measures. *Journal of Informetrics*, 6, 27-33.
- Mali, F., Kronegger, L., Doreian, P., & Ferligoj, A. (2012). Dynamic scientific co-authorship networks. In A.Scharnhorst, K. Borner, & P. van den Besselaar (Eds.), *Models of Science Dynamics. Understanding Complex Systems* (pp. 195-232). Heidelberg: Springer.
- Melin, G. (2000). Pragmatism and self-organization: Research collaboration on the individual level. *Research Policy*, 29, 31-40.
- Newman, M. E. J. (2004). Co-authorship networks and patterns of scientific collaboration. *Proceedings of the National Academy of Sciences of the United States of America*, 101, 5200-5205.
- Ossenblok, T. L. B. & Engels, T. C. E. (2012). A measure of collaboration for edited books in the social sciences and humanities. *Abstracts for the NordForsk workshop on bibliometrics for the social sciences and humanities* <http://blogs.helsinki.fi/nordforskssh2012/files/2012/03/NordForsk-SSH-Workshop-abstracts1.pdf>.
- Ossenblok, T. L. B., Engels, T. C. E., & Sivertsen, G. (2012). The representation of the social sciences and humanities in the Web of Science. A comparison of publication patterns and incentive structures in Flanders and Norway (2005-9). *Research Evaluation*, 21, 280-290.
- Piro, F. N., Aksnes, D. W., & Rorstad, K. (2013). A macro analysis of productivity differences across fields: challenges in the measurement of scientific publishing. *Journal of the American Society for Information Science (Jasist)*, 64, 307-320.
- Rousseau, R. (2011). Comments on the modified collaborative coefficient. *Scientometrics*, 87, 171-174.
- Schneider, J. W. (2009). An outline of the bibliometric indicator used for performance-based funding of research institutions in Norway. *European Political Science*, 8, 364-378.

- Sivertsen, G. (2010). A performance indicator based on complete data for the scientific publication output at research institutions. *ISSI Newsletter*, 6, 22-28.
- Verleysen, F. T. & Engels, T. C. E. (2012). Historical publications at Flemish universities, 2000-2009. An analysis on the basis of the Flemish academic database for the social sciences and humanities. *Journal of Belgian History*, 42, 110-143.
- Wagner, C. S. & Leydesdorff, L. (2005). Mapping the network of global science: Comparing international co-authorships from 1990 to 2000. *International journal of Technology and Globalisation*, 1, 185-208.

## 8.6 Edited books in the social sciences and humanities: Characteristics and collaboration analysis (Scientometrics, 2015)

### Reference

Ossenblok, T. L. B., & Engels, T. C. E. (2015). Edited books in the social sciences and humanities: Characteristics and collaboration analysis. *Scientometrics*, 104(1), 219-237. doi: 10.1007/s11192-015-1544-3

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### KEYWORDS

Co-authorship, Co-editorship, Social Sciences and Humanities, Flanders, collaboration, edited books

### ABSTRACT

Monographs and edited books are important in scholarly communication, especially in the social sciences and humanities (Gorraiz, Purnell, & Glänzel, 2013; Nederhof, 2006). An edited book is a collection of chapters written by different authors, gathered and harmonized by one or more editors. This article analyses the characteristics and collaboration patterns of edited books in the social sciences and humanities as practiced in Flanders, the Northern Dutch speaking part of Belgium. It is based upon a comprehensive set of 753 peer reviewed edited books, of which at least one of the editors has a Flemish university affiliation, and the 12.913 chapters published therein. The article analyses various characteristics of edited books, i.e. the distribution over publishers, the places of publication, language use, the presence of introductions and conclusions, the occurrence of co-editorship and co-authorship, and the number of unique authors and book chapters per volume. Almost half of the edited books are published with about 5% of the publishers. English is the dominant publication language for all places of publication. Writing a conclusion seems rather uncommon. All in all, about 90% of all volumes are co-edited. Edited books in the social sciences have a more diverse authorship than edited books in the humanities. In general, the more co-authorship for articles occurs within a discipline, the more co-authorship occurs for book chapters, whereas the number of editors is independent from this trend.

### Classification

MSC: 01;94 en JEL: A14; 038

## INTRODUCTION

An edited book is a collection of chapters written by different authors, gathered and harmonized by one or more editors. This definition is based on the online dictionary for library and information science<sup>42</sup> which defines an edited work as “a single work, or two or more shorter works by the same or different authors, prepared for publication by a person other than the author, whose name usually appears as editor on the title page.” Two main differences between both definitions appear: the ODLIS definition includes collections of one and the same author as being edited works and states that the editor is a different person than the author. The latter occurs for example in the case of text editions of literary work. Because this article focuses on scholarly peer reviewed edited books, our definition requires contributions by at least two different authors and allows for the common practice that book editors also contribute to the volume as authors of the introduction, the conclusion and/or one or more of the chapters.

An edited book can come into being at the initiative of the publisher, the editor(s) and/or as a result of a scholarly meeting or conference (Lewis, 1996). Our definition of edited books allows us to distinguish edited books from other types of research literature (e.g. those listed by the Finish Association of non-fiction Writers<sup>43</sup>, such as monographs, scientific series, chronicles, scientific journals, research reports, and proceedings (a work published in preparation, rather than as a result, of a conference). In accordance with the ODLIS, a publisher is defined as a person or corporate entity that prepares and issues printed materials for public sale or distribution, normally on the basis of a legal contract in which the publisher is granted certain exclusive rights in exchange for assuming the financial risk of publication and agreeing to compensate the author, usually with a share of the profits.

Previous research (Edwards, 2012; Engels, Ossenblok, & Spruyt, 2012; Gorraiz et al., 2013; Leydesdorff & Felt, 2012; Nederhof, 2006; Torres-Salinas, Robinson-Garcia, Cabezas-Clavijo, & Jiménez-Contreras, 2013) has emphasized the importance of edited books and book chapters in scholarly communication in the social sciences and, especially, in the humanities. The number and share of peer reviewed edited books, indicates the importance of edited books within scholarly communication. In Flanders, about 2% of all peer reviewed publications in the SSH are edited books (EB), with proportions up to 6% in linguistics, literature and theology (Ossenblok, Verleysen, Spruyt, & Engels, 2013). The number of citations they receive also shows the importance of edited books in scholarly communication. Analysis of the Book Citation Index (Web of Science; WoS), indicates that books in the SSH are relatively more cited than books in the sciences (Leydesdorff & Felt, 2012). Furthermore edited books have a significantly higher citation rate than monographs, although the difference is smaller for the humanities than for the social sciences (Torres-Salinas et al., 2013). Chapters too can be highly cited (Gorraiz et al., 2013; Leydesdorff & Felt, 2012; Torres-Salinas et al., 2013), although, especially within the SSH, the number of citations varies between commercial publishers and university presses (Torres-Salinas et al., 2013). However, as the authors of these studies point out, the research results have been influenced by some known limitations of the BkCI, such as: bias towards English as publication language (Gorraiz et al., 2013), a restricted publisher selection (Torres-Salinas et al., 2013), a restricted time frame and the distinct indexation of book chapters in monographs (Leydesdorff & Felt, 2012). Gorraiz

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<sup>42</sup> Reitz, J.M. (s.a.) ODLIS. Online Dictionary for Library and Information Science: [http://www.abc-clio.com/ODLIS/odlis\\_e.aspx](http://www.abc-clio.com/ODLIS/odlis_e.aspx)

<sup>43</sup> <https://www.suomentietokirjailijat.fi/en/>

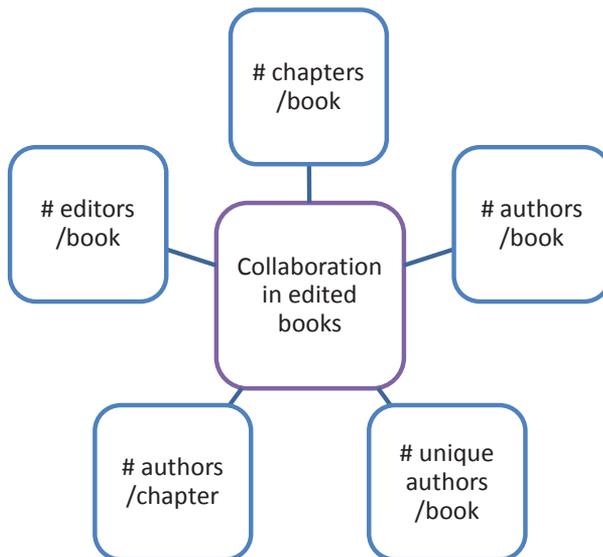
et al (2013) conclude that the BkCI will stimulate authors in disciplines in which books have already been important to publish monographs and (in) edited books.

To the best of our knowledge, no empirical study has addressed the role of a book editor. Thomas and Hrebener (1993) state that editing a book consist of 25% organizing and managing, 25% communication and 50% academic work. Although editing a book is far more time consuming than writing an article (Lewis, 1996; Thomas & Hrebener, 1993) and appears to be undervalued for the academic career (Edwards, 2012; Nederman, 2005; Thomas & Hrebener, 1993), there are some major advantages in editing a book. For the author these advantages are: a great learning experience, in academic, organizational and interpersonal skills (Thomas & Hrebener, 1993), network building possibilities (Edwards, 2012; Thomas & Hrebener, 1993), time saving (in comparison with e.g. writing a monograph) (Edwards, 2012; Nederman, 2005) and the sense of satisfaction (Thomas & Hrebener, 1993). In addition, the edited book has a possible academic and educational value to the field (Edwards, 2012; Gold, 1999; Heumann, 2001; Leal, 2013; Lewis, 1996; Thomas & Hrebener, 1993). Edited volumes can bring together a greater variety of skills and knowledge than a monograph, resulting in a publication with multiple perspectives, a broader scope, more data analysis, multi-disciplinary research and a wide variety of methodologies (Edwards, 2012; Leal, 2013; Lewis, 1996; Nederman, 2005). Edited books offer space to authoritative comparative perspectives across dimensions such as time and geographic location (Edwards, 2012). The value of the book is largely determined by the choice of contributors who have significant expertise and a balanced view on the issues addressed. Moreover, the choice of the contributors determines the chances of success in finishing the edited book, as contributors who do not follow the deadlines can make the project fail (Edwards, 2012; Galanter, 2008; Leal, 2013; Lewis, 1996; Nederman, 2005; Thomas & Hrebener, 1993). The quality of an edited book is determined to a considerable extent by the editing process and the possibility of uniting the chapters into a whole (Heumann, 2001; Nederman, 2005).

According to Leal (2013) the difference between papers and book chapters is to be found in the peer review process. Journal articles are mostly individually reviewed whereas a reviewer of an edited book is often asked to comment on several or even each chapter. Harnad (1986) and Leal (2013) put forward that a reviewer of an edited book might not be able to discuss all chapters with equal authority. However, Leal (2013) also points out that an edited book is evaluated at different levels: the volume editors, the other participants, the series editors (if applicable) and the press editors. Nederman (2005) states that good academic and commercial presses are aware of the misapprehension of quality control and therefore are even more rigorous about the content in volumes than in journals. Derricourt (2012) argues that as journals have their subscribers signed up in advance, and books have not, the publishers will take less economic risk by publishing books from an editor whose ideas and research the publisher thinks important or have been checked by an external confidant.

The structure of this article is as follows: In the data and method section we describe the data set and show that edited books are of special interest for the humanities. As, hitherto, little is known about edited books, we then present data regarding publishers, places of publication, language use and of the presence of introductions and conclusions in the edited books. The second part of the results focuses on collaboration within edited books and the importance of including edited books in research describing collaboration patterns, especially for the humanities. When measuring collaboration within the social sciences and humanities (SSH), previous research focused on co-authorship of articles and book chapters (Ossenblok, Verleysen, & Engels, 2014). However, as collaboration within edited books

comprises on the one hand the authors of the chapters and on the other hand the editors of the book and the collaboration between them, the question arises whether measuring co-authorship of articles and book chapters suffices to quantify the degree of research collaboration within SSH disciplines. Sula (2012) elaborately showed that measuring collaboration in the SSH requires going beyond the analysis of co-authorship. Lewis (1996) argues that contributors to a multi-author book work separately, whereas Nederman (2005) puts forward that collaboration between the contributors, such as sharing and commenting on chapter drafts of the authors, improves a sense of unity and hence the quality of the edited book.



**Figure 29:** Aspects of collaboration in edited books

In the analysis of collaboration in edited books we focus on five aspects (see also Figure 29): the number of editors per book, the number of chapters per book, the total number of authors per book, the number of unique authors per book, and the number of authors per chapter. In Ossenblok et al. (2014) we show that the stronger a disciplinary tradition in co-authoring papers, the more frequent co-authorship of book chapters occurs. Edwards (2012) indicates that in SSH disciplines co-editing a book is more common than co-authoring an article. The author points to four possible explanations: 1) editors share the workload with a colleague in order to maximize impact relative to effort; 2) as editing mostly is not validated for career advancements, co-editing does not imply fractionalizing publication counts; 3) more editors means adding more networks to the project, which can potentially lead to attracting a more esteemed contributor; 4) having a co-editor means dividing the tasks when negotiating changes to a chapter, in this way the editor with the furthest relation to the contributor can be the ‘bad cop’, if necessary. We therefore expect most edited books will have more than one editor. Furthermore we expect that there will be relatively more co-edited books than there will be co-authored articles and book chapters. However, as the average number of authors per article is higher in the social sciences than in the humanities (Ossenblok et al., 2014), we expect a comparable difference of the number of editors between the two fields. As we will show in the results, the average number of editors is indeed higher in the social sciences than in the humanities, although the difference is small.

## DATA AND METHOD

The data used for this article consists of two sets: (1) data from the Flemish Academic Bibliographic Database for the Social Sciences and Humanities (VABB-SHW) and (2) additional data harvested online and in the university libraries.

The first set contains bibliographic information on 753 edited books, all identifiable with an ISBN, and 33.702 journal articles from the period 2000-2011 and registered in the VABB-SHW database as having gone through a peer review process prior to publication. Engels et al. (2012), Ossenblok et al. (2013) and Verleysen, Ghesquière & Engels (2014) provide detailed accounts of the database and more information as well as online access is available at [www.ecoom.be/en/vabb](http://www.ecoom.be/en/vabb). The VABB-SHW database is similar to the Norwegian CRISTin (Sivertsen, 2010) and the Danish Research Agency's database (Ingwersen & Larsen, 2014) but is unique in that it is the only database in its kind which includes edited books as a separate publication type that is taken into account for the calculation of the performance-based university research funding. Only publications with at least one author or editor affiliated to at least one of the Flemish universities are eligible for inclusion in the database. Publications are assigned to one or more of 16 SSH disciplines according to the research unit or departmental affiliation(s) of these authors and editors. The bibliographic information available in the VABB-SHW includes the publication language, the publisher, and the place of publication. Missing publication information was collected manually from the colophons of the book copies. The place of publication in this research is based upon the first city mentioned.

The second data set, the bibliographic information on the book chapters in the 753 edited books included in the VABB-SHW, was harvested manually by the first author of this paper and three assistant researchers. The information was collected online and/or in the libraries of the University of Antwerp, KU Leuven and Ghent University and resulted in information on 12.913 book chapters. We requested a small proportion of the edited books via interlibrary loan. Data regarding the number of book chapters and the authors per chapter were entered in a database. Introductions, conclusions, analyses and/or reviews were included; prefaces, post scripts, epilogues, and abstracts were not included in the data set. Furthermore, missing bibliographic information (e.g. missing editors or places of publication) of the edited books was added manually.

Table 15 shows per discipline the number of journal articles in VABB-SHW, the number of edited books conform our definition, and the number of book chapters in these edited books. In order to ensure the robustness of the analyses, the 8 disciplines with more than 40 edited books in the period 2000-2011 are included separately in this study. Therefore, in addition to the whole of the data set and the aggregations 'humanities' and 'social sciences', Table 17 includes the following disciplines for the humanities: history (n=57); law (n=57); linguistics (n=144); literature (n=102); philosophy (n=66); theology (n=88) and for the social sciences: economics & business (n=54) and political science (n=46). However, in the total for humanities also archaeology, art history and communication studies are included and in the total for social sciences also criminology, educational sciences, psychology, social health sciences, and sociology are included.

**Table 17:** Number of VABB-SHW-articles, edited books and book chapters under study (2000-2011).

	articles	edited books	book chapters
discipline	#	#	#
SSH	33702	753	12913
Humanities	14352	599	10646
Social sciences	18711	175	2710
Economics & business	4931	54	916
History	1220	57	973
Law	5127	57	1019
Linguistics	1907	144	2504
Literature	963	102	1953
Philosophy	1849	66	1058
Political science	1383	46	628
Theology	953	88	1549

In order to measure collaboration we apply a measure of co-authorship, namely the Revised Collaborative Coefficient (RCC). This measure of collaboration leads to values between 0 and 1, where 1 represents maximal collaboration and 0 no collaboration, or only single authored papers. This makes it a good measure to compare different units, in this case different disciplines. The RCC takes into account the total number of papers, the total number of authors as well as the total numbers of papers having a certain number of authors. The RCC is calculated as

$$= \left( \frac{n}{n-1} \right) \left\{ 1 - \frac{\sum_{j=1}^q (1/j) f_j}{N} \right\}$$

where N= total number of publications, n= total number of unique authors in the collection, j= number of authors per publication and fj= number of publications having j authors in the collection and q= the max number of authors in a single publication. In addition, in the RCC the number of authors per publication (j) is fractionalized (1/j) in order to give gradually less weight as publications have more co-authors. By subtracting this weighted average from 1, an inverse effect occurs, i.e. more (fractionalised) weight is given to each collaborative publication, resulting in a value between 0 and 1 to represent a low respectively high degree of collaboration. By multiplying the result of the second part of the formula by n/n-1 we obtain a value of 1 when there is maximal collaboration, i.e. all co-authored publications have the same number of authors as there are co-authored publications. When all publications have 1 author, we obtain a value of 0, i.e. minimal or no collaboration (Ajiferuke,

Burrell, & Tague, 1988; Egghe, 1991; Rousseau, 2011). In this article, we calculated the RCC not only for the authors of the articles and book chapters, but also for the editors of the edited books. To this end we replaced 'author' with 'editor' in the formula above.

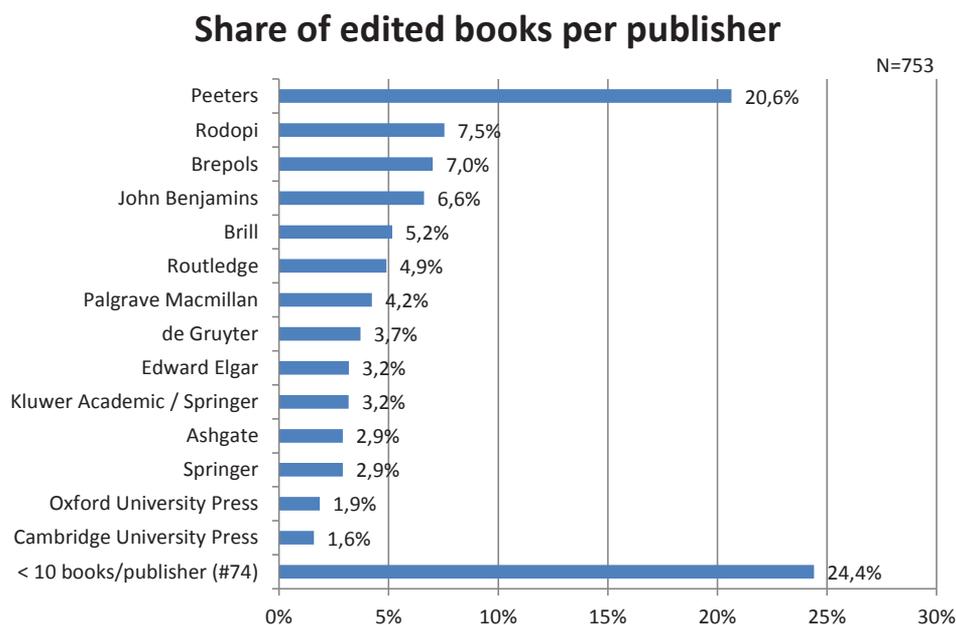
In table 17 we used the independent-samples Kruskal-Wallis Test, a non-parametric test to show if there is a statistically significant difference in the distribution for four of the collaboration aspects between the different disciplines included in this study. However, the edited books are allocated to one or more disciplines depending on the editors' affiliation, therefore 27 edited books belonged to 2 or more of the 8 disciplines included in this study. The Kruskal-Wallis test requires an independent sample, therefore we left the 27 edited books out from this part of our study. In addition to the Kruskal-Wallis Test, we calculated the Pearson correlation to indicate the correlation between four of the collaboration aspects for the social sciences and the humanities. Here 1 indicates a perfect positive correlation, 0 no correlation and -1 a perfect negative correlation. Finally, we calculated the chi-square ( $\chi^2$ ) goodness of fit to show if there is a statistical significant difference between the distribution of the number of editors per book between the humanities and the social sciences. However, 25 edited books were assigned to both the humanities and the social sciences and therefore were left out of the chi-square calculation. One (8.3%) of the expected values was less than 5 but more than 1, hence the chi-square calculation is valid. Because of the limited occurrence of multiple co-editorship in both humanities and social sciences, the analysis was conducted using six categories, i.e. single editor, two editors, three editors, four editors, five editors and six or more editors. Hence in these analyses there are five degrees of freedom (DF) and the distribution among categories of two sets is significantly different when  $\chi^2$  exceeds 11.0705.

## RESULTS

In the first part of this result section we describe the distribution of the edited books among publishers and among places of publication, and we analyse language use and the occurrence of introductions and conclusions in the books. In the second part we present the findings regarding collaboration in edited books.

### *Publishers and places of publication*

Figure 30 presents the share of edited books per publisher. The distribution of the edited books among publishers is Lotkaian, with  $C=0.4589$  and  $\beta=1.6421$ . Furthermore, the distribution of edited books over publishers is highly rightly skewed (min=1, max=155, avg=8.6, median=2). One in five edited books in our data set is published with Peeters, a scholarly publisher headquartered in Leuven, Belgium. Almost half of all edited books (47.0%) is published with 5 publishers: Peeters (n=155), Rodopi (n=57), Brepols (n=53), John Benjamins (n=50) and Brill (n=39), all being academic publishers located in Flanders or the Netherlands. In total 88 publishers published the 753 edited books, where 14 (15.9%) publishers represent more than 75% of all edited books and 74 (84.1%) publishers represent the remaining 24.4% of all edited books.



**Figure 30:** Share of edited books (n=753) per publisher (2000-2011).

Table 18 confirms the importance of Flanders (31.9%) and the Netherlands (23.9%) for publishing edited books that are (co)edited by an editor affiliated to a university in Flanders. The United Kingdom (22.3%) appears as the third main publishers' country for edited books. Together, Flanders, the Netherlands and the UK account for almost 80% of the publishing places of the edited books in our sample. However, previous research demonstrated a gradual evolution over the period 2002-2011 towards publishing monographs, edited books and book chapters more often with UK publishers (Verleysen & Engels, 2014a).

#### **Language use**

Table 18 also indicates the share of edited books published in English, Dutch, French and other languages for the SSH as a whole, for the social sciences, for the humanities, Flanders, the Netherlands, the UK, Germany, the USA and other places of publication. Most (62 out of 74) edited books written in Dutch are published in Flanders; however, the majority (56.8%) of the edited books published in Flanders are in English. For Germany, the Netherlands, the USA and the UK, the percentage of edited books in English is substantially higher, ranging from 75 to 99%. French and German are mostly represented in Flanders (n=42; 17.1%), Germany (n= 11; 16.2%), and the Netherlands (n= 25; 12.8%).

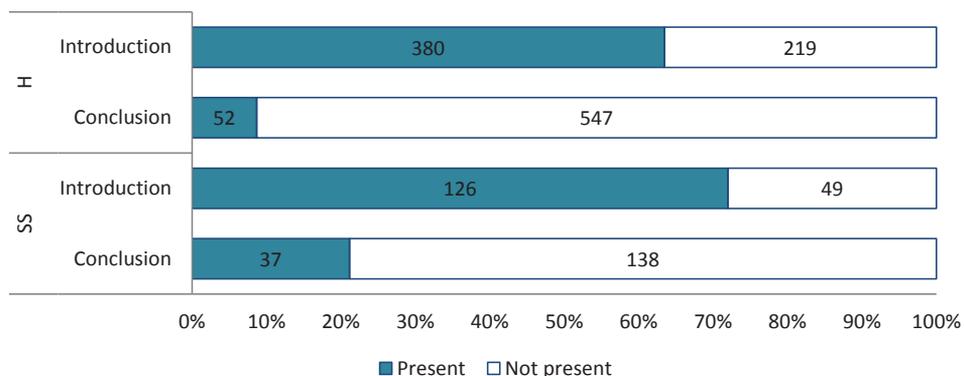
**Table 18:** Proportion of edited books written in Dutch, English, French and other languages for the SSH, humanities, social sciences and per place of publication.

		Dutch		English		French		Other languages		All languages	
		#	%	#	%	#	%	#	%	#	% of total EB
Field	SSH	74	9.8	586	77.8	59	7.8	34	4.5	753	100
	Humanities	68	11.4	441	73.6	57	9.5	33	5.5	599	79.5
	Social Sciences	7	4	163	93.1	4	2.3	1	0.6	175	23.1
Place of publication	Flanders	62	25.8	137	56.8	36	14.9	5	2.1	240	31.9
	The Netherlands	6	3.3	149	82.8	15	8.3	10	5.6	180	23.9
	UK	-	-	167	99.4	-	-	1	0.6	168	22.3
	Germany	-	-	45	75.0	-	-	15	24.6	60	8.0
	USA	1	2.3	42	97.7	-	-	-	-	43	5.7
	Other countries	1	4.8	11	52.4	6	28.6	3	14.3	21	2.8

Furthermore, Table 18 shows that for the whole of the SSH almost 4 in 5 edited books are written in English (n=586; 77.8%), one in ten are written in Dutch (n= 74; 9.8%), 59 (7.8%) are written in French and 34 (4.5%) are written in other languages. Dutch is more often used as a publication language for edited books in the humanities (n= 68; 11.5%) than in the social sciences (n=7; 4.0%). English is dominant as publication language in both fields (H: n=441; 73.6% and SS: n=163; 93.1%). French is more often used in the humanities (n=57; 9.5%), especially in literature (n=22; 21.6%) and linguistics (n=25; 17.4%), which can (partially) be explained by the Roman language study sections in those disciplines. Other languages occur mostly in literature (n=10; 9.83%) and philosophy (n=6; 9.1%).

### ***Occurrence of introductions and conclusions***

Figure 31 shows for the social sciences and the humanities the share and number of edited books with and without an introduction and/or conclusion. For the humanities, 380 (63.4%) of the edited books have an introduction and 52 (8.7%) have a conclusion. For the social sciences the proportions are slightly higher with 126 (72.0%) of the edited books in our study that have an introduction and 37 (21.1%) that have a conclusion. One or more of the editors mostly writes the introduction and conclusion. In addition to the conclusions, 21 (2.8%) edited books, i.e. 13 (2.9%) for the humanities and 8 (4.5%) for the social sciences, have an afterword, a summary, an epilogue, or a postscript. Political science stands out as the discipline where it is most common to write an introduction (67.4%) and/or a conclusion (32.6%) to an edited book. Overall, 67 (8.9%) of all edited books have an introduction and a conclusion, whereas 245 (32.5%) have neither. 423 (56.6%) edited books display an introduction but no conclusion and 18 (2.4%) edited books comprise a conclusion but no introduction.



**Figure 31:** Number and share of edited books in the humanities and in the social sciences with or without an introduction and/or conclusion.

### ***Collaboration within edited books***

Research collaboration brings together diverse people and interests to achieve a common purpose (here the scholarly edited book) via interactions, coordination of activities and sharing of information, competences and resources (Bukvova, 2010; Melin & Persson, 1996). For researchers, the reasons to collaborate are manifold, e.g. researchers gain access to expertise and equipment, enhance productivity and speed up the process, reduce isolation and create networks (Beaver, 2001). Furthermore, collaboration correlates with the visibility of research in terms of citations (Didegah & Thelwall, 2013; Puuska, Muhonnen, & Leino, 2014). Co-authorship data are commonly used to measure collaboration and the resulting indicators are quite easily compared regardless of the underlying characteristics of the collaborative process (Bukova, 2010). However, discussion concerning co-authorship bibliometrics and their relationship to collaboration remain (Katz & Martin, 1997; Laudel, 2002). Therefore other aspects of collaboration need to be taken into account while measuring collaboration, especially within the social sciences and humanities (Sula, 2012).

Collaboration within edited books includes collaboration between authors who co-author a chapter, collaboration between the volume editors, as well as collaboration between the editor(s) of the book and the authors of the book chapters. One could even argue that there is some collaboration among the authors of the different chapters. Measuring this multidimensional collaboration is complex and comprises different aspects, as shown in figure 1. In the following section, we discuss the different aspects separately and in relation to each other.

**Table 19:** The average and median number of chapters, of authors, of unique authors and of editors per book and the Revised Collaboration Coefficient for edited books, based on editors, and for book chapters, based on chapter authors.

discipline	av# chapters /book	Median #chapters/book	av# authors /book	Median # authors/book	av# unique authors /book	Median # unique authors/book	av# eds /book	Median #eds/book
SSH	17.1	14	23.1	18	19.7	17	2.7	2
Humanities	17.8	14	22.1	18	19.1	16	2.6	2
Social sciences	15.5	13	26.9	22	22.5	18	2.9	3
Economics	17.0	12	30.9	23	27.0	20	3.3	3
History	17.1	13	19.9	16	17.4	15	2.6	3
Law	17.9	16	34.2	21	21.7	19	2.6	2
Linguistics	17.4	14	21.4	18	19.1	16	2.6	3
Literature	19.1	16	20.2	17	19.0	16	2.9	3
Philosophy	16.0	13	18.0	15	16.9	14	2.5	2
Political science	13.7	12	21.2	18	16.4	14	2.3	2
Theology	17.6	16	19.2	18	17.4	15	2.4	2

Table 19 shows four of the aspects of collaboration in edited books: the average and median number of book chapters, of authors, of unique authors, and of editors. In addition, Table 20 provides the Pearson correlations between these four aspects of collaboration for the social sciences and humanities as a whole.

The first aspect is the number of book chapters: The average number of chapters per book is 17.1, with 17.7 for the humanities and 15.3 for the social sciences. In literature the average number amounts to 19.3 whereas in political science it is only 13.7. The median number of book chapters ranges from 12 for political science and economics to 16 for literature. Large differences between the average number of book chapters and the median number of book chapters are an indication of outliers, as seems the case in economics (average: 17.0; mean: 12).

The second aspect of collaboration shown in Table 19 is the number of authors per book, i.e. irrespective of the number of times an author is named as author of a chapter. There are on average 23.1 authors per book, 22.2 in the humanities and 26.9 in the social sciences. The highest average number of authors per book is found in law (34.2) and the lowest in philosophy (18.0). Table 20 indicates a moderate positive correlation of the average number of authors with the average number of chapters per book ( $r= 0.553$ ) and of the average number of authors with the average number of unique authors ( $r= 0.568$ ).

**Table 20:** Pearson correlation of four aspects of collaboration in edited books, i.e. number of editors, number of book chapters, number of authors and number of unique authors.

Pearson Correlation	# book chapters	# authors	# unique authors	# editors
# book chapters	1			
# authors	.553**	1		
# unique authors	.842**	.568**	1	
# editors	.156**	.125**	.259**	1
Total (N)	753	753	753	753

\*\* Correlation is statistically significant when  $<0.05$  (2-tailed).

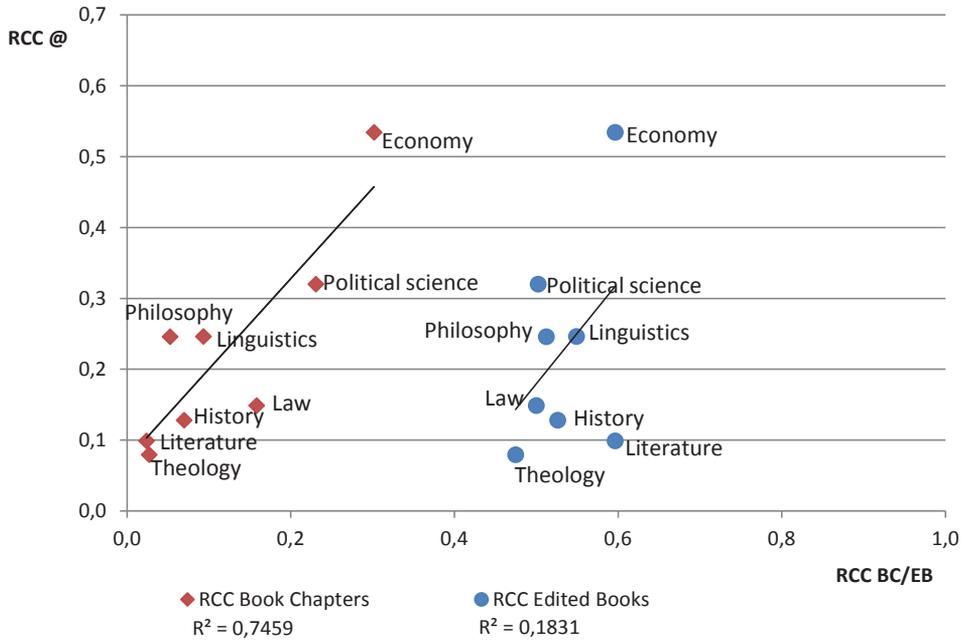
The third aspect of collaboration shown in Table 19 is the average number of unique authors per book. The average number is 19.7, for the humanities this is 19.1 and for the social sciences this is 22.5. The average number of unique authors is the highest in economics (27.0) and the lowest in political science (16.4). The largest difference between the mean and the median is found in economics, again indicating some outliers in the data set. Although the average number of unique authors is higher in the social sciences than in the humanities, the average number of book chapters is lower in the former than in the latter. This implies that on average there is a more diverse author pool per edited book in the social sciences than in the humanities. When e.g. comparing the average number of unique authors and of chapters in economics with the numbers for history, linguistics, and theology, this greater diversity becomes very clear. Table 20 indicates the correlation between number of book chapters and number of unique authors and, overall, there is a very strong positive correlation (0.842) between these two collaboration aspects, meaning that the more book chapters there are in a volume, the more unique authors will be found and vice versa.

The fourth aspect of collaboration shown in Table 19 is the number of editors per book. There are on average 2.7 editors per book, and the difference between the humanities (2.6) and the social sciences (2.9) is tiny. The highest average number of editors is found in economics (3.3) and the lowest in law (1.7). However, apart from these two disciplines, all disciplines have an average between 2.3 and 2.9 editors per book. The median for each of the disciplines varies between 2 and 3 editors per edited book, which confirms our expectation that co-editing a book is a common practice in all disciplines. When comparing the number of editors per book with the three aforementioned aspects, Table 20 indicates a negligible or weak correlation for all aspects. This means the number of editors is independent of the number of book chapters (correlation: 0.156), the number of unique authors (correlation: 0.259) and the number of authors (correlation: 0.125).

The independent-samples Kruskal-Wallis<sup>44</sup> Test is used to indicate the mutual independence of the averages per discipline per aspect shown in Table 20. The results indicate that for all 4 aspects of collaboration, the distributions differ significantly (each  $p < 0.05$ ) among the disciplines. However, when comparing the disciplines pairwise, not all differences are significant (see appendix). E.g.

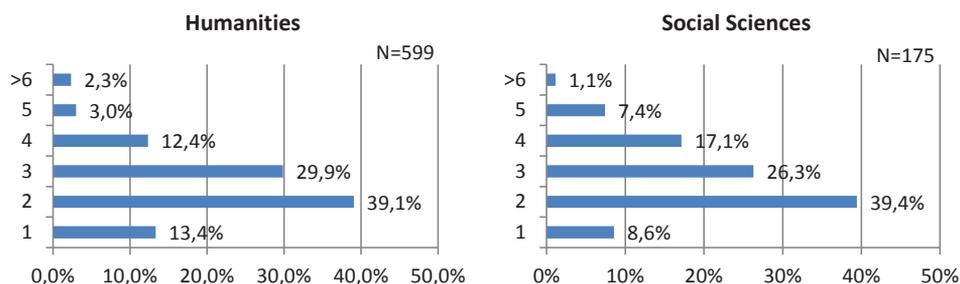
<sup>44</sup> To be able to calculate the independent-samples Kruskal-Wallis Test, all records belonging to more than one discipline (#27) were left out (i.e. defined as missing). When calculating the independent-samples Kruskal-Wallis Test including the records belonging to more than one discipline (i.e. duplicating the records for each of its corresponding disciplines), the results remain overall the same but show a lower significant level for number of editors per book (#chapters/book: sign ,000; # unique authors/book: sign ,000; # authors/book. sign ,000; # editors/book: sign ,005).

whereas political science has a significant different distribution in the number of book chapters compared with all disciplines in this study except economics, linguistics has no significant different distribution in the number of book chapters compared with all disciplines in this study except with political science. Political science seems to have a different tradition in the sense that volumes consist of less chapters than in most other disciplines.



**Figure 32:** Per discipline the Revised Collaborative Coefficient (RCC) based on authors of articles in VABB-SHW on the Y-axis and the RCC based on authors of the book chapters (BC) and the RCC of the editors of the edited books (EB) on the X-axis.

Figure 32 shows per discipline the correlation between the RCC of articles, as shown on the Y-axis, and the RCC of book chapters and of the edited books, as shown on the X-axis. Figure 4 shows that the more researchers within a discipline collaborate together in writing articles, the more they collaborate in writing book chapters, although co-authorship of articles is more common than co-authorship of chapters (Ossenblok et al., 2014). The RCC values for co-editing, however, are all larger than the RCC values for co-authoring of book chapters. Moreover they are all within the range of 0.47 (theology) and 0.60 (economics), indicating a strong tendency to co-edit in disciplines. In addition, the RCCs for book editing are almost not correlated to the RCCs for authorship of articles. This underlines the distinctive nature of edited books in the SSH and of the collaboration habits of the editors.



**Figure 33:** Share of edited books per number of editors per book for the Social Sciences and for the Humanities.

Indeed, Figure 33 displays the share of edited books per number of editors per book for the humanities and for the social sciences. For both the humanities (86.2%) and the social sciences (91.4%) the large majority of the edited books are edited by more than one editor. Previous research (Ossenblok et al., 2014) showed that in the humanities almost 30% of all articles and book chapters is co-authored whereas for the social sciences co-authoring amounts to over 80%. Hence in the humanities edited books are relatively more often co-edited than are articles or chapters co-authored. Yet although it appears from the distribution of edited books by number of editors as shown in Figure 5 that the number of co-editors is rather similar in the humanities and in the social sciences, the distributions do differ significantly ( $\chi^2=13.172 >11.0705$ ;  $df=5$ ;  $sign=.022$ ; Cramer's  $V= .135$ ,  $sign=.022$ ). In particular, editing a book with 4 or more editors is more common in the social sciences (25.6%) than it is in the humanities (17.7%), whereas sole editors are more common in the humanities (13.4%) than in the social sciences (8.6%).

## DISCUSSION AND CONCLUSION

In this article we study peer reviewed edited books as an important publication channel for the social sciences and especially for the humanities, defined as collections of chapters written by different authors gathered and harmonized by one or more editors. Previous research has shown the importance of monographs and edited books in the social sciences and humanities (Engels et al., 2012; Gorraiz et al., 2013; Nederhof, 2006). Literature on edited books is rather scarce and comprises on the one hand essays, mostly based upon own experiences, and on the other hand data-driven research using small local databases or the Book Citation Index from Web of Science. In this article we study edited books based on a comprehensive regional database, the Flemish Academic Bibliographic Database for the social sciences and humanities (VABB-SHW see Engels et al., 2012). Additional information concerning the edited books has been added to the database, resulting in 753 edited books and 12.913 book chapters included in our study for the period 2000-2011.

To start with, we looked at some general characteristics of the edited books in our data set: the distribution over publishers, the places of publication, language use and the presence of introductions and conclusions. The results of the first three characteristics demonstrate the international feature of the edited book and the highly concentrated distribution of edited books over publishers. The analysis of the presence of introductions and conclusions demonstrates the diversity in the editing process of the books. Firstly, the international feature of the edited book is reflected in the publication language and the scope of the publisher, as English and international publishing houses are directly related to

worldwide accessibility (Hicks, 2004; Verleysen & Engels, 2014b). English is the dominant publication language (78%) for both the Flemish (57%) as the non-Flemish publishers and for both the social sciences (93%) and the humanities (74%). When comparing these last two results with findings in previous research (Verleysen, Ossenblok, Spruyt, & Engels, 2015) we find that in both fields English as publication language for edited books is more common than English for articles, as only half of the articles in the humanities and 4 in 5 articles in the social sciences are published in English. Moreover, in the humanities proportionally more edited books than monographs are written in English, whereas, in contrast, in the social sciences no difference has been found in this regard. Besides, half of the edited books are published in the Netherlands (24%) and the United Kingdom (22%), both countries housing large international publisher houses. However, Flanders remains the main publication place for edited books (32%), which might be explained by the economic logic of the publishers. Derricourt (2012) states that the name and institution and background of the author/editor form part of the decision of the publisher to support a project, even though the publisher is also likely to take a risk with an unknown author with interesting ideas. Previous research (Verleysen & Engels, 2014b) showed that especially in the humanities, peer reviewed book literature is often published with local publishers. Secondly, our results demonstrate a high concentration of edited books (75%) published with only a few (#14; 16%) publishers and a low concentration (25%) with the remaining 74 publishers in our study. These results might confirm previous statements that publishers are seen as rather reluctant of accepting and supporting an edited book project (Thomas & Hrebenar, 1993; Nederman, 2005; Edwards, 2012) and that proximity for both the editor and the publisher (Derricourt, 2012) is important in reducing the economic risk. However, these results might also be an indication of the ever changing publishers landscape, with acquisitions and mergers and growing publisher conglomerates (Thompson, 2005). Lastly, we found differences in the editing process concerning the inclusion of an introduction and a conclusion. Although including an introduction, a conclusion or bridging sections in an edited book is advised to frame the volume as a whole (Nederman, 2005), it does not seem to be very common for neither the humanities nor the social sciences. However, some of the first chapters might replace the introduction in its role of unifying the chapters contextually. On average 3 in 5 edited books have an introduction and 1 in 10 edited books have a conclusion. Overall, almost 1 in 10 edited books have an introduction and a conclusion and 3 in 10 edited books have neither.

In the second part of this article we studied the collaboration patterns within edited books using 4 aspects related to measuring collaboration: number of chapters per book, number of authors per book, number of unique authors per book and number of editors per book. We found that all four aspects correlate positively two by two except for number of editors per book. Most edited books in both social sciences and humanities have more than 2 editors, irrespective of the number of book chapters, number of authors and number of unique authors in that book. In general, the humanities and the corresponding disciplines have on average more book chapters per book than the social sciences. However, the humanities have on average less unique authors and less authors per edited book than the social sciences. This shows that within (some of) the humanities disciplines, collaboration is less frequent than it is in (most of) the social sciences disciplines, also in edited books. Furthermore, these results indicate there is a more diverse author pool per edited book in the social sciences than in the humanities. The number of unique authors per edited book is not only positively correlated to the number of book chapters and the total number of authors, it is possibly also influenced by the number of authors per chapter. Ossenblok et al (2014) demonstrated that book chapters are more often co-authored and have on average more authors per chapter in the social sciences than in the humanities.

Further possible explanations can be found in the different publication cultures related to the prestige of editing a book and the nature of the research topics as well as in the size of the editors' network and the number of international authors participating in the edited book project. However, further research is needed to fine-tune all the aforementioned possible explanations. Additionally in this research we used the number of authors per article and per book chapter and the number of editors per edited book to calculate respectively the Revised Collaborative Coefficient (RCC) of articles, book chapters and edited books. Whereas the RCC of book chapters correlates positively with the RCC of articles, this is not true for the RCC of editors per book. Meaning, the more co-authorship we found in articles within a discipline, the more co-authorship we found in book chapters, but not in co-editing a book, because most edited books have more than one editor. However, the distribution of number of editors for the humanities differs significantly with that of the social sciences where the latter has more co-edited books and more editors per co-edited book. All in all, though, for both the social sciences and especially the humanities, co-editing a book is relatively more common than co-authoring an article or a book chapter (Ossenblok et al., 2014).

### ***Limitations and future research***

Some limitations of this study should be put forward. First, our study focusses on edited books with one or more editors affiliated with a Flemish institution, resulting in a comprehensive but rather small selection of edited books. When focusing on the different disciplines, only 2 social sciences disciplines, i.e. political science and economics, were studied in detail as all other disciplines did not have more than 40 books within the chosen time frame (2000-2011). Including other comparable local and international data sets in future research would facilitate a more elaborated robust data set which enhances the possibility for interesting disciplinary comparisons. In addition, the selection of edited books is based on the selection of the publishers included in the VABB-SHW (for a full account see: [www.ecoom.be/vabb](http://www.ecoom.be/vabb)). The main selection (list of 2010) is based on the Norwegian publishers list (level 2), which includes mainly international publishers. Only 2 Flemish publishers were fully included in the publishers selection for the VABB-SHW: Peeters and Brepols, resulting in a share of 1 in 5 edited books published by Peeters, half of which belonging to only two disciplines: theology (n=60; 38.7%) and literature (n=28; 18.1%), both disciplines included in our study. Also, when looking up the place of publication, we always used the first city mentioned as the place. This might give a small but distorted view in place of publication as 7.5% of the publishers have more than one city mentioned (e.g. Leiden – Boston). In addition, publishers might change the place of publication without changing their headquarters.

More research on edited books and the related collaboration practices is needed. Using co-authorship and co-editorship as measures of collaboration is based upon the assumptions that all authors and editors took part in the research collaboration process and that all scientists who collaborated became co-authors (Laudel, 2002). Laudel (2002) further indicates different types of collaboration practices exist within articles. Further research is needed to define the different types of collaboration within edited books and especially concerning the nature of collaboration between the editor of the book and the authors of the chapters. Furthermore, as is assumed that editors often use their network in the process of editing a book (Edwards, 2012), a more detailed study of these networks would give more insights in the making of edited books and the collaboration patterns. Comparing co-authorship networks and co-editorship networks per field, discipline and on an individual basis will give more insight in the bridging role of the edited book for its contributors. Looking at the number of editors,

the use of English as publication language in both social sciences and humanities and the broad range of topics edited books cover, we assume international collaboration is more common practice in edited books than it is in articles. Although we found only a weak correlation between the number of editors and the number of unique authors, looking at the difference between international collaborating editors and locally collaborating editors, i.e. number of non-Flemish editors and chapter authors, could give more insight in the network structure and the use of the international networks by editors.

## ACKNOWLEDGEMENTS

The authors thank all colleagues who helped in setting up the VABB-SHW database. We are also grateful to the Flemish Government for providing an adequate legal framework and funding. All the same we thank Lynn Elshof, Robin Houben and H el ene Veragten for helping with the construction of the additional data set. Finally we thank our colleagues Nick Deschacht, Raf Guns, Ronald Rousseau and Frederik Verleysen for useful comments.

## REFERENCE LIST

- Ajiferuke, I., Burrell, Q., & Tague, J. (1988). Collaborative coefficient: A single measure of the degree of collaboration in research. *Scientometrics*, 14, 421-433.
- Beaver, D. D. (2001). Reflections in scientific collaboration (and its study): Past, present and future. *Scientometrics*, 52, 365-377.
- Bukova, H. (2010). Studying research collaboration: A literature review. *Sprouts Working Papers on Information Systems*, 10(3), <http://sprouts.aisnet.org/10-3>.
- Derricourt, R. (2012). Peer review: Fetishes, fallacies and perceptions. *Journal of Scholarly Publishing*, 43, 137-147.
- Didegah, F. & Thelwall, M. (2013). Which factors help authors produce the highest impact research? Collaboration, journal and document properties. *Journal of Informetrics*, 7, 861-873.
- Edwards, L. (2012). Editing academic books in the humanities and social sciences: Maximizing impact for effort. *Journal of Scholarly Publishing*, 44, 61-74.
- Egghe, L. (1991). Theory of collaboration and collaborative measures. *Information processing and management*, 27, 177-202.
- Engels, T. C. E., Ossenblok, T. L. B., & Spruyt, E. H. J. (2012). Changing publication patterns in the social sciences and humanities, 2000-2009. *Scientometrics*, 93, 373-390.
- Galanter, M. (2008). A guide for preparation of an academic edited book. *Substance abuse*, 29, 1-4.
- Gold, D. (1999). A tapestry of kings: Edited volumes and the growth of knowledge in religious studies. *Religion*, 29, 243-259.
- Gorraiz, J., Purnell, P. J., & Gl anzel, W. (2013). Opportunities and limitations of the book citation index. *Journal of the American Society for Information Science & Technology (Jasist)*, 64, 1388-1398.
- Harnad, S. (1986). On reviewing (and publishing in) edited interdisciplinary volumes. *Contemporary Psychology*, 31, 390.
- Heumann, L. (2001). Growth of edited volumes. *Journal of the American Planning Association*, 67, 467-468.
- Hicks, D. (2004). The four literatures of social science. In H.F.Moed, W. Gl anzel, & U. Schmoch (Eds.), *Handbook of quantitative Science and Technology Research: The use of publication and patent statistics in studies of S&T systems* (pp. 473-496). Dordrecht: Kluwer Academic.
- Ingwersen, P. & Larsen, B. (2014). Influence of a performance indicator on Danish research production and citation impact 2000-12. *Scientometrics*, 101, 1325-1344.
- Katz, J. S. & Martin, B. R. (1997). What is research collaboration? *Research Policy*, 26, 1-18.
- Laudel, G. (2002). What do we measure by co-authorship? *Research Evaluation*, 11, 3-15.

- Leal, D. L. (2013). Chapters, volumes, editors! Oh my! Reassessing the role of edited volumes in the social sciences. *Political Science and Politics*, 46, 380-382.
- Lewis, R. (1996). Books with multiple contributors present multiple editing challenges. *The Scientist*, 10, 15.
- Leydesdorff, L. & Felt, U. (2012). Edited volumes, monographs and book chapters in the book citation index (BKCI) and science citation index (SCI, SSCI, A&HCI). *Journal of Scientometric Research*, 1, 28-34.
- Melin, G. & Persson, O. (1996). Studying research collaboration using co-authorships. *Scientometrics*, 36, 363-377.
- Nederhof, A. J. (2006). Bibliometric monitoring of research performance in the social sciences and the humanities: A review. *Scientometrics*, 66, 81-100.
- Nederman, C. J. (2005). Herding cats: The view from the volume and series editor. *Journal of Scholarly Publishing*, 36, 221-228.
- Ossenblok, T. L. B., Verleysen, F. T., & Engels, T. C. E. (2014). Co-authorship of journal articles and book chapters in the social sciences and humanities (2000-2010). *Journal of the American Society for Information Science & Technology (Jasist)*, 65, 882-897.
- Ossenblok, T. L. B., Verleysen, F. T., Spruyt, E. H. J., & Engels, T. C. E. (2013). Bibliometrische analyse van het Vlaamse universitaire onderzoek in de sociale en humane wetenschappen aan de hand van het VABB-SHW. In K. Debackere & R. Veugelers (Eds.), *Vlaams indicatorenboek 2013* (pp. 91-103). Brussel: Expertisecentrum Onderzoek & Ontwikkelingsmonitoring (ECoOM), Ministerie van de Vlaamse Gemeenschap.
- Puuska, H.-M., Muhonnen, R., & Leino, Y. (2014). International and domestic co-publishing and their citation impact in different disciplines. *Scientometrics*, 98, 823-839.
- Rousseau, R. (2011). Comments on the modified collaborative coefficient. *Scientometrics*, 87, 171-174.
- Sivertsen, G. (2010). A performance indicator based on complete data for the scientific publication output at research institutions. *ISSI Newsletter*, 6, 22-28.
- Sula, C. A. (2012). Visualizing social connections in the humanities: Beyond bibliometrics. *Bulletin of the American Society for Information Science and Technology*, 38, 31-35.
- Thomas, C. S. & Hrebenar, R. J. (1993). Editing multiauthor books in political science: Plotting your way through an academic minefield. *Political Science and Politics*, 26, 778-783.
- Thompson, J. B. (2005). *Books in the digital age. The transformation of academic and higher education publishing in Britain and the United States*. Cambridge (UK): Polity.
- Torres-Salinas, D., Robinson-Garcia, N., Cabezas-Clavijo, Á., & Jiménez-Contreras, E. (2013). Analyzing the citation characteristics of books: Edited books, book series and publisher types in the Book Citation Index. *Scientometrics*, 98, 2113-2127.
- Verleysen, F. T. & Engels, T. C. E. (2014a). Barycentre representation of book publishing internationalization in the social sciences and humanities. *Journal of Informetrics*, 8, 234-240.
- Verleysen, F. T. & Engels, T. C. E. (2014b). Internationalization of peer reviewed and non-peer reviewed book publications in the social sciences and humanities. *Scientometrics*, 101, 1431-1444.
- Verleysen, F. T., Ghesquière, P., & Engels, T. C. E. (2014). The objectives, design and selection process of the Flemish Academic Bibliographic Database for the Social Sciences and Humanities (VABB-SHW). In W. Blockmans & al. (Eds.), *The use and abuse of bibliometrics* (pp. 115-125). Academiae Europaea; Portland Press.
- Verleysen, F.T., Ossenblok, T.L.B., Spruyt, E.H.J., & Engels, T.C.E. (2015). Bibliometrische analyse van het Vlaamse universitaire onderzoek in de sociale en humane wetenschappen aan de hand van het VABB-SHW. In K. Debackere & R. Veugelers (Eds.), *Vlaams indicatorenboek 2015*. (pp. 46-47) Brussel: Expertisecentrum Onderzoek & Ontwikkelingsmonitoring (ECoOM), Ministerie van de Vlaamse Gemeenschap. P46-47.  
[https://www.ecoom.be/indicatorenboek\\_2015\\_files/Indicatorenboek\\_2015.pdf](https://www.ecoom.be/indicatorenboek_2015_files/Indicatorenboek_2015.pdf)

**APPENDIX**

**Table 21:** Significant difference between two disciplines per collaboration aspect.

Significant difference between two disciplines per collaboration aspect	Economics	History	Law	Linguistics	Literature	Philosophy	Political science
History	# book chapters	,468					
	# unique authors	,000					
	# authors	,000					
Law	# editors	,212					
	# book chapters	,006	,037				
	# unique authors	,406	,000				
Linguistics	# authors	,136	,025				
	# editors	,054	,470	,411			
	# book chapters	,089	,371	,114			
Literature	# unique authors	,007	,007	,078			
	# authors	,000	,025	,032			
	# editors	,139	,978	,470			
Philosophy	# book chapters	,006	,043	,742	,141		
	# unique authors	,002	,058	,022	,424		
	# authors	,000	,274	,002	,202		
Political science	# editors	,822	,228	,047	,127		
	# unique authors	,819	,597	,008	,122	,008	
	# authors	,000	,961	,000	,007	,060	
Theology	# editors	,000	,672	,000	,005	,112	
	# book chapters	,049	,467	,402	,467	,041	
	# unique authors	,093	,015	,000	,000	,000	,048
Philosophy	# authors	,000	,936	,000	,012	,070	,899
	# editors	,000	,325	,014	,373	,934	,165
	# book chapters	,012	,481	,116	,164	,009	,595
Political science	# unique authors	,039	,186	,314	,549	,428	,053
	# authors	,000	,228	,003	,102	,435	,240
	# editors	,000	,487	,001	,080	,654	,238
Theology	# editors	,016	,266	,191	,280	,009	,768
	# unique authors	,000	,000	,000	,000	,000	,000
	# authors	,000	,000	,000	,000	,000	,000
Political science	# editors	,016	,266	,191	,280	,009	,768
	# unique authors	,000	,000	,000	,000	,000	,000
	# authors	,000	,000	,000	,000	,000	,000

## **8.7 What's special about book editors? A bibliometric comparison of book editors and other Flemish researchers in the social sciences and humanities. (ISSI-proceedings 2015)**

### **Reference**

Ossenblok, T. L. B., & Thelwall, M. (2015). What's special about book editors? A bibliometric comparison of book editors and other Flemish researchers in the social sciences and humanities. In A. A. Salah, Y. Tonta, A. A. Akdag Salah, C. R. Sugimoto, & U. Al (Eds.), *Proceedings of the 15th international society of scientometrics and informetrics conference (ISSI) (29 June-3 July 2015)*, 778-783. Istanbul.

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Mike Thelwall

### **Conference Topic**

Country-level studies and measuring collaboration in SSH

### **ABSTRACT**

This paper examines the bibliometric characteristics of book editors and non-editors, focussing on gender, career stage, number of publications and collaboration practices. The data consist of 8970 Flemish affiliated researchers with at least one publication between 2000 and 2011 in the comprehensive Flemish academic bibliometric database (VABB-SHW). The analysis shows that most book editors are established male researchers while most non-editors are non-established male researchers. Moreover, males are more likely to be editors than are females. Half of the established editors edit more than 1 book, in contrast to only a small number of non-established editors. Overall, book editors publish more than non-editors, but, when controlling for career stage, book editors publish even more book chapters and monographs than do non-editors. Although editors are highly collaborative while editing a book, no significant differences were found in the number of collaborative articles, monographs, book chapters and proceedings papers written by editors and non-editors.

## INTRODUCTION

Bibliometric studies have demonstrated the importance of books to many disciplines belonging to the social sciences and humanities (SSH). There is a growing consensus among researchers and policy-makers that scholarly publication patterns and their underlying research cultures cannot be adequately analysed without the inclusion of books (Hicks, 2004; Nederhof, 2006; Sivertsen, 2009). So far, this insight has resulted in a limited number of studies on books in the SSH, mostly focused on scholarly monographs. A book publication type that has received far less attention is the edited book. Editing a book often appears to be undervalued for academic careers (Edwards, 2012) but, in Flanders, from 2010 onwards, edited books are included in the funding system (Ossenblok & Engels, 2015) which gives incentives to individual researchers to take on book editorships (Gläser & Laudel, 2007).

We define an edited book here as a collection of chapters written by different authors, gathered and harmonized by one or more editors (Ossenblok & Engels, 2015) and identifiable by the presence of an ISBN. Edited books have been shown to comprise a sizeable share of the publication output of many SSH disciplines, especially in the humanities (Leydesdorff & Felt, 2012; Nederhof, 2006). In Flanders, the Northern Dutch-speaking part of Belgium, about 2% of all peer reviewed publications in the SSH are edited books, with up to 6% in linguistics, literature and theology (Engels, Ossenblok, & Spruyt, 2012). Compared to monographs, edited books have significantly higher citation rates, especially in social science disciplines (Torres-Salinas, Robinson-Garcia, Cabezas-Clavijo, & Jiménez-Contreras, 2013).

This paper presents a bibliometric case study of the characteristics of book editors, for which, to the best of our knowledge, no previous studies exist. We analyse comprehensive publication data and present four elements of a general profile of these scholars: career stage; gender; number of publications; and collaboration practices. We hypothesise that scholars tend to edit books only when they are established researchers that are at the forefront of scholarly collaboration.

## DATA AND METHODS

The data set consists of 8970 authors affiliated with one of the five Flemish universities and who have published a minimum of one peer reviewed publication in the period 2000-2011: a journal article, monograph, edited book, book chapter and/or proceedings paper included in the VABB-SHW (for a full account see: Engels et al., 2012). Because of the use of this database for funding in Flanders, this database appears to be close to exhaustive in its coverage of Flemish research. In addition to the data found in the VABB-SHW, we also determined the gender of all authors. For this, two researchers independently divided all unambiguous first names into two groups: male names and female names. The remaining authors were looked up on the internet, resulting in an additional 1462 gender matches.

A comparison was made between two subsets: book editors (researchers who have published a minimum of 1 peer reviewed edited book in the period under study); and all other researchers, called here non-editors although they may be journal editors or may have edited books during other periods of time. Furthermore, we differentiated between established and non-established researchers. Established researchers are defined in this study as having a total of 12 publications or more and at least one publication in a minimum of 6 different years in the period 2000-2011. These heuristics were chosen after inspection of typical properties of authors in the database. Of course, non-established

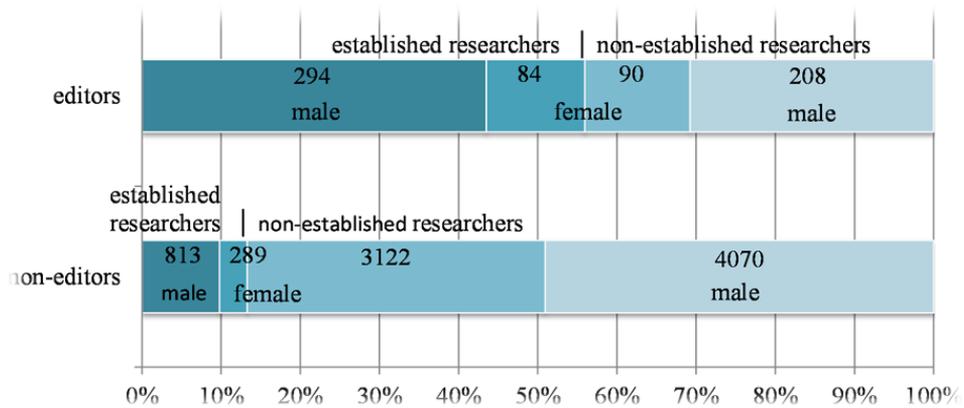
researchers may have many publications within up to five years, may have a prolific consistent set of outputs before or after the period analysed, or may have many outputs of a type not recorded in the database (e.g., book reviews, performances). Nevertheless, the criteria seem to be effective at differentiating between two sets of researchers, the first of which contains researchers that can reasonably be thought of as being established and the second of which probably contains a much lower proportion of established researchers. Cramer's V was used to measure the strength of the correlation between the different subsets, resulting in a number between 0 (no association) and 1 (maximum association). In addition the Mann-Whitney U test, a rank-based nonparametric test, was used to determine whether there were differences between the subsets on the different characteristics under study, using  $p=0.05$  as the threshold for statistical significance.

## RESULTS

### *Career stage and gender*

Figure 34 shows the proportion and number of established and non-established, male and female editors and non-editors in our study. In total, 676 (7.5%) researchers had published one or more edited books (i.e., editors), and 8970 (92.5%) researchers had not published an edited book (i.e., non-editors). Figure 34 demonstrates that 55.9% ( $n=378$ ) of editors are established researchers whereas 13.3% ( $n=1102$ ) of non-editors are established researchers. Furthermore, 74.3% ( $n=502$ ) of editors are male whereas to 58.9% ( $n=4883$ ) of non-editors are male. In addition, 9.3% of all male researchers are editors and 4.9% of all female researchers are editors. Furthermore, 25.5% of all established researchers are editors, whereas only 4% of all non-established researchers are editors. Altogether, 43.5% ( $n=294$ ) are male established editors, 30.8% ( $n=208$ ) are male non-established editors, 13.3% ( $n=90$ ) are female non-established editors and 12.4% ( $n=84$ ) are female established editors. Different proportions occur in the subgroup of the non-editors where 49.1% ( $n=4070$ ) are male non-established researchers, 37.6% ( $n=3122$ ) are female non-established researchers, 9.8% ( $n=813$ ) are male established researchers and 3.5% ( $n=289$ ) are female established researchers.

There is a moderate association (Cramer's  $V=0.134$ ;  $p=.000$ ) between gender and career status overall (see also Figure 34). However, when looking at the different subsets, the correlation between gender and career status is stronger within the subset of non-editors (Cramer's  $V=0.119$ ;  $p=.000$ ) than within the subset of editors (Cramer's  $V=0.091$ ;  $p=.000$ ). Overall, though, career status has a stronger association with editorship than with gender (resp. Cramer's  $V=0.304$ ;  $p=.000$  and Cramer's  $V=0.083$ ;  $p=.000$ ). Therefore in the rest of this study we will focus on differences in career status rather than gender.



**Figure 34:** Share and number of established and non-established, male and female editors and non-editors (2000-2011).

### **Number of publications**

Table 22 shows the mean and median number of edited books, articles, book chapters, monographs and proceedings papers for all editors and non-editors. In addition, Table 22 displays the difference between non-established and established researchers. Overall, editors publish on average a greater number of all publication types than do non-editors. However, established non-editors publish on average more articles than do established editors. Mann-Whitney U tests were run to test for differences in numbers of publications between editors and non-editors for all publication types except edited books. The distributions of all the publication types for editors and non-editors and for established and non-established researchers were visually similar. The differences between editors and non-editors are statistically significant for all publication types (all  $p=.000$ ). When comparing established editors and established non-editors, all differences are significantly different ( $p=.000$ ) except for the numbers of proceedings papers ( $p=.138$ ). When comparing non-established editors with non-established non-editors, the differences for articles ( $p=.119$ ) and proceedings papers ( $p=.911$ ) were not significantly different, whereas the differences for book chapters and monographs were (both  $p=.000$ ).

Furthermore, Table 22 shows that the median of numbers of edited books differ between established and non-established editors. Non-established editors are more likely to have (co-)edited one book whereas established editors are more likely to have more than 1 edited book. More specifically, 83.2% of all non-established editors have one edited book, whereas 48.4% of all established editors have one edited book, 24.3% have two edited books and 27.2% have three or more edited books.

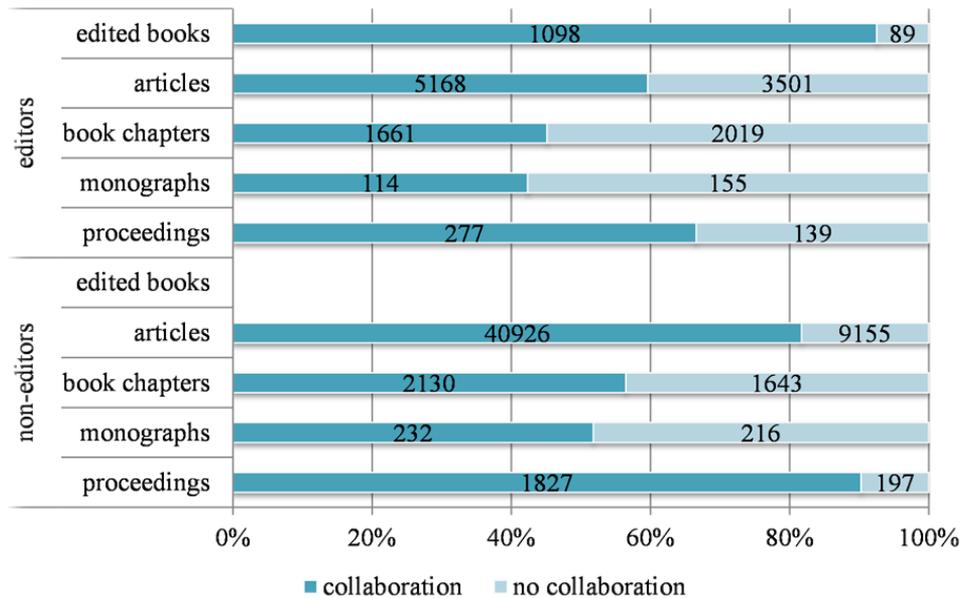
**Table 22:** The mean and median (med) number of edited books, articles, book chapters, monographs and proceedings papers for all established and non-established editors and non-editors (2000-2011).

		<i>edited books</i>		<i>articles</i>		<i>book chapters</i>		<i>monographs</i>		<i>proceedings papers</i>	
		<i>mean</i>	<i>med</i>	<i>mean</i>	<i>med</i>	<i>mean</i>	<i>med</i>	<i>mean</i>	<i>med</i>	<i>mean</i>	<i>med</i>
Editor	established researcher	2.17	2	20.62	14	7.92	6	0.59	0	0.97	0
	non-established researcher	1.22	1	2.93	2	2.31	2	0.16	0	0.17	0
	total	1.76	1	12.82	7	5.44	4	0.40	0	0.62	0
non-editor	established researcher	-	-	26.00	18	1.57	1	0.22	0	0.82	0
	non-established researcher	-	-	3.00	2	0.29	0	0.03	0	0.16	0
	total	-	-	6.06	2	0.46	0	0.05	0	0.24	0

### **Collaboration practices**

For both editors and non-editors, Figure 35 shows the proportion of their edited books, articles, book chapters, monographs and proceedings papers that have been published in collaboration (i.e., multiple authored versus single authored publications). Editors collaborate the most while editing a book (90.3%; n=1827), which is in agreement with previous research demonstrating that most edited books are co-edited (Ossenblok & Engels, 2015). Furthermore, established editors collaborate more than non-established editors for all publication types under study (p=.000). Altogether, though, non-editors seem to collaborate more for articles, book chapters, monographs and proceedings papers than do editors. Mann-Whitney U tests were run to determine if editors and non-editors differ significantly in their numbers of collaborative publications. The different distributions of all the publication types, except edited books, were visually similar. The numbers of collaborative publications of editors and non-editors were statistically significantly different for book chapters and monographs (both p=.000) but not for articles (p=.282) and proceedings papers (p=.116). Thus, non-editors collaborate significantly more in book chapters and in monographs than do editors. In addition, when comparing non-established editors with non-established non-editors, no significant difference in the number of collaborative publications was found for all publication types separately (but p=.000 for articles, monographs and book chapters; p=.005 for proceedings papers). However, when distinguishing between established editors and non-editors, the differences are significant for all publication types

separately ( $p=.000$ ) except for proceedings papers ( $p=.208$ ). In sum, established non-editors collaborate more than do established editors for articles, monographs and book chapters.



**Figure 35:** The proportion of collaborative and solo publications for all editors and non-editors by publication type (2000-2011).

## DISCUSSION AND CONCLUSIONS

Within a comprehensive collection of Flemish affiliated authors' publications for 2000-2011, this paper demonstrates that 7.5% of the authors have edited one or more books, that more than half of the book editors are established researchers, and that 3 in 4 editors are male. Female researchers are less likely to be established than are male researchers and this difference is more pronounced for non-editor than for editors. As career status in this study is defined through numbers of publications and publication years, these findings confirm previous findings that male researchers are often more productive than are their female colleagues (Lariviere, Ni, Gingras, Cronin, & Sugimoto, 2013; Puuska, 2010).

Editors tend to publish significantly more articles, book chapters, monographs and proceedings papers than do non-editors. However, the differences are not statistically significant between the average number of proceedings papers of established editors and non-editors and between the average number of articles and proceedings papers of non-established editors and non-editors. Most non-established editors published only 1 edited book in the period under study, whereas more than half of the established editors published 2 or more edited books. This might be due to the need for a large network and good networking skills for gathering contributions from individual chapter authors for an edited book (Edwards, 2012; Thomas & Hrebentar, 1993). We therefore expected editors to be more collaborative than were non-editors for all publication types, but although 9 out of 10 editors

collaborated while editing a book, non-editors collaborated significantly more for book chapters and monographs than did editors. Furthermore, no significant difference was found in the number of collaborative articles and proceedings papers between editors and non-editors. As edited books are more common in humanities disciplines (Engels et al., 2012) and the humanities have been known to collaborate less than the social sciences in articles and book chapters (Ossenblok, Verleysen, & Engels, 2014), the low level of collaboration of editors might be due to them tending to be humanities scholars.

Overall, the findings offer a first insight into some of the bibliometric characteristics of editorship. Future research will focus on disciplinary differences in collaboration practices between book editors and non-editors. A more detailed analysis of collaboration practices will involve not only the number of collaborative publications, but also the number of co-authors. As previous research (Ossenblok & Engels, 2015) has shown, edited books are often published in English, and so the study of the number of international co-authors and co-editors will broaden our knowledge about the international nature of the collaboration network of the editors. In addition, links between book editors and their chapter authors would provide a more complete picture of the collaboration practices of book editors. This would contribute greatly to our understanding of collaborative practices in the SSH.

## ACKNOWLEDGMENTS

The authors thank their colleagues Nele Dexters, Tim Engels, Raf Guns and Frederik Verleysen for their useful comments.

## REFERENCE LIST

- Edwards, L. (2012). Editing academic books in the humanities and social sciences: Maximizing impact for effort. *Journal of Scholarly Publishing*, 44, 61-74.
- Engels, T. C. E., Ossenblok, T. L. B., & Spruyt, E. H. J. (2012). Changing publication patterns in the social sciences and humanities, 2000-2009. *Scientometrics*, 93, 373-390.
- Gläser, J. & Laudel, G. (2007). Evaluation without evaluators. In R. Whitley & J. Gläser (Eds.), *The changing governance of the sciences. The advent of research evaluation systems* (pp. 127-151). Dordrecht: Springer Science.
- Hicks, D. (2004). The four literatures of social science. In H.F. Moed, W. Glänzel, & U. Schmoch (Eds.), *Handbook of quantitative Science and Technology Research: The use of publication and patent statistics in studies of S&T systems* (pp. 473-496). Dordrecht: Kluwer Academic.
- Larivière, V., Ni, C., Gingras, Y., Cronin, B., & Sugimoto, C. R. (2013). Global gender disparities in science. *Nature*, 504, 211-213.
- Leydesdorff, L. & Felt, U. (2012). Edited volumes, monographs and book chapters in the Book Citation Index (BKCI) and Science Citation Index (SCI, SoSCI, A&HCI). *Journal of Scientometric Research*, 1, 28-34.
- Nederhof, A. J. (2006). Bibliometric monitoring of research performance in the social sciences and the humanities: A review. *Scientometrics*, 66, 81-100.
- Ossenblok, T. L. B. & Engels, T. C. E. (2015). Edited books in the social sciences and humanities: Characteristics and collaboration analysis. *Scientometrics*, 104(1), 219-237.
- Ossenblok, T. L. B., Verleysen, F. T., & Engels, T. C. E. (2014). Co-authorship of journal articles and book chapters in the social sciences and humanities (2000-2010). *Journal of the American Society for Information Science & Technology (Jasist)*, 65, 882-897.
- Puuska, H.-M. (2010). Effects of scholar's gender and professional position on publishing productivity in different publication types. Analysis of a Finnish university. *Scientometrics*, 82, 419-437.

- Sivertsen, G. (2009). Publication patterns in all fields. In F. Aström, R. Danell, B. Larsen, & J. W. Schneider (Eds.), *Celebrating scholarly communication studies: A Festschrift for Olle Persson at his 60th birthday* (pp. 55-60). ISSI.
- Thomas, C. S. & Hrebenar, R. J. (1993). Editing multiauthor books in political science: Plotting your way through an academic minefield. *Political Science and Politics*, 26, 778-783.
- Torres-Salinas, D., Robinson-Garcia, N., Cabezas-Clavijo, Á., & Jiménez-Contreras, E. (2013). Analyzing the citation characteristics of books: Edited books, book series and publisher types in the Book Citation Index. *Scientometrics*, 98, 2113-2127.

## 8.8 Book editors in the social sciences and humanities: an analysis of publication and collaboration patterns of established researchers in Flanders (Learned Publishing, 2015)

### Reference

Ossenblok, T.L.B., Guns, R., & Thelwall, M. (2015). Book editors in the social sciences and humanities: an analysis of publication and collaboration patterns of established researchers in Flanders. *Learned Publishing, Learned Publishing*, 28(4), 261-273.

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### ABSTRACT

Book editors in the social sciences and humanities play an important role in their fields but little is known about their typical publication and collaboration patterns. To partially fill this gap, we compare Flemish editors and other researchers, in terms of career stage, productivity, publication types, publications with domestic and international collaboration as well as the number of (international or all) unique co-authors, co-editors and associated book chapter authors. The results show that editors are most established researchers, especially in the social sciences, produce more book chapters and monographs than do other researchers and are more productive. Nevertheless, editors collaborate less than do other researchers, both in terms of publications and in number of co-authors. Including book chapter authors in the editors' collaboration networks makes those networks substantially larger, demonstrating that editors do not mainly call upon authors from their existing collaboration network when choosing book chapter authors in the edited books. Finally, editors seem to co-author with their book chapter authors slightly more often after the publication of the edited book than before.

### KEY POINTS

- Editorship is especially important for humanities researchers as more than 10% have edited one or more books.
- Book editing is undertaken by both established and non-established researchers in the humanities and mostly by established researchers in the social sciences
- Book editors are more productive overall than are other researchers
- Adding book chapter authors to a co-authorship network increases its diversity and internationalism
- A minority of editors collaborates with book chapter authors before (28%) or after (36%) the edited book.

### INTRODUCTION

Editing books is an important task in some disciplines (Leydesdorff & Felt, 2012; Torres-Salinas, Robinson-Garcia, Cabezas-Clavijo, & Jiménez-Conterras, 2013), especially in the humanities. Despite this, little is known about types of people that edit books, how they fit into their fields, and what impact editing a book has on their careers. In response, this article focuses on publication and collaboration patterns of Flemish book editors, contrasting book editors with other researchers. A book editor in this study is defined as an academic who gathers and harmonizes a collection of book chapters written by different authors which are published in an edited book (Ossenblok & Engels, 2015). Typically, the names of the academic book editors appear on the cover of the edited book. These editors presumably (co-)determine the choice of the book chapter authors, guided by the needs of the book theme as an edited book can come into being at the initiative of the publisher, the editor(s) and/or as a result of a scholarly meeting or conference (Lewis, 1996). Although different types of editors are involved with publications (e.g., series editors, acquisitions editors, manuscript editors, copy editors), in this study we focus solely on the academic book editor, from here on referred to as the editor, whether or not they fulfil other editorial roles. The editor influences the quality of the edited book through the editing process and the possibility of uniting the chapters into a whole (Heumann, 2001; Nederman, 2005). Thomas and Hrebenar (1993) state that editing a book consist of 25% organizing and managing, 25% communication and 50% academic work. Overall, few empirical studies have focused on the edited book and their editors (Ossenblok & Engels, 2015), and none have analysed the relationship between the editor and their book chapter authors.

In Flanders, out of all peer reviewed publications in the period 2000-2011, about one in five in the humanities and one in 14 in the social sciences is a book-related publication, either a monograph, a book chapter or an edited book. In the humanities about 17% of all book-related publications are edited books and about 75% are book chapters. In the social sciences about 9% are edited books and about 81% are book chapters (Engels et al., 2012). Furthermore, a small increase in number and share of edited books and book chapters has been observed in Flanders between 2000-2002 and 2009-2011 (Ossenblok et al., 2013). This implies that edited books are an important publication output, especially in the humanities. In addition, edited books have a higher citation rate than monographs, especially in the social sciences (Torres-Salinas et al., 2013), and book chapters can be highly cited too (Butler & Visser, 2006; Gorraiz et al., 2013; Leydesdorff & Felt, 2012), indicating that edited books are an important publication source for scholarly research. Although it seems there has been no empirical research into the reasons why authors create edited books, Nederman (2005) and Edwards (2012) state that editing a book can be time saving, compared to writing a monograph. Moreover, different authors (Edwards, 2012; Gold, 1999; Heumann, 2001; Leal, 2013; Lewis, 1996; Thomas & Hrebenar, 1993) point out the possible academic and educational value of an edited book to the field, as the edited books often have multiple perspectives, a broad scope, elaborated data analysis, multi-disciplinary research and a wide variety of methodologies. Furthermore, they often combine authoritative thinkers to contemplate a common problem and foster dialogue or debate about some key issues or theses (Nederman, 2005). All considered, the edited book can be useful for academics, professionals, undergraduates and others from different disciplines. Despite this, editing a book appears to be undervalued for academic careers (Edwards, 2012; Nederman, 2005; Thomas & Hrebenar, 1993) as their intellectual and community building value might not be fully appreciated by tenure or promotion committees (Edwards, 2012) and are often not included in the national performance-based research funding systems. However, edited books have been included in the research funding system in Flanders since 2010 (Engels et al., 2012). National incentives like this are

probably reflected at the institutional and individual levels (Aagaard, 2015; Gläser & Laudel, 2007), although there is little real evidence of this (Butler, 2010; Gläser, 2007). Therefore, in Flanders, individual researchers may well be encouraged to take on book editorships, at least from the second half of the period under study (2000-2011) onwards. Scientific collaboration in the social sciences and humanities, both domestic and international, is on the rise worldwide (Bukvova, 2010; Larivière et al., 2006; Ossenblok, Verleysen, & Engels, 2014). The nature of a collaboration depends on factors such as the research environment, the nature of the problem and the methods used (Katz & Martin, 1997; Laudel, 2002; Subramanyam, 1983) and the potential benefits and challenges of scientific collaboration may depend on the type of collaboration, the discipline and the country or countries involved (Leimu & Koricheva, 2005). Scientific collaboration has benefits, such as sharing of knowledge, cross-fertilisation of ideas and intellectual companionship, as well as challenges, such as time consuming discussions, for which a common language is essential (Hampton & Parker, 2011; Katz, 1994), travel costs and increased administration (Beaver, 2013; Katz & Martin, 1997). In addition, collaboration may increase productivity (Beaver, 2013; Katz & Martin, 1997) and citation impact (Beaver, 2013; Didegah & Thelwall, 2013; Katz & Hicks, 1997; Leimu & Koricheva, 2005; Thelwall & Sud, 2014). Many different methods have been used to analyse scientific collaboration, from bibliometrics to interviews (Sonnenwald, 2007). In the present article, collaboration will be measured using co-authorship, which is, despite some limitations (Katz & Martin, 1997; Laudel, 2002), a widely used, easily calculated and thus comparable indicator (Glänzel & Schubert, 2004; Melin & Persson, 1996; Subramanyam, 1983). Ossenblok et al. (2014) demonstrated in a previous study that large differences exist in Flanders between collaboration patterns measured through co-authorship in articles and book chapters of social scientists compared to humanities researchers; the latter having fewer co-authored publications and fewer authors per co-authored publication. Overall, collaboration, as measured by co-authorships, is less frequent within the humanities than it is in the social sciences, and this is also true for edited books. However, previous research (Ossenblok & Engels, 2015) showed the number of book chapters per edited book is higher in the humanities than in the social sciences, confirming co-authorship might not suffice to measure collaboration (B. Cronin, 2004; Sula, 2012), especially in the humanities, where edited books often occur and there is some degree of collaboration between the editors and chapter authors.

Defining collaboration is difficult and subject to social conventions (Katz & Martin, 1997). Sonnenwald (2007) defines scientific collaboration as “the interaction taking place within a social context among two or more scientists that facilitates the sharing of meaning and completion of tasks with respect to a mutually shared, superordinate goal”. Building on this definition, collaboration practices in edited books then comprise the collaboration between the editors, measured by co-editorships, between the authors of one book chapter, measured by co-authorship, and between the editors and their book's chapter authors. Ossenblok and Engels (2015) demonstrated that the more co-authorship was found in articles within a discipline, the more co-authorship was found in book chapters, but not in co-editorship of a book, indicating the special nature of book editing collaboration. Overall, co-editing for books is more common than co-authoring for articles and book chapters. Most edited books in both the humanities and the social sciences have more than two editors, irrespective of the number of book chapters, number of authors and number of unique authors in that book. Furthermore, as the choice of the contributors helps to determine the value of the edited book and the chances of success in finishing the work (Galanter, 2008; Leal, 2013; Lewis, 1996; Nederman, 2005), so editors need a large network and good networking skills (Edwards, 2012; Thomas & Hrebener, 1993). Therefore, we expect

editors to be established and highly collaborative researchers with a large and diverse network. Equally, we expect editors to draw upon their co-authorship network for their book chapter authors.

Previous research (Ossenblok & Engels, 2015) has demonstrated the international character of the edited book, as reflected by the publication language and the scope of the publisher involved. English is the dominant publication language in edited books for both the social sciences and the humanities. In addition, half of all edited academic books are published in the Netherlands and the United Kingdom, both housing large international publishing houses (Ossenblok & Engels, 2015). The use of English and the involvement of international publishing houses contribute to worldwide accessibility of books and other scholarly publications (Hicks, 2004; Verleysen & Engels, 2014b). Moreover, Edwards (2012) argues that edited books offer the space required for authoritative comparative perspectives across dimensions, such as time and geographic location. Overall, we hypothesize that international collaboration within edited books would be more common than in other publication types.

In this article we address the following specific questions:

- \* Are editors more likely to be established researchers than are other researchers?
- \* Are editors more productive than other researchers?
- \* Are editors more collaborative, both domestically and internationally?
- \* Do editors use their co-authorship network when appointing book chapter authors?

Although these questions are international they will be addressed only for publications with at least one Flemish editor. Flanders is an appropriate scope for the study because it maintains a comprehensive publication database for its academics that is tied to funding.

## **DATA AND METHODS**

The data set consists of 8966 Flemish social sciences and humanities (SSH)-affiliated authors who have at least one peer reviewed publication in the period 2000-2011, whether a journal article, monograph, edited book chapter and/or proceedings paper, in the Flemish Academic Bibliographic Database for the Social Sciences and Humanities (VABB-SHW). The VABB-SHW is used in the performance-based research funding system (PRFS) in Flanders and the coverage of this database appears to be close to exhaustive (for a full account see: Engels, Ossenblok & Spruyt, 2012).

Author names were standardized manually for the Flemish researchers and the non-Flemish researchers with a co-authorship, co-editorship or editor-book chapter author relationship with a Flemish researcher. In addition, all Flemish authors were assigned to one of the 18 disciplines registered in the VABB-SHW. All publications in the database are assigned to one or more SSH disciplines, according to the affiliation(s) of all the co-authors or co-editors with one or more departments or research groups at one of the five Flemish universities. Unfortunately, the authors' affiliation(s) in the VABB-SHW are not published. Therefore, we counted the number of times a discipline was linked with the publications of the Flemish researchers. When multiple disciplines were linked to an author name, the discipline that occurred most often was chosen. In 6.2% (n=564) of all cases two disciplines were equal and the first discipline according to alphabetical order was chosen. The disciplines include: (1) in the humanities: archaeology; art history (including architecture and arts); communication studies; history; law; linguistics; literature; philosophy (including history of ideas); theology (including religious studies); humanities general (e.g., gender studies) and (2) in the social sciences: criminology; economics & business (including library and information science); educational

sciences; political science; psychology; social health sciences; sociology; social sciences general (e.g. geography). In this study the humanities and the social sciences are studied as a whole. A more detailed analysis of the individual disciplines can be found on figshare <http://dx.doi.org/10.6084/m9.figshare.1485611>.

In this study a comparison is made between two subsets: book editors, i.e. researchers who have published a minimum of 1 peer reviewed edited book in the period under study; and all other researchers, called here non-editors although they may be journal editors, editors of non-peer reviewed edited books or may have edited books during other periods of time. Furthermore, we differentiated for career stage between established and non-established researchers. In this article we focus on established researchers only, who are defined as having at least 12 publications and at least one publication in a minimum of 6 different years in the period 2000-2011. These heuristics were chosen after inspection of typical properties of authors in the database. Of course, non-established researchers may have many publications within up to five years, may have a prolific consistent set of outputs before or after the period analysed, or may have many outputs of a type not recorded in the database (e.g., book reviews, performances). Nevertheless, the criteria seem to be effective at selecting a group of researchers that can reasonably be thought of as being established.

For each author, two publication counts were calculated: the whole publication count, i.e. all publications are counted as 1 irrespective of the number of authors, and the fractional publication count, i.e. all publications are fractionalized according to the number of authors per publication (e.g. a paper with 4 authors gives a fractional count of 0.25 to each author). As the maximum number of authors per publication registered in the database is 20, the fractional count varies between 0.05 (publications with 20 co-authors) and 1 (single authored publications). Both the whole and fractionalized publication count were then weighted using the weights used in the Flemish performance-based funding model, the BOF-key (Ossenblok et al., 2013), where articles, book chapters and edited books receive a weight of 1, whereas monographs have a weight of 4 and proceedings papers have a weight of 0.5. Additionally, the Degree of Collaboration (Liao & Yan, 2012) ( $DC = 1 - \frac{f_1}{N}$ ) was calculated, where  $f_1$  is the number of publications having 1 author and  $N$  is the total number of publications. This formula could also be interpreted as the ratio of number of publications with minimum 2 authors over the total number of publications. Analogously, the Degree of International collaboration ( $DIC = \frac{N_1}{N_c}$ ) was calculated, where  $N_1$  is the number of publications having at least one non-Flemish co-author and  $N_c$  is the total number of publications with two or more authors.

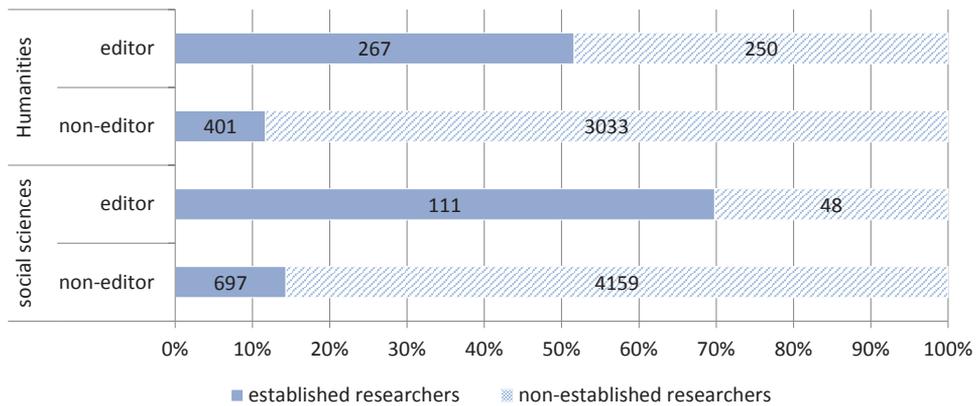
Finally, to compare the different groups under study, three statistical measures were applied Cramer's  $V$ , the Mann-Whitney U test and the Wilcoxon signed-rank test. For further details on the statistical analysis please contact the authors or see <http://dx.doi.org/10.6084/m9.figshare.1485611>

## RESULTS

### *Career stage of the editors*

Figure 36 shows the number and share of established and non-established editors and non-editors in the humanities and the social sciences in Flanders. Of all editors in our data set ( $n=676$ ), 76.5% belong to the humanities and 23.5% to the social sciences and, overall, 55.9% are established researchers

(Figure 36). In the humanities, 13.1% of all researchers (N=3951) are editors whereas in the social sciences only 3.2% of all researchers (N=5015) have edited one or more books. For both the humanities and the social sciences, the total number of established researchers is smaller than that of non-established researchers: 16.9% (n=686) and 16.1% (n=808) respectively. However, of all editors in the humanities, 51.6% (n=517), are established researchers, whereas in the social sciences 69.8% (n=159) are established researchers. For the non-editors the difference between humanities and social sciences is smaller as respectively 11.7% and 14.4% are established researchers. In the humanities 40% of all established researchers (n=668) are editors whereas only 8% of all non-established researchers are editors. In the social sciences, 8% of all established researchers and 1% of all non-established researchers are editors. A preliminary study on editors (Ossenblok & Thelwall, 2015) found a low correlation between gender and editorship, with more than 7 in 10 editors being male. Furthermore, male researchers are more likely to be established than are their female counterparts and this difference is more pronounced for non-editors than for editors. As career stage in this study is defined through numbers of publications and publication years, these findings confirm that male researchers tend to be more productive.



**Figure 36:** Number and share of established and non-established editors and non-editors in the humanities and the social sciences (Flanders, 2000-2011).

### ***Productivity and publication types of the editors***

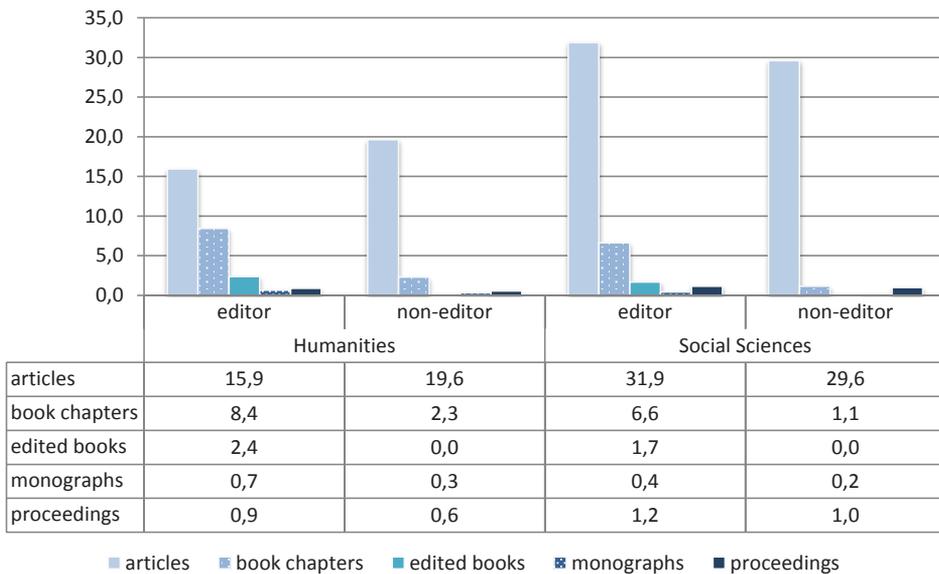
From this point onwards, only established researchers (both editors and non-editors) are included in the comparisons. In both the humanities and the social sciences, the average total publication count and the average weighted fractional publication count are higher for the editors than for the non-editors (Table 23). In the humanities, editors have on average 6.4 and 7.4 more weighted whole and fractional counted publications than do non-editors. In the social sciences, these differences are larger, with editors having on average 10.5 and 8.8 more weighted whole and fractional counted publications than do non-editors. Overall, editors seem to be more productive than non-editors. However, researchers in the humanities have fewer weighted whole counted publications than do their colleagues from the social sciences. Conversely, when looking at the weighted fractional publication count, the humanities scholars outnumber the social scientists. This might be related to differences in publication cultures, with humanities scholars publishing more monographs, which have, in this study,

a weight of 4. Furthermore, the difference between whole counts and fractional counts is more pronounced in the social sciences than in the humanities, pointing towards a higher number of co-authors in the social sciences, confirming previous research (Ossenblok et al., 2014).

**Table 23:** Average weighted whole publication count and average weighted fractional publication count for established editors and established non-editors editors and non-editors for both the humanities and the social sciences (2000-2011).

		Established	
		editor	non-editor
Humanities	Average weighted whole counted publications	29.9	23.5
	Average weighted fractional counted publications	21.8	14.4
Social Sciences	Average weighted whole counted publications	42.4	31.9
	Average weighted fractional counted publications	19.1	10.3

Contrasting with Table 23, the publication counts in Figure 37 are not fractionalized nor weighted. In both the humanities and the social sciences, articles are the most popular publication type for both editors and non-editors, varying between 15.9 articles per editor in the humanities and 31.9 in the social sciences. Especially for the editors, book chapters are the second most popular publication type, with 8.4 book chapters per academic in the humanities and 6.6 in the social sciences. Overall, in both the humanities and social sciences, editors write on average more book chapters and monographs than do non-editors. In the humanities, editors publish on average fewer articles than do non-editors whereas in the social sciences, editors and non-editors have on average the same number of articles and proceedings papers.



**Figure 37:** Average number of articles, book chapters, edited books, monographs and proceedings papers per established editor and established non-editor for both the humanities and the social sciences (Flanders; 2000-2011).

### ***Collaboration patterns of the editor(s)***

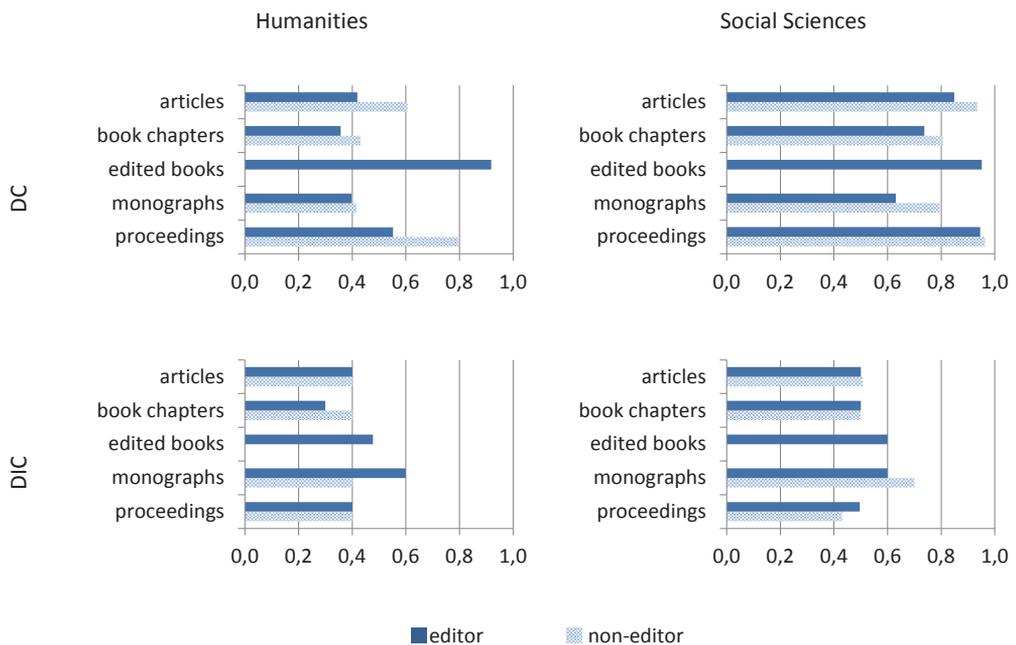
The following part investigates the collaboration patterns of the editors, both total and international collaboration, by focussing on both their publications in (international) collaboration and their (international) collaboration networks, i.e. the number of (international) unique co-authors and co-editors.

#### ***Collaborative publications***

In general, the share of collaborative publications in the humanities (52.5%; n=8773) is lower than the social sciences (91.3%; n=24,542) (Table 24), confirming previous research (Ossenblok et al., 2014). Furthermore, the humanities have a lower share of collaborative articles with one or more international authors (respectively: 40.6%; n=3566 and 53.1%; n=13,040), also confirming previous research (Ossenblok, Verleysen, & Engels, 2012). Overall, editors have fewer collaborative publications than do non-editors, both for the humanities and the social sciences. Differences are larger for the humanities researchers ( $\Delta$ , i.e. difference =14.4%) than for the social scientists ( $\Delta$  =9.4%). However, when looking at the share of internationally collaborated publications of all collaborative papers, differences between editors and non-editors are smaller. In the humanities, editors have slightly more internationally collaborative papers than do non-editors (2.0%), whereas in the social sciences, editors publish fewer internationally co-authored publications than do non-editors, although the difference is small ( $\Delta$ =3.5%).

**Table 24:** Total number of publications, number and share of publications in collaboration and in international collaboration, for both established editors and non-editors, in the humanities and the social sciences (2000-2011).

		Total number of publications	Collaboration		International collaboration	
		#	#	%	#	% collaboration
Humanities	Editor	7562	3375	44.6	1413	41.9
	Non-editor	9142	5398	59.0	2153	39.9
Social Sciences	Editor	4635	3873	83.6	1945	50.2
	Non-editor	22,231	20,669	93.0	11,095	53.7



**Figure 38:** Degree of collaboration (DC) and Degree of international collaboration (DIC) of articles, book chapters, edited books, monographs and proceedings papers; for established editors and established non-editors in the humanities and the social sciences (2000-2011).

#### *Co-authorship & co-editorship networks*

Overall, the social sciences have a more diverse author pool, measured by the number of unique co-authors, than the humanities (Table 25) confirming previous research (Ossenblok & Engels, 2015). For the purpose of the current article, we understand the diversity of a researcher's network as the number of unique co-authors. Other interpretations of diversity exist; see Rafols & Meyer, 2010) for an overview. In both the humanities and the social sciences, editors have on average a less diverse co-authorship network than do non-editors (H:  $\Delta=3.8$  and SS:  $\Delta=9.3$ ). When including the co-editors, the differences are smaller (H:  $\Delta=3.6$  and SS:  $\Delta=7.8$ ) but the trend remains. However, when adding co-editors to the co-authorship networks, the median number of unique co-authors and co-editors is the same, pointing towards a more skewed distribution for the non-editors compared to the editors. In addition, the average and median number of unique book chapter authors in books edited by the researcher(s) was calculated (i.e. when one editor edits more than one book, the unique authors of all books are taken into account). Humanities researchers have a more diverse book chapter author pool than do the social scientists. This might be explained by the higher number of editors with two or more edited books, using diverse unique authors for each book. In addition, humanities researchers have on average fewer international unique co-authors and co-editors than do social scientists, and in both the humanities and the social sciences editors and non-editors have the same share of international collaborators, also when including the co-editorships. In general, the co-editor pool is less international than the co-author pool for both the humanities and the social sciences. Still, the international share of unique book chapter authors in the edited books is higher than for co-authors and co-editors. This indicates that edited books are relatively international. As shown in Figure 4, few of the book chapter

authors have published with the editors in articles, monographs, book chapters or proceedings papers. Therefore, adding the book chapter authors to the co-authorship and co-editorship networks increases their diversity (i.e. the number of unique co-authors and co-editors) and their internationality (i.e. the number of international unique co-authors and co-editors).

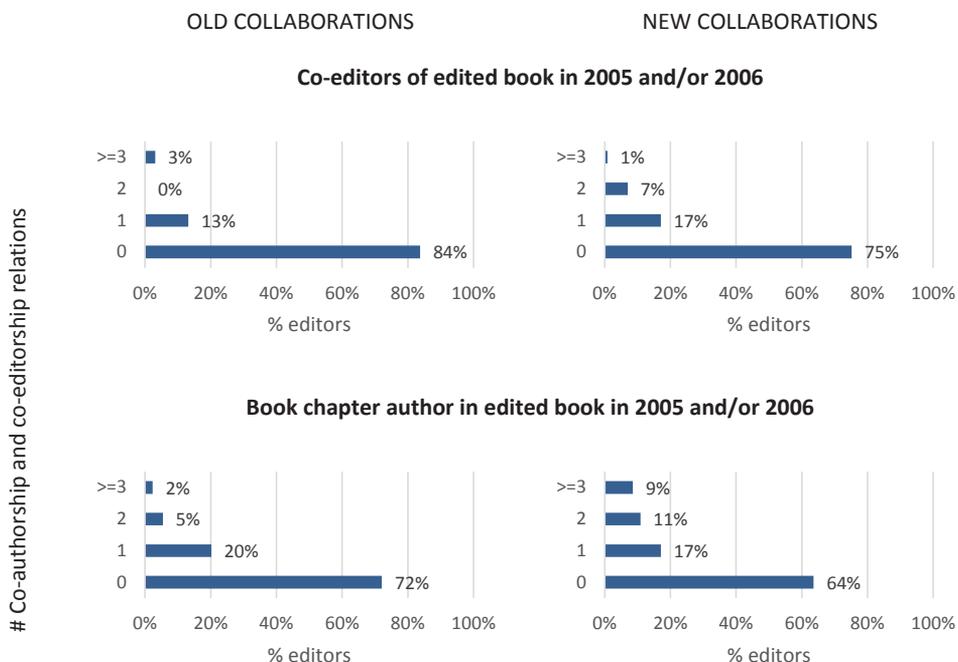
**Table 25:** For all established editors and non-editors in both the humanities and social sciences, the mean and median number of unique co-authors; co-editors; co-authors & co-editors and book chapter authors in edited books and share (%) of international unique co-authors; co-editors; co-authors & co-editors and of unique book chapter authors (Flanders, 2000-2011).

		Humanities		Social Sciences	
		Editors	Non-editors	Editors	Non-editors
# unique co-authors	Mean	11.0	16.8	39.9	49.2
	Median	6	9	22	33
	% International co-authors	46.0	47.0	57.6	57.7
# unique co-editors	Mean	3.49	-	2.9	-
	Median	3	-	2	-
	% international co-editors	42.7	-	50.9	-
# unique co-authors & co-editors	Mean	13.2	16.8	41.4	49.2
	Median	9	9	23	33
	% international co-authors & co-editors	47.5	47.0	57.9	57.7
# unique book chapter authors in one or more edited books	Mean	40.3	-	32.3	-
	Median	29	-	26	-
	% international book chapter authors	81.7	-	77.1	-

Furthermore, about 80% of the unique book chapter authors are non-Flemish, indicating the international character of edited books. It is therefore logical to assess whether the network of book chapter authors overlaps with the network of co-authors and co-editors, indicating the use of the network for creating the edited book, an issue that is addressed next.

In both the humanities and the social sciences, the edited book is the publication type most often published in collaboration (Figure 39). Nevertheless, only small differences exist between editors and non-editors for the share of internationally co-authored publications. Furthermore, edited books are

more often internationally co-authored than are the other publication types except for monographs. In both the humanities and the social sciences, monographs have an even larger Degree of International Collaboration (DIC) than edited books.



**Figure 39:** Share of editors collaborating with co-editors and book chapter authors before, i.e. old collaboration, and after, i.e. new collaboration, the publication of the edited book in 2005 or 2006.

Overall, monographs are often written with one or more international co-authors. In the humanities, editors have on average more international collaboration in monographs than in edited books, whereas in the social sciences editors collaborate equally internationally in monographs and in edited books.

Figure 39 presents on the X-axes the share (%) of editors with edited books in 2005 and/or 2006 (total 129 editors editing 88 books). On the Y-axes are the number co-authorship and co-editorship relationships, i.e. collaborations for an article, monograph, book chapter, proceedings paper or another edited book, of the editor with one or more of the co-editors and book chapter authors of the edited book. In addition, the graph differentiates between old and new collaborations, i.e. collaborations before and after the publication of the edited book. Due to the small share of editors collaborating with more than three of their co-editors and book chapter authors, the numbers on the Y-axes are limited to three or more.

Previous research <sup>3</sup> has shown that there are on average 2.7 editors (median 2) and 19.7 (median 17) unique authors per edited book. However, as shown in Figure 39, few editors have collaborated with one of the co-editors and/or book chapter authors before or after the publication of the edited book. The maximum number of old collaboration partners for co-editors and for book chapter authors is 3,

and of new collaboration partners it is 4 for co-editors and 8 for book chapter authors. Nevertheless, there are slightly more collaborations after than before the publication of the edited book (see figshare for statistical details). More specifically, 16% of the editors have co-authored or co-edited with at least one of their co-editors before the edited book and 25% after. In addition, 28% of the editors have co-authored or co-edited with at least one of their book chapter authors before and 36% of them have after publication of the edited book. Moreover, 1 in 3 book chapter authors that have collaborated before or after publication of the edited book with the editor, is also a co-editor of the book, indicating a different relationship between the researchers.

## DISCUSSION AND CONCLUSIONS

**Table 26:** Main conclusions on book editors and their networks.

Aspect	Editors compared to non-editors
Discipline	Greater frequency of editorship in the humanities
Career stage	More often established researchers
Productivity	Have more fractional and whole counted publications
Publication types	Publish more book chapter and monographs and, only in the Humanities, fewer articles.
Collaborative publications	Have fewer publications with two or more authors than do non-editors
Internationally collaborated publications	[No difference in the share of publications with 1 or more non-Flemish co-authors]
Diversity in network	Have fewer unique co-authors, except when looking at individual disciplines
Internationality of network	[No difference in the share of international unique co-authors]
<b>When including book chapter authors in the collaboration network of editors</b>	
Adding book chapter authors in the edited books	- Increases the diversity in network - Increases the internationality of network
Use of co-authorship network in edited books	- Few collaborations before publication - More collaborations after publication

This research focusses on the special publication and collaboration practices of Flemish academic book editors in the social sciences and humanities, as a follow-up to a first empirical analysis of edited books and co-authorship (Ossenblok & Engels, 2015). Overall, editorship is especially important in the

humanities as more than 1 in 10 researchers have edited one or more edited books, in contrast with the social sciences where only 1 in 30 researchers are book editors. Moreover, in response to our first research question, whether editors are more likely to be established researchers than are other researchers, we found that in the humanities both established and non-established researchers edit books, whereas in the social sciences book editing is more often undertaken by established researchers.

The picture emerging of the typical book editor is that of a significantly more productive researcher as regards monographs and book chapters, and having more fractional weighted publications overall, answering our second research question, about whether editors are more productive than other researchers. There are also differences in collaboration patterns, as addressed in our third research question, about whether editors are more collaborative, both domestically and internationally. Measured by the relative frequency of co-authored publications and number of unique co-authors, SSH book editors are less collaborative overall, and less well embedded in a diverse network of unique co-authors and co-editors. Additionally, there are few differences in the share of international collaborative publications and of unique co-authors and co-editors between established editors and non-editors. To answer our last research question, i.e. whether editors use their co-authorship network when appointing book chapter authors, the editors in our study do not seem to rely on their existing co-authorship network when appointing the book chapter authors, but the edited book might fulfil a good networking opportunity as more co-authorships and co-editorships between the editors and their book chapter authors occur after publishing the edited books. It may also be the case that editors do rely on their network when appointing book chapter authors, but that the network is only partially visible through co-authorships.

As a venue for collaborating with a broad network of both domestic and international colleagues, in many SSH disciplines (in Flanders at least and more so in the humanities than in the social sciences) edited books are likely to be at least as important as journals. This implies that collaboration studies for the SSH which analyse solely journal articles are strongly biased towards social science disciplines which rely mostly upon this publication type (e.g. in the Flemish data: psychology, economics and social health sciences (Ossenblok et al., 2014)). For the far more book-oriented humanities, the inclusion of book data in bibliometric analysis shows them to be significantly more collaborative and internationally oriented than analyses based on articles only (Ossenblok et al., 2014).

Overall, the results thus both confirm and contradict the existing image of editors apparent in the scarce current literature. While it is true that such authors still often prefer to work alone (e.g., when writing a monograph or a book chapter (Ossenblok et al., 2014)), and are less collaborative for journal articles - another, partially separate scholarly publication universe appears to exist, in which the (edited) book is a prime focus of collaboration and internationalization. The main causes of this difference in authors' publication output preferences are unclear. While varying disciplinary epistemic cultures are likely to be important, the divergent orientation of research units and individual researchers, whether intrinsic or strategic, should also be taken into account. Humanities scholars seem to enoble single authored papers (Ossenblok et al., 2014), not all collaboration is converted into co-authorship, and these ghost authorships are not often included in collaboration studies. Inter-disciplinary and inter-author differences in publication patterns therefore need to be studied more in depth, also making use of complementary qualitative methods. These could clarify the precise socio-

academic and corporate publishing contexts in which SSH publication outputs, among them edited books, come into being.

#### *Limitations and future research*

The present study has several limitations. First, the data set is relatively small and focusses only on Flanders. Future research, comparing and combining different local and international data sets, is needed to assess the extent to which the results are specific to Flanders. Second, this study focusses on differences between humanities and social sciences and between some of the more book oriented humanities disciplines. However, as interdisciplinary publication cultures are common, it is important to examine the differences in the nature of the research methods and research topics related to publication and collaboration practices. Third, when analysing the edited book network, only a short period of time could be taken into account (5 or 6 years before and after the edited book). In addition, publication delays were not taken into account. The edited book, in some cases, might take longer to finish than an article, or vice versa. Therefore, it is difficult to state when a co-authorship or co-editor relation was first initiated. A longer period under study might clarify the start of a co-authorship and co-editorship relationship as well as adding the number of times editors collaborate with their book chapter authors. As the literature states, editing a book is a risk that can be reduced by knowing the book chapter authors (Edwards, 2012), but it is not clear whether co-authorship and co-editorship relationships are sufficient to identify the collaboration network of the editors before and after the edited book. An additional study would be needed to identify existing relations between the editor and the book chapter authors, which are not visible when measuring collaboration through co-authorship and co-editorship. Fourth, the choice of the book chapter authors might be influenced by the publisher and the readership of the edited book, e.g. more international authors are asked to meet the international market. All in all, this research helps to further understand the publication and collaboration practices of researchers in the social sciences and humanities, however several questions remain unanswered, especially concerning the motivations of the editor(s), the book chapter authors and the publishers in choosing the edited book as a publication type or not. Future research can shed more light on this interesting and rather peculiar publication type.

#### **ACKNOWLEDGEMENTS**

We thank Tim Engels and Frederik Verleysen for useful suggestions and comments, Nele Dexters for help with transforming the data and Jakaria Rahman, Saskia Peersman, H el ene Veragten, Lynn Elshof, and Robin Houben for help with data collection.

#### **REFERENCE LIST**

- Aagaard, K. 2015. How incentives trickle down: Local use of a national bibliometric indicator system. *Science and Public Policy*, 13. <http://dx.doi.org/10.1093/scipol/scu087>
- Beaver Dd. 2013. The many faces of collaboration and teamwork in scientific research: Updated reflections on scientific collaboration. *Collnet Journal of Scientometrics and Information Management*, 7(1), 45-54. doi: 10.1080/09737766.2013.802629
- Bukvova, H. 2010. Studying research collaboration: A literature review. *Sprouts Working Papers on Information Systems*, 10(3), <http://sprouts.aisnet.org/10-3>.

- Butler, L. 2010. Impact of performance-based research funding systems: A review of the concerns and the evidence. In: OECD (eds). *Performance-based funding for public research in tertiary education institutions: Workshop proceedings*. OECD-publishing, Paris.
- Butler, L. and Visser, M.S. 2006. Extending citation analysis to non-source items. *Scientometrics*, 66(2), 327-43. <http://dx.doi.org/10.1007/s11192-006-0024-1>
- Cronin, B. 2004. Bowling alone together: academic writing as distributed cognition. *Journal of the American Society for Information Science (Jasist)*, 55(6), 557-60. <http://dx.doi.org/10.1002/asi.10406>
- Didegah, F. and Thelwall, M. 2013. Which factors help authors produce the highest impact research? Collaboration, journal and document properties. *Journal of Informetrics*, 7, 861-73. <http://dx.doi.org/10.1016/j.joi.2013.08.006>
- Edwards, L. 2012. Editing academic books in the humanities and social sciences: Maximizing impact for effort. *Journal of Scholarly Publishing*, 44(1), 61-74. <http://dx.doi.org/10.3138/jsp.44.1.61>
- Engels, T.C.E., Ossenblok, T.L.B. and Spruyt, E.H.J. 2012. Changing publication patterns in the social sciences and humanities, 2000-2009. *Scientometrics*, 93(2), 373-90. <http://dx.doi.org/10.1007/s11192-012-0680-2>
- Galanter, M. 2008. A guide for preparation of an academic edited book. *Substance abuse*, 29(1), 1-4. [http://dx.doi.org/10.1300/J465v29n01\\_01](http://dx.doi.org/10.1300/J465v29n01_01)
- Gläser, J. 2007. The social orders of research evaluation systems. In: R. Whitley and J. Gläser (eds). *The changing governance of the sciences, the advent of research evaluation systems*. Springer, Dordrecht.
- Glänzel, W. and Schubert, A. 2004. Analysing scientific networks through co-authorship. In: H.F. Moed, W. Glänzel and U. Schmoch (eds). *Handbook of quantitative science and technology research: The use of publication and patent statistics in studies on S&T systems*. Kluwer Academic Publishers, Dordrecht.
- Gläser, J. and Laudel, G. 2007. Evaluation without evaluators. In: R. Whitley, J. Gläser (eds). *The changing governance of the sciences The advent of research evaluation systems. Sociology of the sciences yearbook*. Springer Science, Dordrecht.
- Gold, D. 1999. A tapestry of kings: Edited volumes and the growth of knowledge in religious studies. *Religion*, 29, 243-59. <http://dx.doi.org/10.1006/reli.1998.0172>
- Gorraiz, J., Purnell, P.J. and Glänzel, W. 2013. Opportunities and limitations of the Book Citation Index. *Journal of the American Society for Information Science & Technology (Jasist)*, 64(7), 1388-98. <http://dx.doi.org/10.1002/asi.22875>
- Hampton, S.E. and Parker, J.N. 2011. Collaboration and productivity in scientific synthesis. *BioScience*, 61(11), 900-10. <http://dx.doi.org/10.1525/bio.2011.61.11.9>
- Heumann, L. 2001. Growth of edited volumes. *Journal of the American Planning Association*, 67(4), 467-8.
- Hicks, D. 2004. The four literatures of social science. In: H.F. Moed, W. Glänzel and U. Schmoch (eds). *Handbook of quantitative science and technology research: The use of publication and patent statistics in studies on S&T systems*. Kluwer Academic Publishers, Dordrecht. [http://dx.doi.org/10.1007/1-4020-2755-9\\_22](http://dx.doi.org/10.1007/1-4020-2755-9_22)
- Leal, D.L. 2013. Chapters, volumes, editors! Oh my! Reassessing the role of edited volumes in the social sciences. *Political Science and Politics*, 46, 380-2. <http://dx.doi.org/10.1017/S1049096513000097>
- Katz, J.S. 1994. Geographical proximity and scientific collaboration. *Scientometrics*, 31(1). <http://dx.doi.org/10.1007/BF02018100>
- Katz, JS and Hicks, D. 1997. How much is a collaboration worth? A calibrated bibliometric model. *Scientometrics*, 40(3), 541-54. <http://dx.doi.org/10.1007/BF02459299>
- Katz, J.S. and Martin, B. 1997. What is research collaboration? *Research Policy*, 26, 1-18. [http://dx.doi.org/10.1016/S0048-7333\(96\)00917-1](http://dx.doi.org/10.1016/S0048-7333(96)00917-1)

- Larivière, V., Gingras, Y. and Archambault, E. 2006. Canadian collaboration networks: A comparative analysis of the natural sciences, social sciences and the humanities. *Scientometrics*, 68(3), 519-33. <http://dx.doi.org/10.1007/s11192-006-0127-8>
- Laudel, G. 2002. What do we measure by co-authorship? *Research Evaluation*, 11(1), 3-15. <http://dx.doi.org/10.3152/147154402781776961>
- Leimu, R. and Koricheva, J. 2005. Does scientific collaboration increase the impact of ecological articles? *BioScience*, 55(5), 438. doi: 10.1641/0006-3568(2005)055[0438:dsciti]2.0.co;2
- Leydesdorff, L. and Felt, U. 2012. Edited volumes, monographs and book chapters in the Book Citation Index (BKCI) and Science Citation Index (SCI, SoSCI, A&HCI). *Journal of Scientometric Research*, 1, 28-34. <http://dx.doi.org/10.5530/jscires.2012.1.7>
- Lewis, R. 1996. Books with multiple contributors present multiple editing challenges. *The Scientist*, 10(9), 15.
- Liao, C.H. and Yan, H.R. 2012. Quantifying the degree of research collaboration: A comparative study of collaborative measures. *Journal of Informetrics*, 6, 27-33. <http://dx.doi.org/10.1016/j.joi.2011.09.003>
- Melin, G. and Persson, O. 1996. Studying research collaboration using co-authorships. *Scientometrics*, 36(3), 363-77. <http://dx.doi.org/10.1007/BF02129600>
- Nederman, C.J. 2005. Herding cats: The view from the volume and series editor. *Journal of Scholarly Publishing*, 36(4), 221-8. <http://dx.doi.org/10.3138/jsp.36.4.221>
- Ossenblok, T.L.B. and Engels, T.C.E. 2015. Edited books in the social sciences and humanities: Characteristics and collaboration analysis. *Scientometrics*, 104(1), 219-237. <http://dx.doi.org/10.1007/s11192-015-1544-3>
- Ossenblok, T.L.B. and Thelwall, M. 2015. What's special about book editors? A bibliometric comparison of book editors and other Flemish researchers in the social sciences and humanities. In: A. Ali Salah, Y. Tonta, A. A. Akdağ Salah, C. Sugimoto, U. Al (eds). *Proceedings of the 15th International Society of Scientometrics and Informetrics Conference*. Istanbul
- Ossenblok, T.L.B., Verleysen, F.T. and Engels, T.C.E. 2012. Patterns of co-authorship in journal articles in the social sciences and humanities (2000-2010). In: E. Archambault, Y. Gingras and V. Larivière (eds). *Proceedings of 17th International Conference on Science and Technology Indicators. Science-Matrix and OST*, Montreal.
- Ossenblok, T.L.B., Verleysen, F.T. and Engels, T.C.E. 2014. Co-authorship of journal articles and book chapters in the social sciences and humanities (2000-2010). *Journal of the American Society for Information Science & Technology (Jasist)*, 65(5), 882-97. <http://dx.doi.org/doi:10.1002/asi.23015>
- Ossenblok, T.L.B., Verleysen, F.T., Spruyt, E.H.J. and Engels, T.C.E. 2013. Bibliometrische analyse van het Vlaamse universitaire onderzoek in de sociale en humane wetenschappen aan de hand van het VABB-SHW. In: K. Debackere and R. Veugeliers (eds). *Vlaams indicatorenboek 2013*. Brussel: Expertisecentrum Onderzoek & Ontwikkelingsmonitoring (ECCOM), Ministerie van de Vlaamse Gemeenschap. <http://anet.uantwerpen.be/docman/irua/6fb6d3/6b724b54.pdf>
- Rafols, I. and Meyer, M. 2010. Diversity and network coherence as indicators of interdisciplinarity: case studies in bionanoscience. *Scientometrics*, 82, 263-87. <http://dx.doi.org/10.1007/s11192-009-0041-y>
- Sonnenwald, D.H. 2007. Scientific collaboration. *Annual Review of Information Science and Technology*, 41(1), 643-81. <http://dx.doi.org/10.1002/aris.2007.1440410121>
- Subramanyam, K. 1983. Bibliometric studies of research collaboration: A review. *Journal of Information Science*, 6, 33-8. <http://dx.doi.org/10.1177/016555158300600105>
- Sula, CA. 2012. Visualizing social connections in the humanities: Beyond bibliometrics. *Bulletin of the American Society for Information Science and Technology*, 38(4), 31-5. <http://dx.doi.org/10.1002/bult.2012.1720380409>
- Thelwall, M. and Sud, P. 2014. No citation advantage for monograph-based collaborations? *Journal of Informetrics*, 8(1), 9. <http://dx.doi.org/10.1016/j.joi.2013.12.008>

Thomas, C.S. and Hrebenar, R.J. 1993. Editing multiauthor books in political science: Plotting your way through an academic minefield. *Political Science and Politics*, 26(4), 778-83.  
<http://dx.doi.org/10.1017/S1049096500039135>

Torres-Salinas, D., Robinson-Garcia, N., Cabezas-Clavijo, Á. and Jiménez-Contreras, E. 2013. Analyzing the citation characteristics of books: Edited books, book series and publisher types in the Book Citation Index. *Scientometrics*, 98(3), 2113-27. <http://dx.doi.org/10.1007/s11192-013-1168-4>

Verleysen, F.T., Engels, T.C.E. 2014. Internationalization of peer reviewed and non-peer reviewed book publications in the social sciences and humanities. *Scientometrics*, 101(2), 1431-44.  
<http://dx.doi.org/10.1007/s11192-014-1267-x>

## SUPPLEMENTARY MATERIAL

### *Introduction*

The article “*Book editors in the social sciences and humanities: an analysis of publication and collaboration patterns of established researchers in Flanders*” is published in *Learned Publishing* in 2015. Due to the limited space in and the readership of the journal, the authors of the article decided to make additional material available through this document, published on Figshare. This document contains information on individual disciplines. In order to keep the analysis of the individual disciplines robust, only disciplines with at least 30 established editors are discussed in detail: history; law; linguistics; literature; philosophy (including history of ideas); theology (including religious studies) (see Table 27) - all humanities disciplines. In addition, this document compares the different groups under study using three statistical measures: Cramer’s V, The Mann-Whitney U test and the Wilcoxon signed-rank test. Cramer’s V was used to measure the strength of the association between the different subsets, resulting in a number between 0 (no association) and 1 (maximum association). In addition, the normality of the distributions of all our subgroups was ascertained visually through histograms as well as numerically, using the Shapiro-Wilk test with  $p < 0.05$  as the threshold for normality. As most of our distributions were not normally distributed, we used the Mann-Whitney U test, a rank-based nonparametric test, to test whether one subset tends to have higher values (i.e., a higher average rank in the combined set) than another for the different characteristics under study, using  $p = 0.05$  as the threshold for statistical significance. Finally, we used the Wilcoxon signed-rank test, also a rank-based nonparametric test, to determine whether there was a median difference between paired observations, i.e. the number of collaborations of the same group of editors before and after the publication of the edited book (see Figure 39).

### *Career stage of the editors*

Figure 36 in the main article (Ossenblok, Guns, & Thelwall, 2015) shows the number and share of established and non-established editors and non-editors in the humanities and the social sciences (Flanders, 2000-2011). There is a moderate association (Cramer’s  $V = 0.360$ ;  $p = .000$ ) between career stage and editorship in the humanities and a lower association (Cramer’s  $V = 0.265$ ;  $p = .000$ ) in the social sciences.

Table 27 shows the number and share of established and non-established editors and non-editors for each of the 6 disciplines under study, i.e. disciplines with 30 or more established researchers. Literature (40.5%,  $n = 79$ ) and theology (30.1%,  $n = 65$ ) are the disciplines with the highest share of editors, followed by linguistics (19.2%,  $n = 100$ ), history (18.7%,  $n = 54$ ) and philosophy (18.3%,  $n = 67$ ). The discipline with the lowest share of editors is law (6.0%,  $n = 53$ ). In all disciplines under study a minority of researchers are established, varying between 18.0% ( $n = 158$ ) in law and 25.1% ( $n = 49$ ) in literature. Furthermore, in

all disciplines except philosophy (47.8% established editors) editors are more likely to be established than non-established researchers, with a range between 50.6% in literature and 58.7% in law. Non-editors are less likely to be established researchers, varying between 7.8% in literature and 15.4% in law. In general, there is a high association between career stage and editorship in theology (Cramer's  $V=0.523$ ;  $p=.000$ ), a moderate association in literature (Cramer's  $V=0.485$ ;  $p=.000$ ), history (Cramer's  $V=0.461$ ;  $p=.000$ ); linguistics (Cramer's  $V=0.456$ ;  $p=.000$ ) and philosophy (Cramer's  $V=0.311$ ;  $p=.000$ ) and a low association in law (Cramer's  $V=0.267$ ;  $p=.000$ ).

**Table 27:** The total number of researchers and number and share of established editors, non-established editors, established non-editors and non-established non-editors for each discipline under study (Flanders, 2000-2011).

	Total number of researchers in our study  #	Editors				Non-editors			
		established		non-established		established		non-established	
		#	%	#	%	#	%	#	%
History	289	30	10.4	24	8.3	23	8.0	212	73.4
Law	878	31	3.5	22	2.5	127	14.5	698	79.5
Linguistics	521	55	10.6	45	8.6	42	8.1	379	72.7
Literature	195	40	20.5	39	20.0	9	4.6	107	54.9
Philosophy	367	32	8.7	35	9.5	45	12.3	255	69.5
Theology	216	36	16.7	29	13.4	12	5.6	139	64.4

*Publication types of the editors*

Table 28 shows the average number of publications per publication type for all established editors under study. In all the different disciplines under study editors write more book chapters than do non-editors and no differences were found in the average number of articles of editors and non-editors. No differences were found for the number of monographs, except for established researchers in law, where editors seem to publish more monographs than do non-editors and no differences were found in the number of proceedings papers, except in linguistics where editors publish more proceedings papers than do non-editors.

**Table 28:** Average number of publications per publication type for all established editors (2000-2011).

		Articles	Book chapters	Edited books	Monographs	Proceedings papers
History	Editor	12.5	6.8*	1.9	0.2	0.5
	Non-editor	14.1	2.9*	-	0.1	0.7
Law	Editor	26.2	7.5*	1.7	0.8*	0.2
	Non-editor	20.0	1.6*	-	0.2*	0.1
Linguistics	Editor	12.8	9.2*	2.7	0.6	1.6*
	Non-editor	13.6	3.5*	-	0.5	0.3*
Literature	Editor	13.7	9.0*	3.1	0.8	0.9
	Non-editor	12.9	3.0*	-	0.9	0.0
Philosophy	Editor	17.4*	6.3*	1.7	0.5	0.6
	Non-editor	22.0*	3.6*	-	0.4	0.6
Theology	Editor	15.6	11.6*	3.2	0.9	0.1
	Non-editor	12.5	5.6*	-	1.3	0.0

\*Significant at  $p < .05$  (Mann-Whitney U-test).

#### *Collaboration patterns of the editor(s)*

Table 24 in the main article (Ossenblok, et al, 2015) shows the total number of publications, number and share of publications in collaboration and in international collaboration for both established editors and non-editors, in the humanities and the social sciences. A Mann Whitney U-test shows a statistically significant difference in distribution for share of collaborative publications between editors and non-editors, both in the humanities ( $p=0.000$ ) and the social sciences ( $p=0.000$ ). However, no significant difference in distribution was found for the share of internationally collaborative publications in the social sciences.

Table 29 shows the total number of publications, number and share of publications in collaboration and in international collaboration for both established editors and non-editors, in the different disciplines under study. For law ( $\Delta = 11\%$ ), history ( $\Delta=8.5\%$ ) and linguistics ( $\Delta=7\%$ ), editors have more collaborative publications than do non-editors. The reverse is true for literature ( $\Delta=5\%$ ) and philosophy ( $\Delta=4.6\%$ ) where editors have fewer collaborative publications. Theology is the only discipline where editors and non-editors have an equal share of collaborative publications. However, when looking at the share of publications with at least one non-Flemish affiliated researcher, different trends are revealed. In literature ( $\Delta=4.6\%$ ), history ( $\Delta=2.8\%$ ) and law ( $\Delta=0.6\%$ ) editors have relatively more internationally collaborated publications than do non-editors, whereas in philosophy ( $\Delta=9.3\%$ ),

linguistics ( $\Delta=6\%$ ) and theology ( $\Delta=3.2\%$ ) editors have fewer international collaborated publications. A Mann Whitney U-test found no significant differences between the distributions for the disciplines under study ( $p$ -values from  $p=.105$  in theology to  $.990$  in Literature), except for the share of international collaborative publications in linguistics ( $p=.020$ ).

**Table 29:** Total number of publications, number and share of publications in collaboration and in international collaboration, for both established editors and non-editors, in the different disciplines under study (2000-2011).

		Total number of publications		Collaboration		International collaboration
		#	#	%	#	% collaboration
History	Editor	656	251	38.3	116	46.2
	Non-editor	410	122	29.8	53	43.4
Law	Editor	1127	532	47.2	210	39.5
	Non-editor	2768	1002	36.2	390	38.9
Linguistics	Editor	1478	822	55.6	334	40.6
	Non-editor	748	371	49.6	173	46.6
Literature	Editor	1100	338	30.7	128	37.9
	Non-editor	151	69	45.7	23	33.3
Philosophy	Editor	848	435	51.3	142	32.6
	Non-editor	1199	670	55.9	281	41.9
Theology	Editor	1131	287	25.4	93	32.4
	Non-editor	232	59	25.4	21	35.6

Figure 38 in the main article (Ossenblok, et al, 2015) demonstrates the degree of collaboration (DC) and degree of international collaboration (DIC) of articles, book chapters, edited books, monographs and proceedings papers; for established editors and established non-editors in the humanities and the social sciences (2000-2011). Mann-Whitney U tests were run to test for differences in distribution of the numbers of publications between editors and non-editors for all publication types except edited books, and distinguishing between the humanities and the social sciences and between the individual disciplines under study. In the humanities, editors write on average more book chapters ( $p=.000$ ), monographs ( $p=.000$ ) and proceedings papers ( $p=.026$ ) than do non-editors, whereas editors write on average less articles than do non-editors ( $p=.000$ ). In the social sciences, editors write more book chapters and monographs than do non-editors (all  $p=.000$ ). However, no significant differences were found for the average number of articles and proceedings papers between editors and non-editors in the social sciences (respectively:  $p=.832$  and  $p=.905$ ).

**Table 30:** Degree of collaboration and Degree of international collaboration of articles, book chapters, edited books, monographs and proceedings papers; for established editors and non-editors in the different disciplines under study (2000-2011).

			articles	book chapters	edited books	monographs	proceedings papers	
Degree of Collaboration	History	Editor	0.3	0.4	0.9	0.1	0.1	
		Non-editor	0.3	0.3	-	0.3	0.5	
	Law	Editor	0.5	0.4	0.8	0.4	0.2	
		Non-editor	0.4	0.4	-	0.5	0.5	
	Linguistics	Editor	0.5	0.5	0.9	0.4	0.7	
		Non-editor	0.5	0.5	-	0.2	0.3	
	Literature	Editor	0.2	0.2	1.0	0.4	0.2	
		Non-editor	0.5	0.2	-	0.6	-	
	Philosophy	Editor	0.5	0.3	0.9	0.4	0.6	
		Non-editor	0.6	0.3	-	0.4	0.5	
	Theology	Editor	0.2	0.2	0.9	0.5	0.0	
		Non-editor	0.3	0.1	-	0.1	-	
	Degree of International Collaboration	History	Editor	0.4	0.4	0.7	1.0	0.0
			Non-editor	0.5	0.2	-	0.0	0.6
Law		Editor	0.4	0.3	0.6	0.8	1.0	
		Non-editor	0.4	0.3	-	0.7	0.0	
Linguistics		Editor	0.4	0.4	0.5	0.5	0.4	
		Non-editor	0.5	0.3	-	0.0	0.0	
Literature		Editor	0.3	0.3	0.4	0.4	0.7	
		Non-editor	0.3	0.2	-	0.4	-	
Philosophy		Editor	0.3	0.2	0.4	0.8	0.3	
		Non-editor	0.4	0.2	-	0.6	0.2	
Theology		Editor	0.2	0.3	0.5	0.3	-	
		Non-editor	0.4	0.3	-	0.5	-	

Table 30 summarizes the degree of collaboration and degree of international collaboration for articles, book chapters, edited books, monographs and proceedings papers for the different disciplines under study. When looking within the different disciplines, editors write more book chapters than do non-editors (p-value between  $p=.000$  and  $p=.021$ ). Furthermore, there were no statistically significant differences between the number of articles of editors and non-editors for any discipline; no statistically significant differences were found for the number of monographs, except for established researchers in law, where editors seem to publish more monographs than do non-editors ( $p=.000$ ). No differences were found in the number of proceedings papers, except in linguistics where editors publish more proceedings papers than do non-editors ( $p=.013$ ). In all disciplines most of the edited books are co-

edited, as the Degree of Collaboration (DC) ranges from 0.8 in law to 1.0 in literature, and edited books are more often published in collaboration than are other publication types. However, the degree of international collaboration varies between 0.4 in literature and philosophy to 0.7 in history.

#### *Co-authorship & co-editorship networks*

Table 31 displays the mean and median number of unique co-authors and co-editors and book chapter authors in edited books for all established editors and non-editors; for the different disciplines under study (2000-2011). In disciplines where book editing is common, editors are often more collaborative than are other researchers. Overall, the median and mean number of unique co-authors and co-editors varies between the disciplines under study. However, in all disciplines except Literature (no differences in median) the editors have a higher median number of unique co-authors than do non-editors. In addition, Table 31 shows the share (%) of international unique co-authors and co-editors and of unique book chapter authors. In history, law and literature editors have a higher international share of co-authors and co-editors than do non-editors whereas in linguistics, philosophy and theology editors have a lower international share than do non-editors. Finally, the number of unique book chapter authors in one or more edited books of the editors is in all disciplines significantly higher than the number of unique co-authors and co-editors.

**Table 31:** Mean and median number of unique co-authors and co-editors and book chapter authors in edited books; share (%) of international unique co-authors and co-editors and of unique book chapter authors for all established editors and non-editors; for the different disciplines under study (2000-2011).

		# Unique co-authors & co-editors		# Unique book chapter authors in one or more edited books
		Editors	Non-editors	Editors
History	Mean	9.3	6.6	26.1
	Median	7	4	18
	International share (%)	48.6	42.4	80.9
Law	Mean	14.7	7.5	36.2
	Median	9	5	33
	International share (%)	49.7	45.8	87.8
Linguistics	Mean	14.1	11.2	43.3
	Median	11	6	29
	International share (%)	46.8	51.8	82.5
Literature	Mean	9.5	6.8	54.5
	Median	8	8	39
	International share (%)	40.2	37.7	78.7
Philosophy	Mean	11.6	18.7	27.7
	Median	8	6	19
	International share (%)	43.4	55.2	82.2
Theology	Mean	7.8	6.2	55.5
	Median	7	2	40
	International share (%)	28.0	66.2	79.3

Figure 39 in the main article (Ossenblok, et al, 2015) demonstrates the share of editors collaborating with co-editors and book chapter authors before, i.e. old collaboration, and after, i.e. new collaboration, the publication of the edited book in 2005 or 2006. A Wilcoxon signed-rank test shows a statistically significant median difference between the number of collaborations of the editors with the co-editors and book chapter authors in other publications before and after publication of the edited book in 2005 or 2006 ( $p=.001$ ).

## REFERENCES

- Aagaard, K. (2015). How incentives trickle down: Local use of a national bibliometric indicator system. *Science and Public Policy*, 13. doi:10.1093/scipol/scu087
- Aagaard, K., Bloch, C. W., & Schneider, J. W. (2015). Impacts of performance-based research funding systems: The case of the Norwegian publication indicator. *Research Evaluation*, 24(2), 106-117. doi:10.1093/reseval/rvv003
- Abramo, G., D'Angelo, C. A., & Di Costa, F. (2009). Research collaboration and productivity: Is there correlation? *Higher Education*, 57, 155-171.
- Abramo, G., D'Angelo, C. A., & Solazzi, M. (2011). The relationship between scientists' research performance and the degree of internationalisation of their research. *Scientometrics*, 86, 629-643.
- Académie Royale de Belgique (2011). *Groupe de travail sur le financement de l'enseignement supérieur en Communauté Française*. Retrieved from Brussels: [http://www.cref.be/Rapport\\_fin\\_Acad\\_royale.pdf](http://www.cref.be/Rapport_fin_Acad_royale.pdf)
- Adams, J. & Testa, J. (2011). Thomson Reuters book citation index. In E. Noyons, P. Ngulube, & J. Leta (Eds.), *Proceedings of the 13th conference of the international society for scientometrics and informetrics (ISSI)* (pp. 13-18). Durban, South Africa: ISSI, Leiden University and University of Zululand.
- Ahlgren, P., Colliander, C., & Persson, O. (2012). Field normalized citation rates, field normalized journal impact and Norwegian weights for allocation of university research funds. *Scientometrics*, DOI 10.1007/s11192-012-0632-x.
- Ajiferuke, I., Burrell, Q., & Tague, J. (1988). Collaborative coefficient: A single measure of the degree of collaboration in research. *Scientometrics*, 14(5-6), 421-433.
- Aksnes, D. W., Frølich, N., & Slipersaeter, S. (2008). Science policy and the driving forces behind the internationalisation of science: The case of Norway. *Science and Public Policy*, 35(6), 445-457.
- Aksnes, D. W., & Mikki, S. (2012). Applying CRIS-data for analysing research collaboration at the University of Bergen, Norway. In K. G. Jeffery & J. Dvořák (Eds.), *E-Infrastructures for research and innovation: Linking information systems to improve scientific knowledge production: Proceedings of the 11th international conference on current research information systems* (pp. 271-278). Prague (Czech Republic): euroCRIS.
- Aksnes, D. W., Rorstad, K., Piro, F., & Sivertsen, G. (2011). Are female researchers less cited? A large-scale study of Norwegian scientists. *Journal of the American Society for Information Science and Technology (Jasist)*, 62(4), 628-636. doi:10.1002/asi.21486
- Aksnes, D. W., Rorstad, K., Piro, F. N., & Sivertsen, G. (2013). Are mobile researchers more productive and cited than non-mobile researchers? A large-scale study of Norwegian scientists. *Research Evaluation*, 22(4), 215-223. doi:10.1093/reseval/rvt012
- Aksnes, D. W., Schneider, J. W., & Gunnarsson, M. (2012). Ranking national research systems by citation indicators. A comparative analysis using whole and fractional counting methods. *Journal of Informetrics*, 6, 36-43.
- Ammon, U. (2001). *The dominance of English as a language of science. Effects on other language and language communities*. Berlin/New York: Mouton de Gruyter.
- Andries, P., Debackere, K., Hoskens, M., Dengis, P., & Viaene, P. (2013). *Totale O&O-intensiteit in Vlaanderen 1997-2011. "3% nota" (Report)*. (pp. 22). Brussels: Expertisecentrum O&O Monitoring (ECONOM); EWI.
- Archambault, E., Vignola-Gagne, E., Côté, G., Larivière, V., & Gingras, Y. (2006). Benchmarking scientific output in the social sciences and humanities: The limits of existing databases. *Scientometrics*, 68(3), 329-342.
- Ardanuy, J. (2012). Scientific collaboration in library and information science viewed through the web of knowledge: The Spanish case. *Scientometrics*, 90, 877-890.

- Armstrong, D. (2013). The new engagement game: The role of gamification in scholarly publishing. *Learned Publishing*, 26, 253-256. doi:doi: 10.1087/20130403
- Auranen, O., & Nieminen, M. (2010). University research funding and publication performance - An international comparison. *Research Policy*, 39, 822-834. doi:10.1016/j.respol.2010.03.003
- Bailey, F. G. (1977). *Morality and expediency: The folklore of academic politics*. Oxford: Blackwell.
- Baldauf, R. B. (2001). Speaking of science: the use by Australian university science staff of language skills. In U. Ammon (Ed.), *The dominance of English as a language of science. Effects on other languages and language communities* (pp. 139-165). Berlin/New York: Mouton De Gruyter.
- Beaver, D. D. (2001). Reflections in scientific collaboration (and its study): Past, present and future. *Scientometrics*, 52(3), 365-377.
- Beaver, D. D. (2004). Does collaborative research have greater epistemic authority? *Scientometrics*, 60(3), 399-408.
- Beaver, D. D. (2013). The many faces of collaboration and teamwork in scientific research: Updated reflections on scientific collaboration. *Collnet Journal of Scientometrics and Information Management*, 7(1), 45-54. doi: 10.1080/09737766.2013.802629
- Beaver, D. D., & Rosen, R. (1978). Studies in scientific collaboration, Part I. *Scientometrics*, 1(1), 65-84.
- Becher, T. (1994). The significance of disciplinary differences. *Studies in Higher Education*, 19(2), 151-161.
- Becher, T., & Trowler, P. R. (2001). *Academic tribes and territories: Intellectual enquiry and the cultures of disciplines*. Buckingham: Open University Press.
- Benavent-Pérez, M., Gorraiz, J., & Gumpenberger, C. (2012). The different flavors of research collaboration: A case study of their influence on university excellence in four world regions. *Scientometrics*, DOI 10.1007/s11192-012-0638-4.
- Benda, W. G. G., & Engels, T. C. E. (2011). The predictive validity of peer review: A selective review of the judgmental forecasting qualities of peers, and implications for innovation in science. *International Journal of Forecasting*, 27(1), 166-182.
- Benneworth, P. (2015). Tracing how arts and humanities research translates, circulates and consolidates in society. How have scholars been reacting to diverse impact and public value agendas? *Arts & Humanities in Higher Education*, 14(1), 45-60. doi:10.117/1474022214533888
- Bernardes, A. T., & Albuquerque, E. D. (2003). Cross-over, thresholds, and interactions, between science and technology: Lessons for less-developed countries. *Research Policy*, 32(5), 865-885. doi:10.1016/s0048-7333(02)00089-6
- Biagioli, M. & Galison, P. (2003). *Scientific Authorship. Credit and intellectual property in science*. New York; London: Routledge.
- Biglan, A. (1973a). The characteristics of subject matter in different academic areas. *Journal of applied psychology*, 57(3), 195-203. doi:10.1037/h0034701
- Biglan, A. (1973b). Relationships between subject matter characteristics and structure and output of university departments. *Journal of applied psychology*, 57(3), 204-213. doi:10.1037/h0034699
- Billiet, J., Bocken, H., Bruynseraede, Y., Clarysse, W., De Dijn, H., De Mey, M., et al. (2004). *Bibliometrie in de humane wetenschappen (Report)*. Brussel: Koninklijke Vlaamse Academie van België voor Wetenschappen en Kunsten.
- Birnholtz, J. P. (2006). What does it mean to be an author? The intersection of credit, contribution, and collaboration in science. *Journal of the American Society for Information Science and Technology (Jasist)*, 57(13), 1758-1770.
- Björneborn, L., & Ingwersen, P. (2004). Toward a basic framework for webometrics. *Journal of the American Society for Information Science and Technology (Jasist)*, 55(14), 1216-1227. doi:10.1002/asi.20077
- Bloch, C. W., & Schneider, J. W. (2015). Performance-based funding models and researcher behavior: An analysis of the influence of the Norwegian publication indicator at the individual level. *Research Evaluation*, submitted for publication.
- Borgman, C. L. (2009). The digital future is now: a call to action for the Humanities. *DHQ: Digital Humanities Quarterly*, 3, 1-21.

- Bornmann, L., & Daniel, H.-D. (2009). The state of *h* index research. *EMBO reports*, *10*(1), 2-6.
- Bourdieu, P. (2002). *Homo academicus*. Leuven/Leusden: Acco.
- Bourke, P., Butler, L., & Biglia, B. (1996). *Monitoring research in the periphery: Australia and the ISI indices*. Canberra: Australian National University.
- Box, S. (2010). Performance-based funding for public research in tertiary education institutions: Country experiences. In OECD (Ed.), *Performance-based funding for public research in tertiary education institutions: Workshop proceedings* (pp. 85-126). Paris: OECD Publishing.
- Braun, T., Glanzel, W., & Schubert, A. (1985). *Scientometric indicators*. Singapore: Kim Hup Lee Printing.
- Bridgstock, M. (1991). The quality of single and multiple authored papers: An unresolved problem. *Scientometrics*, *21*(1), 37-48.
- Bucchi, M. (2004). *Science in society: An introduction to social studies of science*: Psychology Press.
- Buela-Casal, G., Perakakis, P., Taylor, M., & Checa, P. (2006). Measuring internationality: Reflections and perspectives on academic journals. *Scientometrics*, *67*(1), 45-65. doi:10.1007/s11192-006-0050-z
- Bukvova, H. (2010). Studying research collaboration: A literature review. *Sprouts Working Papers on Information Systems*, *10*(3), <http://sprouts.aisnet.org/10-13>. <http://sprouts.aisnet.org/10-3>
- Burgelman, J.-C., Osimo, D., & Bogdanowicz, M. (2010). Science 2.0 (change will happen...). *First Monday*, *15*(7), 1-9.
- Burgess, S., Gea-Valor, M. L., Moreno, A. I., & Rey-Rocha, J. (2014). Affordances and constraints on research publication: A comparative study of the language choices of Spanish historians and psychologists. *Journal of English for Academic Purposes*, *14*, 72-83. doi:10.1016/j.jeap.2014.01.001
- Butler, L. (2003a). Explaining Australia's increased share of ISI publications-the effects of a funding formula based on publication counts. *Research Policy*, *32*(1), 143-155.
- Butler, L. (2003b). Modifying publication practices in response to funding formulas. *Research Evaluation*, *12*(1), 39-46.
- Butler, L. (2004). What happens when funding is linked to publication counts? In H. F. Moed, W. Glänzel, & U. Schmoch (Eds.), *Handbook of quantitative science and technology research* (pp. 389-405): Kluwer Academic Publishers.
- Butler, L. (2007). Assessing university research: A plea for a balanced approach. *Science and Public Policy*, *34*(8), 565-574.
- Butler, L. (2008). Using a balanced approach to bibliometrics: quantitative performance measures in the Australian Research Quality Framework. *Ethics in Science and Environmental Politics*, *8*, 83-92. doi:10.3354/esep00077
- Butler, L. (2010). Impact of performance-based research funding systems: A review of the concerns and the evidence. In OECD (Ed.), *Performance-based funding for public research in tertiary education institutions: Workshop proceedings* (pp. 127-165). Paris: OECD-publishing.
- Butler, L. & Visser, M.S. (2006). Extending citation analysis to non-source items. *Scientometrics*, *66*(2), 327-43. <http://dx.doi.org/10.1007/s11192-006-0024-1>
- Carayol, N., & Matt, M. (2006). Individual and collective determinants of academic scientists' productivity. *Information Economics and Policy*, *18*(1), 55-72. doi:10.1016/j.infoecopol.2005.09.002
- Clemens, E. S., Powell, W. W., McIlwaine, K., & Okamoto, D. (1996). Careers in print: Books, journals, and scholarly reputations. *American Journal of Sociology*, *101*(4), U2-U2.
- Cole, F. J., & Eales, N. B. (1917). The history of comparative anatomy. Part I: A statistical analysis of the literature. *Science progress*, *11*, 578-596.
- Costas, R., & Bockhove, C. (2012). On the relationship between author collaboration and impact of scientific publications. In E. Archambault, Y. Gingras, & V. Larivière (Eds.), *Proceedings of 17th international conference on science and technology indicators (STI)*. Montréal: Science-Metrix and Ost.

- Costas, R., & Bordons, M. (2007). The h-index: Advantages, limitations and its relation with other bibliometric indicators at the micro level. *Journal of Informetrics*, 1(3), 193-203. doi:10.1016/j.joi.2007.02.001
- Crane, D. (1969). Social structure in a group of scientists: A test of the 'Invisible College' hypothesis. *American Sociological Review*, 34(3), 335-352.
- Creswell, J. W., & Bean, J. P. (1981). Research output, socialization, and the Biglan model. *Research in Higher Education*, 15(1), 69-91. doi:10.1007/bf00976549
- Cronin, B. (2001). Hyperauthorship: A postmodern perversion or evidence of a structural shift in scholarly communication practices? *Journal of the American Society for Information Science and Technology*, 52(7), 558-569.
- Cronin, B. (2004). Bowling alone together: Academic writing as distributed cognition. *Journal of the American Society for Information Science*, 55(6), 557-60. <http://dx.doi.org/10.1002/asi.10406>
- Cronin, B., Shaw, D., & La Barre, K. (2003). A cast of thousands: Co-authorship and subauthorship collaboration in the 20th century as manifested in the scholarly journal literature of Psychology and Philosophy. *Journal of the American Society for Information Science and Technology*, 54(9), 855-871.
- Cronin, B., Snyder, H., & Atkins, H. (1997). Comparative citation rankings of authors in monographic and journal literature: A study of sociology. *Journal of documentation*, 53(3), 263-273. doi:10.1108/eum0000000007200
- Cronin, B., & Sugimoto, C. R. (Eds.). (2015). *Scholarly metrics under the microscope: From citation analysis to academic auditing*. Medford, New Jersey: ASIST/Information Today, Inc.
- Debruin, R. E., Braam, R. R., & Moed, H. F. (1991). Bibliometric lines in the sand. *Nature*, 349(6310), 559-562. doi:10.1038/349559a0
- De Haan, J. (1997). Authorship patterns in Dutch sociology. *Scientometrics*, 39(2), 197-208.
- De Kock, L., Viaene, P., Levecque, k., Stassen, I., & Gilliot, D. (2015). Het menselijk potentieel in wetenschap, technologie en innovatie in Vlaanderen. In K. Debackere & M. Veugelers (Eds.), *Vlaams Indicatorenboek 2015* (pp. 25-39). Brussel: Expertisecentrum Onderzoek & Ontwikkelingsmonitoring (ECCOM), Ministerie van de Vlaamse Gemeenschap.
- De Mul, J. (2008). Publish and Perish. In P. Loobuyck, G. Vanheeswijck, W. Van Herck, E. Grieten, & K. Vercauteren (Eds.), *Welke universiteit willen wij (niet)?* (pp. 185-197). Gent: Academia Press.
- de Nooy, W., Mrvar, A., & Batagelj, V. (2011). *Exploratory social network analysis with Pajek. Revised and expanded second edition* (2 ed.): Cambridge University Press.
- de Souza, C. G., & Azevedo Ferreira, M. L. (2013). Researchers profile, co-authorship pattern and knowledge organization in information science in Brazil. *Scientometrics*, 95(2), 673-687. doi:10.1007/s11192-012-0882-7
- Debackere, K., & Glänzel, W. (2004). Using a bibliometric approach to support research policy making: The case of the Flemish BOF-key. *Scientometrics*, 59(2), 253-276.
- Debackere, K. & Glänzel, W. (2008). Evidence-based bibliometrics: A decade of bibliometrics-based science policy in Flanders. In J. Gorraiz & E. Schiebel (Eds.), *Proceedings of the 10th international conference on science and technology indicators (STI)*(pp. 123-125). Vienna, Austria: Austrian Research Centres.
- Debackere, K., & Veugelers, M. (2015). *Vlaams Indicatorenboek 2015*. Expertisecentrum O&O Monitoring (ECCOM). [https://www.ecoom.be/indicatorenboek\\_2015\\_files/Indicatorenboek\\_2015.pdf](https://www.ecoom.be/indicatorenboek_2015_files/Indicatorenboek_2015.pdf)
- Derricourt, R. (2012). Peer review: Fetishes, fallacies and perceptions. *Journal of Scholarly Publishing*, 43, 137-147.
- Díaz-Faes, A. A., Bordons, M., van Leeuwen, T., & Galindo, M. P. (2015). Outlining the scientific activity profile of researchers in the social sciences and humanities in Spain: The case of CSIC. In A. A. Salah, Y. Tonta, A. A. Akdag Salah, C. R. Sugimoto, & U. Al (Eds.), *Proceedings of ISSI 2015 Istanbul: 15th international society of scientometrics and informetrics conference, Istanbul, Turkey, 29 June to 3 July 2015*. Istanbul: Bogaziçi University Printhouse.

- Didegah, F., & Thelwall, M. (2013). Which factors help authors produce the highest impact research? Collaboration, journal and document properties. *Journal of Informetrics*, 7, 861-873.
- Ding, Y., Rousseau, R., & Wolfram, D. (Eds.). (2014). *Measuring scholarly impact: Methods and practice*. Cham, Heidelberg, New York, Dordrecht, London: Springer.
- Duque, R. B. (2005). Collaboration paradox: Scientific productivity, the internet, and problems of research in developing areas. *Social Studies of Science*, 35(5), 755-785. doi:10.1177/0306312705053048
- Dyachenko, E. L. (2014). Internationalization of academic journals: Is there still a gap between social and natural sciences? *Scientometrics*, 101, 241-255.
- Ede, L., & Lunsford, A. A. (2001). Collaboration and concepts of authorship. *PMLA*, 116(2), 354-369.
- Edwards, L. (2012). Editing academic books in the humanities and social sciences: Maximizing impact for effort. *Journal of Scholarly Publishing*, 44(1), 61-74. doi:10.3138/jsp.44.1.61
- Egghe, L. (1991). Theory of collaboration and collaborative measures. *Information processing and management*, 27(2/3), 177-202.
- Egghe, L., & Rousseau, R. (1996). Amdahl's Law and scientific collaboration. *The international journal of scientometrics and informetrics (JISSI)*, 2(1), 41-48.
- Egghe, L., & Rousseau, R. (2009). *Wetenschappelijke communicatie en wetensevaluatie: Deel I*. Course (2009-2010). Instituut voor Onderwijs- en Informatiewetenschappen. University of Antwerp.
- Eisend, M., & Schmidt, S. (2014). The influence of knowledge-based resources and business scholars' internationalisation strategies on research performance. *Research Policy*, 43, 48-59.
- Endersby, J. W. (1996). Collaborative research in the social sciences: Multiple authorship and publication credit. *Social Science Quarterly*, 77(2), 375-392.
- Engels, T. C. E., Ossenblok, T. L. B., & Spruyt, E. H. J. (2012). Changing publication patterns in the social sciences and humanities, 2000-2009. *Scientometrics*, 93(2), 373-390. doi: 10.1007/s11192-012-0680-2
- Engels, T. C. E., Spruyt, E. H. J., Glänzel, W., & Debackere, K. (2009). Het Vlaams academisch bibliografisch bestand voor de sociale en humane wetenschappen: Instrument ten dienste van een optimaal wetenschapsbeleid? *Tijdschrift voor Onderwijsrecht & Onderwijsbeleid*, 2008-09(5), 395-403.
- Etzkowitz, H., & Leydesdorff, L. (2000). The dynamics of innovation: From national systems and 'mode 2' to a triple helix of university-industry-government relations. *Research Policy*, 29, 109-123.
- Etzkowitz, H., Webster, A., Gebhardt, C., & Cantisano Terra, B. R. (2000). The future of the university and the university of the future: Evolution of ivory tower to entrepreneurial paradigm. *Research Policy*, 29, 313-330.
- European Commission. (2010). *Assessing Europe's university-based research (Report)* (D.-G. f. R. Expert group on assessment of university-based research, European Commission Ed.). Brussels: European Commission.
- European Commission. (2015). *Validation of the results of the public consultation on Science 2.0: Science in transition (Report)* (European Commission Ed.): Research and innovation, European Commission. Retrieved from [https://ec.europa.eu/research/consultations/science-2.0/science\\_2\\_0\\_final\\_report.pdf](https://ec.europa.eu/research/consultations/science-2.0/science_2_0_final_report.pdf)
- Fang, H. (2011). Peer review and over-competitive research funding fostering mainstream opinion to monopoly. *Scientometrics*, 87(2), 293-301.
- Fowler, J. H., & Aksnes, D. W. (2007). Does self-citation pay? *Scientometrics*, 72(3), 427-437. doi:10.1007/s11192-007-1777-2
- Fox, M. F. (2005). Gender, family characteristics, and publication productivity among scientists. *Social Studies of Science*, 35(1), 131-150. doi:10.1177/0306312705046630
- Franceschet, M., & Costantini, A. (2010). The effect of scholar collaboration on impact and quality of academic papers. *Journal of Informetrics*, 4(4), 540-553. doi:10.1016/j.joi.2010.06.003
- Frølich, N. (2008). *The Politics of steering by numbers: Debating performance-based funding in Europe (Report)* (Vol. 3). Oslo: NIFU - STEP.

- Frost, J., & Brockmann, J. (2014). When qualitative productivity is equated with quantitative productivity: Scholars caught in a performance paradox. *Z Erziehungswiss*, 17, 25-45. doi:DOI 10.1007/s11618-014-0572-8
- Fry, J., Creaser, C., Butters, G., Craven, J., Griffiths, J., & Hartley, D. (2009). *Communicating knowledge: How and why researchers publish and disseminate their findings. Supporting paper 4: Literature review*. London: Research information Network.
- Galanter, M. (2008). A guide for preparation of an academic edited book. *Substance abuse*, 29(1), 1-4. doi:10.1300/J465v29n01\_01
- Garvey, W. D. (1979). *Communication: the essence of science. Facilitating information exchange among librarians, scientists, engineers and students*. Oxford: Pergamon Press.
- Gazni, A., & Didegah, F. (2011). Investigating different types of research collaboration and citation impact: A case study of Harvard university's publications. *Scientometrics*, 87, 251-265. doi:DOI 10.1007/s11192-011-0343-8
- Geuna, A., & Martin, B. R. (2003). University research evaluation and funding: An international comparison. *Minerva*, 41(4), 277-304.
- Ghesquière, P., Van Bendegem, J.-P., Gillis, S., Willems, D., & Cornelissen, K. (2011). Het VABB-SHW: Eerste versie klaar, nu verfijnen. In K. Debackere & R. Veugeliers (Eds.), *Vlaams Indicatorenboek 2011* (pp. 260-264). Brussel: Expertisecentrum O&O Monitoring.
- Gibbons, M. (1999). Science's new social contract with society. *Nature*, 402(6761), C81-C84. doi:10.1038/35011576
- Gibbons, M., Limoges, C., Nowotny, H., Schwartzman, S., Scott, P., & Throw, M. (1994). *The new production of knowledge*. London: Sage Publications.
- Gingras, Y., Larivière, V., Macaluso, B. t., & Robitaille, J. P. (2008). The effects of aging on researchers' publication and citation patterns. *PLoS ONE*, 3(12), e4048.
- Glänzel, W. (2001). National characteristics in international scientific co-authorship relations. *Scientometrics*, 51(1), 69-115.
- Glänzel, W. (2003). *Bibliometrics as a research field. A course on theory and application of bibliometric indicators*. KULeuven.
- Glänzel, W. (2010). On reliability and robustness of scientometrics indicators based on stochastic models. An evidence-based opinion paper. *Journal of Informetrics*, 4(3), 313-319.
- Glänzel, W., & Schoepflin, U. (1994). Little scientometrics, big scientometrics ... And beyond. *Scientometrics*, 30(2-3), 375-384. doi:10.1007/bf02018107
- Glänzel, W., & Schoepflin, U. A. (1999). A bibliometric study of reference literature in the sciences and social sciences. *Information processing and management*, 35, 31-44.
- Glänzel, W., & Schubert, A. (2003). A new classification scheme of science fields and subfields designed for scientometric evaluation purposes. *Scientometrics*, 56(3), 357-367.
- Glänzel, W. & Schubert, A. (2004). Analysing scientific networks through co-authorship. In H.F.Moed, W. Glänzel, & U. Schmoch (Eds.), *Handbook of quantitative science and technology research: The use of publication and patent statistics in studies on S&T systems* (pp. 257-276). Dordrecht: Kluwer Academic Publishers.
- Glänzel, W. & Schubert, A. (2005). Domesticity and internationality in co-authorship, references and citations. *Scientometrics*, 65, 323-342.
- Gläser, J. (2007). The social orders of research evaluation systems. In R. Whitley & J. Gläser (Eds.), *The changing governance of the sciences, the advent of research evaluation systems* (pp. 245-264). Dordrecht: Springer.
- Gläser, J., & Laudel, G. (2007). Evaluation without evaluators. In R. Whitley & J. Gläser (Eds.), *The changing governance of the sciences. The advent of research evaluation systems* (pp. 127-151). Dordrecht: Springer Science.
- Gläser, J., Laudel, G., Hinze, S., & Butler, L. (2002). *Impact of evaluation-based funding on the production of scientific knowledge: What to worry about, and how to find out (Report)*. Expertise for the German Ministry for Education and Research. <http://www.laudel.info/publications/research-papers/>

- Gold, D. (1999). A tapestry of kings: Edited volumes and the growth of knowledge in religious studies. *Religion*, 29, 243-259.
- Goldfinch, S., Dale, T., & DeRouen Jr., K. (2003). Science from the periphery: Collaboration, networks and 'Periphery Effects' in the citation of New Zealand Crown Research Institutes articles, 1995-2000. *Scientometrics*, 57(3), 321-337.
- Gordon, M. D. (1980). A critical reassessment of inferred relations between multiple authorship, scientific collaboration, the production of papers and their acceptance for publication. *Scientometrics*, 2(3), 193-201.
- Gorraiz, J., Purnell, P. J., & Glänzel, W. (2013). Opportunities and limitations of the book citation index. *Journal of the American Society for Information Science & Technology (Jasist)*, 64(7), 1388-1398.
- Greene, M. (2008). The demise of the lone author. *Nature*, 450(7173). doi:doi:10.1038/nature06243
- Guns, R., & Rousseau, R. (2014). Recommending research collaborations using link prediction and random forest classifiers. *Scientometrics*, 101(2), 1461-1473. doi:10.1007/s11192-013-1228-9
- Hagen, N. T. (2009). Credit for coauthors. *Science*, 323(5914), 583-583.
- Hagen, N. T. (2010). Harmonic publication and citation counting: sharing authorship credit equitably - not equally, geometrically or arithmetically. *Scientometrics*, 84(3), 785-793. doi:10.1007/s11192-009-0129-4
- Hammarfelt, B., & de Rijcke, S. (2015). Accountability in context: Effects of research evaluation systems on publication practices, disciplinary norms and individual working routines in the faculty of Arts at Uppsala University. *Research Evaluation*, 24(1), 63-77.
- Hampton, S.E. & Parker, J.N. (2011). Collaboration and productivity in scientific synthesis. *BioScience*, 61(11), 900-10. <http://dx.doi.org/10.1525/bio.2011.61.11.9>
- Hansen, H. F. (2010). Performance indicators used in performance-based research funding systems. In OECD (Ed.), *Performance-based funding for public research in tertiary education institutions: Workshop proceedings* (pp. 53-84). Paris: OECD Publishing.
- Hartley, J. (2015). [Personal communication].
- Harnad, S. (1986). On reviewing (and publishing in) edited interdisciplinary volumes. *Contemporary psychology*, 31, 390.
- Haslam, N., Ban, L., Kaufmann, L., Loughnan, S., Peters, K., Whelan, J., & Wilson, S. (2008). What makes an article influential? Predicting impact in social and personality psychology. *Scientometrics*, 76(1), 169-185. doi:DOI: 10.1007/s11192-007-1892-8
- Haustein, S., Costas, R., & Larivière, V. (2015). Characterizing social media metrics of scholarly papers: The effect of document properties and collaboration patterns. *PLoS ONE*, 10(5), e0127830. doi:10.1371/journal.pone.0120495
- Heffner, A. (1981). Funded research, multiple authorship, and subauthorship collaboration in four disciplines. *Scientometrics*, 3(1), 5-12.
- Heinze, T., Shapira, P., Rogers, J. D., & Senker, J. M. (2009). Organizational and institutional influences on creativity in scientific research. *Research Policy*, 38, 610-623. doi:10.1016/j.respol.2009.01.014
- Hemlin, S., & Gustafsson, M. (1996). Research production in the arts and humanities - A questionnaire study of factors influencing research performance. *Scientometrics*, 37(3), 417-432.
- Henriksen, D. (2015). [Personal communication].
- Heumann, L. (2001). Growth of edited volumes. *Journal of the American Planning Association*, 67, 467-468.
- Heywood, J. S., Wei, X., & Ye, G. (2011). Piece rates for professors. *Economics Letters*, 113, 285-287.
- Hicks, D. (1999). The difficulty of achieving full coverage of international social science literature and the bibliometric consequences. *Scientometrics*, 44(2), 193-215.
- Hicks, D. (2004). The four literatures of social science. In H. F. Moed, W. Glänzel, & U. Schmoch (Eds.), *Handbook of quantitative Science and Technology Research: The use of publication and patent statistics in studies of S&T systems* (pp. 473-496). Dordrecht: Kluwer Academic.

- Hicks, D. (2010). Overview of models of performance-based research funding systems. In OECD (Ed.), *Performance-based funding for public research in tertiary education institutions: Workshop proceedings* (pp. 23-52). Paris: OECD-publishing.
- Hicks, D. (2012). Performance-based university research funding systems. *Research Policy*, *41*, 251-261.
- Hicks, D. (2013). One size doesn't fit all: on the co-evolution of national evaluation systems and social science publishing. *Confero*, *1*(1), 67-90. doi: 10.3384/confero13v1121207b
- Hicks, D., & Skea, J. E. F. (1989). Is big really better? *Physics World*(December), 31-34.
- Hicks, D., & Wang, J. (2009). *Towards a bibliometric database for the social sciences and humanities. A European scoping project (Report; Appendix 1 to Martin et al., 2010)*. Arizona: Georgia University of Technology: School of Public Policy.
- Hicks, D., & Wang, J. (2011). Coverage and overlap of the new social science and humanities journal lists. *Journal of the American Society for Information Science & Technology (Jasist)*, *62*, 284-294.
- Hicks, D., Wouters, P., Waltman, L., de Rijcke, S., & Rafols, I. (2015). Bibliometrics: The Leiden manifesto for research metrics. *Nature*, *520*(7548), 429-431.
- Hirsch, J. E. (2005). An index to quantify an individual's scientific research output. *Proceedings of the national academy of sciences of the United States of America*, *102*, 16569-16572.
- Holmberg, K. J. (2016). *Altmetrics for information professionals: Past, present, future*. Amsterdam/Boston/Cambridge: Chandos Publishing/Elsevier.
- Hornbostel, S. (2008). Gesucht: Aussagekräftige Indikatoren und belastbare Datenkollektionen. Desiderate geisteswissenschaftlicher Evaluierung in Deutschland. In E. Lack & C. Marksches (Eds.), *What the hell is quality?* (pp. 55-73). Frankfurt/New York: Campus Verlag.
- Hsu, J.-w., & Huang, D.-w. (2011). Correlation between impact and collaboration. *Scientometrics*, *86*, 317-324. doi:10.1007/s11192-010-0265-x
- Hu, X. (2009). Loads of special authorship functions: Linear growth in the percentage of equal first authors and corresponding authors. *Journal of the American Society for Information Science & Technology (Jasist)*, *60*(11), 2379-2391.
- Huang, M. H., & Chang, Y. W. (2008). Characteristics of research output in Social Sciences and Humanities: From a research evaluation perspective. *Journal of the American Society for Information Science and Technology (Jasist)*, *59*(11), 1819-1828.
- Hug, S. E., Ochsner, M., & Daniel, H.-D. (2013). Criteria for assessing research quality in the humanities: A Delphi study among scholars of English literature, German literature and art history. *Research Evaluation*, *22*, 369-383.
- Ingwersen, P., & Larsen, B. (2014). Influence of a performance indicator on Danish research production and citation impact 2000-12. *Scientometrics*, *101*(2), 1325-1344.
- Jacobs, J. A. (2014). *In defense of the disciplines: Interdisciplinarity and specialization in the research university*. Chicago, IL: University of Chicago Press.
- Jeong, S., Choi, J. Y., & Kim, J. (2011). The determinants of research collaboration modes: Exploring the effects of research and researcher characteristics on co-authorship. *Scientometrics*, *89*, 967-983.
- Jimenez-Contreras, E., Anegón, F. D., & Lopez-Cozar, E. D. (2003). The evolution of research activity in Spain - The impact of the National Commission for the Evaluation of Research Activity (CNEAI). *Research Policy*, *32*(1), 123-142. doi:10.1016/s0048-7333(02)00008-2
- Jin, B.H. & Wang B. (1999). Chinese science citation database: Its construction and application. *Scientometrics*, *45*, 325-332.
- John-Steiner, V. P., & Meehan, T. M. (2000). Creativity and collaboration in Knowledge construction. In C. D. Lee & P. Smagorinsky (Eds.), *Vygotskian perspectives on literacy research. Constructing meaning through collaborative inquiry* (pp. 31-50). Cambridge, United Kingdom: Cambridge University Press.
- Johnston, R., Richards, K., Gandy, M., Taylor, Z., Paasi, A., Fox, R. et al. (2009). The future of research monographs: an international set of perspectives. *Progress in Human Geography*, *33*, 101-126.

- Kagan, J. (2009). *The three cultures. Natural sciences, social sciences and the humanities in the 21st century*. New York, USA: Cambridge University Press.
- Kato, M., & Ando, A. (2013). The relationship between research performance and international collaboration in chemistry. *Scientometrics*, *91*, 535-553.
- Katz, J. S. (1994). Geographical proximity and scientific collaboration. *Scientometrics*, *31*(1), 31-43
- Katz, J. S. (1999). *Bibliometric indicators and the social sciences (Report)*. Brighton/Swindon (UK): SPRU, University of Sussex; ESRC-Polaris House.
- Katz, J. S., & Hicks, D. (1997). How much is a collaboration worth? A calibrated bibliometric model. *Scientometrics*, *40*(3), 541-554. doi:10.1007/bf02459299
- Katz, J. S., & Martin, B. R. (1997). What is research collaboration? *Research Policy*, *26*, 1-18.
- Kaufmann, A., & Kasztler, A. (2009). Differences in publication and dissemination practices between disciplinary and transdisciplinary science and the consequences for research evaluation. *Science and Public Policy*, *36*(3), 215-227. doi:10.3152/030234209x427121
- Kellsey, C., & Knievel, J. E. (2004). Global English in the humanities? A longitudinal citation study of foreign-language use by humanities scholars. *College & Research Libraries*, *65*(3), 194-204.
- King, C. (2012, 2012). Multiauthor paper: Onward and upward. *ScienceWatch Newsletter*, July 2012.
- KNAW (2005). *Judging research on its merits. An advisory report by the council for the humanities and the social sciences*. (KNAW-report). Amsterdam
- Knorr Cetina, K. (1999). *Epistemic cultures: How the sciences make knowledge*. Cambridge, Massachusetts: Harvard University Press.
- Kousha, K. & Thelwall, M. (2015). An automatic method for extracting citations from Google books. *Journal of the Association for Information Science and Technology (Jasist)*, *66*(2), 309-320.
- Kousha, K., Thelwall, M., & Somayeh, R. (2011). Assessing the citation impact of books: the role of Google books, Google Scholar, and Scopus. *Journal of the American Society for Information Science and Technology (Jasist)*, *62*(11), 2147-2164.
- Kretschmer, H. & Aguillo, I. F. (2004). Visibility of collaboration on the Web. *Scientometrics*, *61*, 405-426.
- Kretschmer, H., & Rousseau, R. (2001). Author inflation leads to a breakdown of Lotka's law. *Journal of the American Society for Information Science and Technology*, *52*(8), 610-614. doi:10.1002/asi.1118
- Krishnan, A. (2009). *What are academic disciplines. Some observations on the disciplinarity versus interdisciplinarity debate*. University of Southampton: National Centre for Research methods.
- Kuhn, T. (1970). *The structure of the scientific revolutions*. Chicago, IL: University of Chicago Press.
- Kyvik, S. (1991). *Productivity in academia: Scientific publishing at Norwegian universities*. Trøgstad, Norway: Norwegian University Press.
- Kyvik, S. (2003). Changing trends in publishing behaviour among university faculty, 1980-2000. *Scientometrics*, *58*, 35-48.
- Kyvik, S., & Teigen, M. (1996). Child care, research collaboration, and gender differences in scientific productivity. *Science Technology & Human Values*, *21*(1), 54-71. doi:10.1177/016224399602100103
- Laband, D. N., & Tollison, R. D. (2000). Intellectual collaboration. *Journal of Political Economy*, *108*(3), 632-662.
- Lamont, M., & Molnár, V. (2002). The study of boundaries in the social sciences. *Annual review of sociology*, *28*, 167-195.
- Langfeldt, L. (2001). The decision-making constraints and processes of grant peer review, and their effects on the review outcome. *Social Studies of Science*, *31*(6), 820-841.
- Larivière, V. (2014). Personal communication.
- Larivière, V., Gingras, Y., & Archambault, E. (2006). Canadian collaboration networks: A comparative analysis of the natural sciences, social sciences and the humanities. *Scientometrics*, *68*(3), 519-533.
- Larivière, V., Haustein, S., & Mongeon, P. (2015). The oligopoly of academic publishers in the digital era. *PLoS ONE*, *10*(6), e0127502. doi:10.1371/journal.pone.0127502

- Larivière, V., & Macaluso, B. (2011). Improving the coverage of social science and humanities researchers' output: The case of the *éruvit* journal platform. *Journal of the American Society for Information Science & Technology*, *62*(12), 2437-2442.
- Larivière, V., Ni, C., Gingras, Y., Cronin, B., & Sugimoto, C. R. (2013). Bibliometrics: Global gender disparities in science. *Nature*, *504*(7479), 211-213.
- Laudel, G. (2002). What do we measure by co-authorship? *Research Evaluation*, *11*(1), 3-15.
- Leal, D. L. (2013). Chapters, volumes, editors! Oh my! Reassessing the role of edited volumes in the social sciences. *Political Science and Politics*, *46*, 380-382. doi:10.1017/S1049096513000097
- Lee, S., & Bozeman, B. (2005). The Impact of research collaboration on scientific productivity. *Social Studies of Science*, *35*(5), 673-702. doi:10.1177/0306312705052359
- Leimu, R. & Koricheva, J. (2005). Does scientific collaboration increase the impact of ecological articles? *BioScience*, *55*(5), 438. doi: 10.1641/0006-3568(2005)055[0438:dsciti]2.0.co;2
- Levitt, J. M. (2015). What is the optimal number of researchers for social science research? *Scientometrics*, *102*, 213-225. doi:DOI 10.1007/s11192-014-1441-1
- Levitt, J. M., & Thelwall, M. (2010). Does the higher citation of collaborative research differ from region to region? A case study of economics. *Scientometrics*, *85*(171-183). doi:10.1007/s11192-010-0197-5
- Levitt, J. M., & Thelwall, M. (2013). Alphabetization and the skewing of first authorship towards last names early in the alphabet. *Journal of Informetrics*, *7*, 575-582.
- Lewis, R. (1996). Books with multiple contributors present multiple editing challenges. *The Scientist*, *10*(9), 15-15.
- Lewis, J. M. & Ross, S. (2011). Research funding systems in Australia, New Zealand and the UK: policy settings and perceived effects. *Policy & Politics*, *39*, 379-398.
- Lewison, G. (2001). Evaluation of books as research outputs in history of medicine. *Research Evaluation*, *10*(2), 89-95. doi:10.3152/147154401781777051
- Leydesdorff, L., & Felt, U. (2012). Edited volumes, monographs and book chapters in the book citation index (BKCI) and science citation index (SCI, SoSCI, A&HCI). *Journal of Scientometric Research*, *1*, 28-34.
- Leyman, A., Vandeveldel, K., Van Rossem, R., & Groenvynck, H. (2011). Senior onderzoekers aan het woord. De resultaten van de 'Survey of senior researchers' aan de Vlaamse universiteiten. (Rep. No. 4). Ghent: Human Resources in Research (HR<sup>2</sup>).
- Liao, C. H., & Yan, H. R. (2012). Quantifying the degree of research collaboration: A comparative study of collaborative measures. *Journal of Informetrics*, *6*, 27-33.
- Liben-Nowell, D., & Kleinberg, J. (2007). The link-prediction problem for social networks. *Journal of the American Society for Information Science and Technology*, *58*(7), 1019-1031. doi:10.1002/asi.20591
- Lievrouw, L. A. (1989). The invisible college reconsidered. Bibliometrics and the development of scientific communication theory. *Communication research*, *16*(5), 615-628.
- Lillis, T., & Curry, M. J. (2010). *Academic writing in a global context: The politics and practices of publishing in English*. London/New York: Routledge.
- Lodahl, J. B., & Gordon, G. (1972). The structure of scientific fields and the functioning of university graduate departments. *American Sociology Review*, *37*, 57-72.
- Loobuyck, P., Vanheeswijck, G., Van Herck, W., Grieten, E., & Vercauteren, K. (2008). *Welke universiteit willen wij (niet)?* Gent: Academia Press.
- Lopez-Navarro, I., Moreno, A. I., Angel Quintanilla, M., & Rey-Rocha, J. (2015). Why do I publish research articles in English instead of my own language? Differences in Spanish researchers' motivations across scientific domains. *Scientometrics*, *103*(3), 939-976. doi:10.1007/s11192-015-1570-1
- Lotka, A. J. (1926). The frequency distribution of scientific productivity. *Journal of Washington Academy Sciences*, *16*, 317-323.
- Luukkonen, T., Persson, O., & Sivertsen, G. (1992). Understanding patterns of international scientific collaboration. *Science, technology & human values*, *17*(1), 101-126.

- Luukkonen, T., Tijssen, R. J. W., & Sivertsen, G. (1993). The measurement of international scientific collaboration. *Scientometrics*, 28(1), 15-36.
- Luwel, M. (2000). A bibliometric profile of Flemish research in natural, life and technical sciences. *Scientometrics*, 47, 281-302.
- Luwel, M. (2010). Highlights and reflections: Rapporteur's report. In OECD (Ed.), *Performance-based funding for public research in tertiary education institutions: Workshop proceedings* (pp. 167-174). Paris: OECD-publishing.
- Mali, F., Kronegger, L., Doreian, P., & Ferligoj, A. (2012). Dynamic scientific co-authorship networks. In A. Scharnhorst, K. Borner, & P. van den Besselaar (Eds.), *Models of Science Dynamics. Understanding Complex Systems* (pp. 195-232). Heidelberg: Springer.
- Martin, B., Tang, P., Morgan, M., Glänzel, W., Hornbostel, S., Lauer, G. et al. (2010). Towards a bibliometric database for the social sciences and humanities - *A European scoping project: A report produced for DFG, ESRC, AHRC, NWO, ANR and ESF*. Sussex: Science and Technology Policy Research Unit.
- Mathews, L. A., & Andersen, K. (2001). A gender gap in publishing? Women's representation in edited political science books. *Political Science and Politics*, 34(01), 143-147.
- Melin, G. (2000). Pragmatism and self-organization: Research collaboration on the individual level. *Research Policy*, 29(1), 31-40.
- Melin, G. & Persson, O. (1996). Studying research collaboration using co-authorships. *Scientometrics*, 36, 363-377.
- Merton, R. K. (1973). *The sociology of science: Theoretical and empirical investigations*. Chicago and London: The University of Chicago Press.
- Moed, H. F., Linmans, A. J. M., Nederhof, A., Zuccala, A., López Illescas, C., & de Moya Anegón, F. (2009). *Options for a comprehensive database of research outputs in social sciences and humanities. Research report to the project board of the scoping study "Towards a bibliometric database for the social sciences and humanities" (Report)*. Leiden & Madrid: CWTS & CSIC.
- Moed, H. F., Luwel, M., Houben, J. A., Spruyt, E., & Van Den Berghe, H. (1998). The effects of changes in the funding structure of the Flemish universities on their research capacity, productivity and impact during the 1980's and early 1990's. *Scientometrics*, 43, 231-255.
- Moed, H. F., Luwel, M., & Nederhof, J. (2002). Towards research performance in the humanities. *Library trends*, 50, 498-520.
- Moody, J. (2004). The structure of a social science collaboration network: Disciplinary cohesion from 1963-1999. *American Sociological Review*, 69(2), 213-239.
- Must, Ü. (2012). Alone or together: Examples from history research. *Scientometrics*, 91, 527-537.
- Nalimov, V. V., & Mulchenko, B. M. (1969). *Scientometrics* (Vol. (in Russian)). Moscow: Nauka.
- Narin, F., Stevens, K., & Whitlow, E. S. (1991). Scientific co-operation in Europe and the citation of multinationally authored papers. *Scientometrics*, 21(3), 313-323.
- Narin, F. (1994). Patent bibliometrics. *Scientometrics*, 30(1), 147-155.
- National Academies (2004). *Facilitating interdisciplinary research*. National Academies (Committee on Facilitating Interdisciplinary Research, Committee on Science, Engineering, and Public Policy). Washington: National Academy Press, p. 2.
- Nederhof, A. J. (2006). Bibliometric monitoring of research performance in the social sciences and the humanities: A review. *Scientometrics*, 66(1), 81-100.
- Nederhof, A. J. (2011). A bibliometric study of productivity and impact of modern language and literature research. *Research in Science Education*, 20(2), 117-129.
- Nederhof, A. J., & Noyons, E. C. M. (1992). International comparison of departments' research performance in the humanities. *Journal of the American Society for Information Science & Technology*, 43(3), 249-256.
- Nederhof, A. J., Van Leeuwen, T., & van Raan, A. (2010). Highly cited non-journal publications in political science, economics and psychology: A first exploration. *Scientometrics*, 83, 363-374. doi:10.1007/s11192-009-0086-y

- Nederhof, A. J., & Zwaan, R. A. (1991). Quality judgments of journals as indicators of research performance in the humanities and the social and behavioral-sciences. *Journal of the American Society for Information Science*, 42(5), 332-340.
- Nederhof, A. J., Zwaan, R. A., Debruin, R. E., & Dekker, P. J. (1989). Assessing the usefulness of bibliometric indicators for the humanities and the social and behavioral sciences - A comparative study. *Scientometrics*, 15(5-6), 423-435.
- Nederman, C. J. (2005). Herding cats: The view from the volume and series editor. *Journal of Scholarly Publishing*, 36(4), 221-228.
- Nelles, J., & Vorley, T. (2010). From policy to practice: Engaging and embedding the third mission in contemporary universities. *International journal of sociology and social policy*, 30(7/8), 341-353. doi:http://dx.doi.org/10.1108/01443331011060706
- Newman, M. E. J. (2004). Co-authorship networks and patterns of scientific collaboration. *Proceedings of the national academy of sciences of the United States of America*, 1010, 5200-5205.
- Nowotny, H., Scott, P., & Gibbons, M. (2003). Introduction: 'Mode 2' revisited: The new production of knowledge. *Minerva*, 41(3), 179-194.
- OAPEN-UK. (2014). *Survey of use of monographs by academics - as authors and readers (Report)*. Retrieved from <http://oapen-uk.jiscebooks.org/research-findings/researcher-survey-2014/>
- Ochsner, M., Hug, S. E., & Daniel, H. D. (2013). Four types of research in the humanities: Setting the stage for research quality criteria in the humanities. *Research Evaluation*, 22(2), 79-92. doi:10.1093/reseval/rvs039
- Ossenblok, T. L. B. & Engels, T. C. E. (2012). A measure of collaboration for edited books in the social sciences and humanities. *Abstracts for the NordForsk workshop on bibliometrics for the social sciences and humanities* <http://blogs.helsinki.fi/nordforskssh2012/files/2012/03/NordForsk-SSH-Workshop-abstracts1.pdf>.
- Ossenblok, T. L. B., & Engels, T. C. E. (2015). Edited books in the social sciences and humanities: Characteristics and collaboration analysis. *Scientometrics*, 104(1), 219-237. doi: 10.1007/s11192-015-1544-3
- Ossenblok, T.L.B., Engels, T.C.E. and Sivertsen, G. (2012). The representation of the social sciences and humanities in the web of science. A comparison of publication patterns and incentive structures in Flanders and Norway (2005-2009). *Research Evaluation*, 21(4), 280-290. DOI: 10.1093/reseval/rvs019
- Ossenblok, T. L. B., Guns, R., & Thelwall, M. (2015). Book editors in the social sciences and humanities: An analysis of publication and collaboration patterns of established researchers in Flanders. *Learned Publishing*, 28(4), 261-273.
- Ossenblok, T. L. B. & Thelwall, M. (2015). What's special about book editors? A bibliometric comparison of book editors and other Flemish researchers in the social sciences and humanities. In: A. Ali Salah, Y. Tonta, A. A. Akdağ Salah, C. Sugimoto, U. Al (eds). *Proceedings of the 15th international society of scientometrics and informetrics conference (ISSI)*. Istanbul
- Ossenblok, T. L. B., Verleysen, F. T. & Engels, T. C. E. (2012). Patterns of co-authorship in journal articles in the social sciences and humanities (2000-2010). In: E. ARchambault, Y. Gingras and V. Larivière (eds). *Proceedings of 17th international conference on science and technology indicators (STI)*. Science-Metrix and OST, Montreal.
- Ossenblok, T. L. B., Verleysen, F. T., & Engels, T. C. E. (2014). Co-authorship of journal articles and book chapters in the social sciences and humanities (2000-2010). *Journal of the American Society for Information Science and Technology (Jasist)*. 65(5), p. 882-897. DOI: 10.1002/asi.23015
- Ossenblok, T. L. B., Verleysen, F. T., Spruyt, E. H. J., & Engels, T. C. E. (2013). Bibliometrische analyse van het Vlaamse universitaire onderzoek in de sociale en humane wetenschappen aan de hand van het VABB-SHW. In K. Debackere & R. Veugelers (Eds.), *Vlaams indicatorenboek 2013* (pp. 91-103). Brussel: Expertisecentrum Onderzoek & Ontwikkelingsmonitoring (ECOOM), Ministerie van de Vlaamse Gemeenschap.

- Osterloh, M., Wollersheim, J., Ringelhan, S., & Welpel, I. M. (2015). Preface. In I. M. Welpel, J. Wollersheim, S. Ringelhan, & M. Osterloh (Eds.), *Incentives and performance. Governance of research organizations*: Springer.
- Osuna, C., Cruz-Castro, L., & Sanz-Menéndez, L. (2011). Overturning some assumptions about the effects of evaluation systems on publication performance. *Scientometrics*, 86, 575-592.
- Paul-Hus, A., Sugimoto, C. R., Haustein, S., & Larivière, V. (2015). Is there a gender gap in social media metrics? In A. A. Salah, Y. Tonta, A. A. Akdag Salah, C. R. Sugimoto, & U. Al (Eds.), *Proceedings of the 15th international society of scientometrics and informetrics conference (ISSI)*. (pp. 37-45). Istanbul (Turkey), 29 June to 3 July 2015: Bogaziçi University Printhouse.
- Persson, O. (2010). Are highly cited papers more international? *Scientometrics*, 83, 397-401.
- Persson, O., Glänzel, W., & Danell, R. (2004). Inflationary bibliometric values: The role of scientific collaboration and the need for relative indicators in evaluative studies. *Scientometrics*, 60(3), 421-432.
- Persson, O., Melin, G., Danell, R., & Kaloudis, A. (1997). Research collaboration at nordic universities. *Scientometrics*, 39(2), 209-223.
- Pestaña, A., Gómez, I., Fernández, M. T., Zulueta, M. A., & Méndez, A. (1995). Scientometric evaluation of R&D activities in medium-size institutions: a case study based on the Spanish Scientific Research Council (CSIC). In M. Koenig & A. Bookstein (Eds.), *The Proceedings of the fifth international conference of the international society for scientometrics and informetrics (ISSI)* (pp. 425-434).
- Piro, F. N., Aksnes, D. W., & Rorstad, K. (2013). A macro analysis of productivity differences across fields: challenges in the measurement of scientific publishing. *Journal of the American Society for Information Science (Jasist)*, 64(2), 307-320.
- Porter, A. L., Cohen, A. S., Roessner, J. D., & Perrault, M. (2007). Measuring researcher interdisciplinarity. *Scientometrics*, 72, 117-147.
- Price, D. J. d. S. (1986). *Little science, big science.. and beyond*. New York: Colombia University Press.
- Price, D. J. d. S., & Beaver, D. D. (1966). Collaboration in an invisible college. *American psychologist*, 21(11), 1011-1018.
- Prpic, K. (2002). Gender and productivity differentials in science. *Scientometrics*, 55(1), 27-58. doi:10.1023/a:1016046819457
- Prpic, K. (2007). Changes of scientific knowledge production and research productivity in a transitional society. *Scientometrics*, 72, 487-511.
- Puuska, H.-M. (2010). Effects of scholar's gender and professional position on publishing productivity in different publication types. Analysis of a Finnish university. *Scientometrics*, 82(2), 419-437. doi:10.1007/s11192-009-0037-7
- Puuska, H.-M. (2014). *Scholarly publishing patterns in Finland. A comparison of disciplinary groups. Doctoral Dissertation*. Tampere: Tampere University Press.
- Puuska, H.-M., & Miettinen, M. (2008). *Publishing practices in different disciplines (Report)*. Finland: Publications of Finnish Ministry of Education.
- Puuska, H.-M., Muhonnen, R., & Leino, Y. (2014). International and domestic co-publishing and their citation impact in different disciplines. *Scientometrics*, 98(2), 823-839.
- Rafols, I. & Meyer, M. (2010). Diversity and network coherence as indicators of interdisciplinarity: case studies in bionanoscience. *Scientometrics*, 82, 263-87. <http://dx.doi.org/10.1007/s11192-009-0041-y>
- Reitz, J.M. (s.a.) ODLIS. Online Dictionary for Library and Information Science: [http://www.abc-clio.com/ODLIS/odlis\\_e.aspx](http://www.abc-clio.com/ODLIS/odlis_e.aspx)
- Reskin, B. (1978). Sex differentiation and the social organization of science. In J. Gaston (Ed.), *The sociology of science* (pp. 6-37). San Francisco: Jossey-Bass.
- Rossiter, M. W. (1993). The matthew-matilda effect in science. *Social Studies of Science*, 23(2), 325-341. doi:10.1177/030631293023002004
- Rousseau, R. (2011). Comments on the modified collaborative coefficient. *Scientometrics*, 87, 171-174.

- Rousseau, R. (2014). Library science: Forgotten founder of bibliometrics. *Nature*, 510(7504), 218. doi:10.1038/510218e
- Rousseau, R. (2015). Citation data as a proxy for quality or scientific influence are at best PAC (Probably Approximately Correct). *Journal of the American Society for Information Science & Technology, to be published*. doi:10.1002/asi
- Rousseau, R., & Ye, F. Y. (2013). A multi-metric approach for research evaluation. *Chinese Science Bulletin*, 58(26), 3288-3290. doi:10.1007/s11434-013-5939-3
- Rowlands, I., & Nicholas, D. (2005). Scholarly communication in the digital environment - The 2005 survey of journal author behaviour and attitudes. *Aslib Proceedings*, 57(6), 481-497.
- Schneider, J. W. (2009). An outline of the bibliometric indicator used for performance-based funding of research institutions in Norway. *European Political Science*, 8(3), 364-378.
- Schneider, J. W., Aagaard, K., & Bloch, C. W. (2015). What happens when funding is linked to differentiated publication counts? New insights from an evaluation of the Norwegian publication model. *Research Evaluation, submitted*.
- Schuermans, N., Meeus, B., & De Maesschalck, F. (2010). Is there a world beyond the web of science? Publication practices outside the heartland of academic geography. *Area*, 42, 417-424.
- Shumway, D. R., & Messer-Davidow, E. (1991). Disciplinarity: An introduction. *Poet. Today*, 12, 201-225. doi:10.2307/1772850
- Sismondo, S. (2009). *An introduction to science and technology studies* (2nd ed.): Wiley-Blackwell.
- Sivertsen, G. (2009). Publication patterns in all fields. In F. Aström, R. Danell, B. Larsen, & J. W. Schneider (Eds.), *Celebrating scholarly communication studies: A Festschrift for Olle Persson at his 60th birthday* (pp. 55-60). ISSI.
- Sivertsen, G. (2010). A performance indicator based on complete data for the scientific publication output at research institutions. *ISSI Newsletter*, 6(1), 22-28.
- Sivertsen, G., Deschacht, N., Aldberg, H., & Engels, T. C. E. (2013). Poster: The influence of performance-based university research funding systems on co-authorship practices. In S. Hinze & A. Lottmann (Eds.), *Translational twists and turns: Science as a socio-economic endeavor. Proceedings of 18th international conference on science and technology indicators (STI)*. Berlin: IFQ.
- Sivertsen, G. & Larsen, B. (2012). Comprehensive bibliographic coverage of the social sciences and humanities in a citation index: an empirical analysis of the potential. *Scientometrics*, doi:10.1007/s11192-011-0615-3.
- Smith, M. (1958). The trend toward multiple authorship in psychology. *The American Psychologist*, 13, 596-599.
- Sonnenwald, D. H. (2007). Scientific collaboration. *Annual Review of Information Science and Technology*, 41(1), 643-681.
- Spruyt, E. H. J., & Engels, T. C. E. (2013a). Het nieuwe BOF-besluit en de implicaties ervan voor de universitaire onderzoeksfinanciering en -beleidsvoering. *Tijdschrift voor onderwijsrecht en onderwijsbeleid (TORB)*, 55-67.
- Spruyt, E. H. J., & Engels, T. C. E. (2013b). Nieuwe sleutel verdeling van middelen Bijzonder Onderzoeksfonds. *Thema: Tijdschrift voor Hoger Onderwijs en Management*, 13(3), 56-61.
- Spruyt, E. H. J., & Rons, N. (2008). Belonend Onderzoek Financiering: De BOF-sleutel, een staaltje sleutelkunde. *Delta*, 5(18), 25-32.
- Spruyt, E. H. J., Tan, B., & Van Dyck, D. (2006). Onderzoek binnen de academiseringsopdracht in de associaties met als casus de Associatie Universiteit & Hogescholen Antwerpen. *Tijdschrift voor Onderwijsrecht & Onderwijsbeleid*(4-5), 415-433.
- Stieg Dalton, M. (2008). The publishing experiences of historians. *Journal of Scholarly Publishing*, 39(3), 197-240. doi:10.3138/jsp.39.3.197
- Stieg Dalton, M., & Charnigo, L. (2004). Historians and their information sources. *College & Research Libraries*, 65, 400-425.
- Stolte-Heiskanen, V. (1983). The role and status of women scientific workers in research groups. In J. Pleck & H. Lopata (Eds.), *Research in the interweave of social roles* (Vol. 3). Greenwich: CT: JAI.

- Stone, S. (1982). Humanities scholars: Information needs and uses. *Journal of documentation*, 38, 292-313.
- Subramanyam, K. (1983). Bibliometric studies of research collaboration: A review. *Journal of Information Science*, 6, 33-38.
- Sugimoto, C. R., & Weingart, S. (2015). The kaleidoscope of disciplinarity. *Journal of documentation*, 71(4), 775-794. doi:10.1108/jd-06-2014-0082
- Sula, C. A. (2012). Visualizing social connections in the humanities: Beyond bibliometrics. *Bulletin of the American Society for Information Science and Technology*, 38(4), 31-35.
- Surowiecki, J. (2004). *The wisdom of crowds. Why the many are smarter than the few*. London, UK: Little, Brown Book Group.
- Svensson, P. (2010). The landscape of digital humanities. *digital humanities quarterly*, 4(1).
- Tague-Sutcliffe, J. (1992). An introduction to informetrics. *Information Processing & Management*, 28(1), 1-3.
- Thelwall, M., & Sud, P. (2014). No citation advantage for monograph-based collaborations? *Journal of Informetrics*, 8(1), 9.
- Thomas, C. S., & Hrebenar, R. J. (1993). Editing multiauthor books in political science: Plotting your way through an academic minefield. *Political Science and Politics*, 26(4), 778-783. <http://dx.doi.org/10.1017/S1049096500039135>
- Thompson, J. B. (2005). *Books in the digital age. The transformation of academic and higher education publishing in Britain and the United States*. Cambridge (UK): Polity.
- Thompson, J. W. (2002). The death of the scholarly monograph in the humanities? Citation patterns in literary scholarship. *Libri*, 52, 121-136.
- Thompson Klein, J. (1990). *Interdisciplinarity: History, theory and practice*. Detroit: Wayne State University press.
- Thompson Klein, J. (2005). *Humanities, culture and interdisciplinarity: The changing american academy*. New York: State University of New York Press.
- Torres-Salinas, D., Robinson-Garcia, N., Cabezas-Clavijo, Á., & Jiménez-Contreras, E. (2013). Analyzing the citation characteristics of books: Edited books, book series and publisher types in the Book Citation Index. *Scientometrics*, 98(3), 2113-2127. doi:DOI 10.1007/s11192-013-1168-4
- Torres-Salinas, D., Rodriguez-Sanchez, R., Robinson-Garcia, N., & Fdez-Valdivia, J. A. G. (2013). Mapping Citation Patterns of Book Chapters in the Book Citation Index. *Journal of Informetrics*, 7(2), 412-424.
- Townley, B. (1997). The institutional logic of performance appraisal. *Organization Studies*, 18(2), 261-285.
- van Dalen, H. P., & Henkens, K. (2012). Intended and unintended consequences of a publish-or-perish culture: A worldwide survey. *Journal of the American Society for Information Science and Technology*, 63(7), 1282-1293. doi:10.1002/asi.22636
- van Raan, A. F. J. (2004). Measuring Science. *Capita Selecta of Current Main Issues*. In H.F.Moed, W. Glänzel, & U. Schmoch (Eds.), *Handbook of Quantitative Science and Technolgy Research* (pp. 19-50). Dordrecht, the Netherlands: Kluwer Academic Publishers.
- van Raan, A. F. J., & van Leeuwen, T. N. (2002). Assessment of the scientific basis of interdisciplinary, applied research: Application of bibliometric methods in nutrition and food research. *Research Policy*, 31(4), 611-632. doi:10.1016/s0048-7333(01)00129-9
- van Rijnssoever, F. J., & Hessels, L. K. (2011). Factors associated with disciplinary and interdisciplinary research collaboration. *Research Policy*, 40, 463-472.
- Verleysen, F. T., & Engels, T. C. E. (2012). Historical publications at Flemish universities, 2000-2009. An analysis on the basis of the Flemish Academic Database for the Social Sciences and Humanities. *Journal of Belgian History*, 42(4), 110-143.
- Verleysen, F. T., & Engels, T. C. E. (2013a). A label for peer-reviewed books. *Journal of the American Society for Information Science and Technology (Jasist)*, 64, 428-430. doi:10.1002/asi.22836
- Verleysen, F. T. & Engels, T. C. E. (2013b). Measuring internationalisation of book publishing in the Social Sciences and Humanities using the barycentre method In Gorraiz, J., Schiebel, E.,

- Gumpenberger, C., Hörlesberger, M. & Moed, H. (Eds.), *Proceedings of the 14th international society of scientometrics and informetrics conference (ISSI- 15<sup>th</sup> to 20<sup>th</sup> July 2013)*, (pp. 1170-1176), Vienna (Austria).
- Verleysen, F. T., & Engels, T. C. E. (2014a). Barycenter representation of book publishing internationalisation in the social sciences and humanities. *Journal of Informetrics*, 8, 234-240.
- Verleysen, F. T., & Engels, T. C. E. (2014b). Internationalisation of peer reviewed and non-peer reviewed book publications in the social sciences and humanities. *Scientometrics*, 101(2), 1431-1444. <http://dx.doi.org/10.1007/s11192-014-1267-x>
- Verleysen, F. T., Ghesquière, P., & Engels, T. C. E. (2014). The objectives, design and selection process of the Flemish Academic Bibliographic Database for the Social Sciences and Humanities (VABB-SHW). In W. Blockmans & al. (Eds.), *The use and abuse of bibliometrics* (pp. 115-125). Academiae Europaea; Portland Press.
- Verleysen, F.T. & Ossenblok, T.L.B. (2016). Monograph authors in the social sciences and humanities: an analysis of publication and collaboration patterns of Flemish social sciences and humanities researchers. *Under construction*
- Verleysen, F. T., Ossenblok, T. L. B., & Engels, T. C. E. (2012). Een veld in beweging: Onderzoeksevaluatie in de sociale en humane wetenschappen: Internationaal Colloquium van het Expertisecentrum Onderzoek- en Ontwikkelingsmonitoring (ECCOM), Antwerpen, 9 december 2011. *Tijdschrift voor Onderwijsrecht & Onderwijsbeleid*, 5, 345-351.
- Verleysen, F.T., Ossenblok, T.L.B., Spruyt, E.H.J., & Engels, T.C.E. (2015). Bibliometrische analyse van het Vlaamse universitaire onderzoek in de sociale en humane wetenschappen aan de hand van het VABB-SHW. In K. Debackere & R. Veugelers (Eds.), *Vlaams indicatorenboek 2015*. (pp. 46-47) Brussel: Expertisecentrum Onderzoek & Ontwikkelingsmonitoring (ECCOM), Ministerie van de Vlaamse Gemeenschap. P46-47. [https://www.ecoom.be/indicatorenboek\\_2015\\_files/Indicatorenboek\\_2015.pdf](https://www.ecoom.be/indicatorenboek_2015_files/Indicatorenboek_2015.pdf)
- Verleysen, F. T., & Weeren, A. (2016). Clustering of authors by their publication patterns in the social sciences and humanities. *Accepted pending minor revisions*
- Vesterager Pedersen, C. (2010). The Danish bibliometric research indicator. Research publications, research assessment, university funding. *Nordic-Baltic Forum for Scientific Communication*, 4, 4.
- Wagner, C. S. & Leydesdorff, L. (2005). Mapping the network of global science: comparing international co-authorships from 1990 to 2000. *International journal of Technology and Globalisation*, 1, 185-208.
- Wagner, C. S., Roessner, J. D., Bobb, K., Klein, J. T., Boyack, K. W., Keyton, J., etc. (2011). Approaches to understanding and measuring interdisciplinary scientific research (IDR): A review of the literature. *Journal of Informetrics*, 5(1), 14-26. doi: 10.1016/j.joi.2010.06.004
- Waldrop, M. M. (2008). Science 2.0. *Scientific American*, 298(5), 68-73.
- Wang, J., & Hicks, D. (2013). Detecting structural change in university research systems: A case study of British research policy. *Research Evaluation*, 22(4), 258-268. doi:10.1093/reseval/rvt016
- Watson-Boone, R. (1994). The information needs and habits of humanities scholars. *RQ*, 34(2), 203-215.
- Weibel, A., Rost, K., & Osterloh, M. (2009). Pay for performance in the public sector--benefits and (hidden) costs. *Journal of Public Administration Research and Theory*, 20(2), 387-412. doi:10.1093/jopart/mup009
- Weingart, P. (2005). Impact of bibliometrics upon the science system: Inadvertent consequences? *Scientometrics*, 62(1), 117-131.
- Welkenhuyse-Gybels, J., & Loosveldt, G. (2002). *Regressieanalyse: Een introductie in de multivariabelenanalyse*. Leuven/Leusden: ACCO.
- West, J. D., Jackquet, J., King, M. M., Corell, S. J., & Bergstrom, C. T. (2013). The role of gender in scholarly authorship. *PLoS ONE*, 8(7), e66212.

- White, H. D., Boell, S. K., Yu, H., Davis, M., Wilson, C. S., & Cole, F. T. H. (2009). Libcitations: A measure for comparative assessment of book publications in the humanities and social sciences. *Journal of the American Society for Information Science and Technology*, 60 (6), 1083-1096.
- Whitley, R. (1984). *The intellectual and social organization of the sciences* (1st ed.). Oxford: Clarendon Press.
- Whitley, R. (2000). *The intellectual and social organization of the sciences* (2nd ed.). Oxford: Oxford University Press.
- Whitley, R. (2007). Changing governance of the public sciences. In R. Whitley & J. Gläser (Eds.), *The changing governance of the sciences. The advent of research evaluation systems*. (pp. 3-27). Dordrecht: Springer Science.
- Whitley, R. (2011). Changing governance and authority relations in the public sciences. *Minerva*, 49(4), 359-385. doi:10.1007/s11024-011-9182-2
- Whitley, R., & Gläser, J. (Eds.). (2007). *The changing governance of the sciences. The advent of research evaluation systems*. Dordrecht, The Netherlands: Springer.
- Willaert, F. (2007). Welke universiteit willen wij? In P. Loobuyck, G. Vanheeswijck, W. Van Herck, E. Grieten, & K. Vercauteren (Eds.), *Welke universiteit willen wij (niet)?* (pp. 3-10). Gent: Academia Press.
- Williams, P., Stevenson, I., Nicholas, D., Watkinson, A., & Rowlands, I. (2009). The role and future of the monograph in arts and humanities research. *Aslib Proceedings*, 61, 67-82.
- Wilsdon, J., Allen, L., Belfiore, E., Campbell, P., Curry, S., Hill, S., Jones, R., Kain, R., Kerridge, S., Thelwall, M., Tinkler, J., Viney, I., Wouters, P., Hill, J., Johnson, B. (2015). *The metric tide: Report of the independent review of the role of metrics in research assessment and management*. DOI: 10.13140/RG.2.1.4929.1363
- Wray, K. B. (2002). The epistemic significance of collaborative research. *Philosophy of Science*, 69, 150-168.
- Wray, K. B. (2006). Scientific authorship in the age of collaborative research. *Studies in History and Philosophy of Science*, 37(3), 505-514. doi:10.1016/j.shpsa.2005.07.011
- Wu, Y., Pan, Y., Zhang, Y., Ma, Z., Pang, J., Guo, H., Xu, B., & Yang, Z. (2004). China scientific and technical papers and citations (CSTPC): History, impact and outlook. *Scientometrics*, 60(3), 385-397.
- Wuchty, S., Jones, B. F., & Uzzi, B. (2007). The increasing dominance of teams in production of knowledge. *Science*, 316(5827), 1036-1039. doi:10.1126/science.1136099
- Yitzhaki, M. (1998). The language preference in sociology. *Scientometrics*, 41(1-2), 243-254.
- Young, C. D. (1995). An assessment of articles published by women in 15 top political-science journals. *Ps-Political Science & Politics*, 28(3), 525-533. doi:10.2307/420325
- Zuccala, A. (2006). Modeling the invisible college. *Journal of the American Society for Information Science and Technology*, 57(2), 152-168.
- Zuckerman, H., & Merton, R. K. (1972). Age, aging and age structure in science. In M. White Riley, M. Johnson, & A. Foner (Eds.), *Aging and society* (Vol. 3: *A Sociology of age stratification*). New York: Russel Sage Foundation.
- Zuijdam, F., Ploeg, M., Mostert, B., & Boekholt, P. (2013). *Evaluatie van het Vlaams academisch bibliografisch bestand voor de sociale en humane wetenschappen (VABB-SHW). (Final report)*. Amsterdam: technopolis /group.

## APPENDIX

### A. List of scientific communication

#### A.1. List of presentations

2011

1. "The representation of the SS&H in the WoS. A comparison of publication patterns and incentive structures in Flanders and Norway (2005-2009)". Tryuken Ossenblok (presenter), Gunnar Sivertsen (presenter) and Tim Engels – ENID/STI conference on Actors and networks in European Science – Rome (Italy), CNR – Consiglio Nazionale delle Recerche – 7-9 September 2011
2. "Construction and analysis of a regional database of publications in the SS&H". Tryuken Ossenblok (presenter) and Tim Engels - 16th Nordic Workshop on Bibliometrics and Research Policy – Aalborg (Denmark) – 23 September 2011
3. "On the second version of the VABB-SHW". Tryuken Ossenblok and Tim Engels (presenter) – ECOOM colloquium: Assessing research performance in the social sciences and humanities – Antwerp – 9 December 2011

2012

4. "Patterns of Co-authorship in the SSH (2000-2010)". Tryuken Ossenblok (presenter), Frederik Verleysen and Tim Engels – 17<sup>th</sup> STI conference on Actors and networks in Science – Montreal (Canada) - 7 September 2012
5. "A measure of collaboration for edited books in SSH". Tryuken Ossenblok (presenter) and Tim Engels– Nordforsk workshop on Bibliometrics for the social sciences and humanities (ism 17<sup>th</sup> Nordic Workshop on Bibliometrics and Research Policy) - Helsinki (Finland) -11 October 2012 - <http://blogs.helsinki.fi/nordforskssh2012/>
6. "Publiceren in Rechten" Tryuken Ossenblok (presenter) and Frederik Verleysen (presenter) – Information session concerning the VABB-SHW –University of Hasselt – 5 December 2012

2013

7. "Research of the scientific communication of social science and humanities researchers". Tryuken Ossenblok – Wolverhampton – 10 April 2014
8. "Onderzoek naar de wetenschappelijke communicatie van sociale en humane wetenschappers". Tryuken Ossenblok – Onderwijs Research Club – IOIW - 17 June 2013

9. "Collaboration in the social sciences and humanities: Edited books in economics, history and linguistics". Trycken Ossenblok (presenter) and Tim Engels – poster op ISSI 2013 – Vienna (Austria) - 15-17 juni 2013.
10. "The VABB-SHW, a Flemish Academic Bibliographic database for the social sciences and humanities". Trycken Ossenblok– Workshop Output registration and research assessment in the SS, H & Law, 2013 – Leiden (the Netherlands) – 21 November 2013

2014

11. "Book editors as nodes in a collaboration network in the SS&H: Does it make a difference?". Trycken Ossenblok (presenter), Raf Guns and Mike Thelwall – 19<sup>th</sup> Nordic Workshop – Reykjavik (Island) – 26 September 2014

2015

12. "What's special about book editors? A bibliometric comparison of book editors and other Flemish researchers in the social sciences and humanities". Trycken Ossenblok (presenter) and Mike Thelwall – ISSI2015 – Istanbul (Turkey) – 29 juni-4 July 2015.
13. "Bibliometric profiling of monograph authors (part II)". Trycken Ossenblok (presenter) and Frederik Verleysen – 20th Nordic Workshop – Oslo (Norway) – 1 & 2 October 2015

## A.2. List of original articles

1. Engels, T.C.E., **Ossenblok, T.L.B.**, & Spruyt, E.H.J. (2012). Changing publication patterns in the social sciences and humanities, 2000-2009. *Scientometrics*, 93, 373-390. DOI: 10.1007/s11192-012-0680-2
2. **Ossenblok, T.L.B.**, Engels, T.C.E. and Sivertsen, G. (2012). The representation of the social sciences and humanities in the Web of Science. A comparison of publication patterns and incentive structures in Flanders and Norway (2005-2009). *Research Evaluation*, 21(4), 280-290. DOI: 10.1093/reseval/rvs019
3. Verleysen, F.T., **Ossenblok, T.L.B.**, & Engels, T.C.E. (2012). Een veld in beweging: onderzoeksevaluatie in de sociale en humane wetenschappen: Internationaal Colloquium van het Expertisecentrum Onderzoeks- en Ontwikkelingsmonitoring (ECOOM), Antwerpen, 9 december 2011. *Tijdschrift voor Onderwijsrecht & Onderwijsbeleid*, 5, 345-351.
4. **Ossenblok, T.L.B.**, Verleysen, F.T., & Engels, T.C.E. (2014). Co-authorship of journal articles and book chapters in the SSH (2000-2010). *Journal of the American Society for Information Science and Technology (Jasist)*. 65(5), p. 882-897. DOI: 10.1002/asi.23015

5. **Ossenblok, T.L.B.**, & Engels, T.C.E. (2015). Edited books in the social sciences and humanities: Characteristics and collaboration analysis. *Scientometrics*, 104(1), 219-237. doi: 10.1007/s11192-015-1544-3
6. **Ossenblok, T.L.B.**, Guns, R., & Thelwall, M. (2015). Book editors in the social sciences and humanities: An analysis of publication and collaboration patterns of established researchers in Flanders. *Learned Publishing*, 28(4), 261-273.
7. Verleysen, F.T. & **Ossenblok, T.L.B.** (2015). Monograph authors in the social sciences and humanities: an analysis of publication and collaboration patterns of Flemish social sciences and humanities researchers. *Under construction*

### A.3. List of proceedings papers

1. **Ossenblok, T.L.B.**, Verleysen, F.T., Engels, T.C.E. (2012). Patterns of co-authorship in journal articles in the SSH (2000-2010). In Archambault, E., Gingras, Y. & Larivière, V. (Eds.) *Proceedings of the 17th International Conference on Science and Technology (STI)*, (pp. 640-650). Montreal (Canada).
2. **Ossenblok, T.L.B.**, & Thelwall, M. (2015). What's special about book editors? A bibliometric comparison of book editors and other Flemish researchers in the social sciences and humanities. In A. A. Salah, Y. Tonta, A. A. Akdag Salah, C. R. Sugimoto, & U. Al (Eds.), *Proceedings of the 15th International Society of Scientometrics and Informetrics Conference (29 June-3 July 2015)*, (pp. 778-783). Istanbul (Turkey).

### A.4. List of Posters

1. **Ossenblok, T.L.B.**, & Engels, T.C.E. (2013). Collaboration in the social sciences and humanities: Edited books in economics, history and linguistics (Poster). In Gorraiz, J., Schiebel, E., Gumpenberger, C., Hörlesberger, M. & Moed, H. (Eds.), *Proceedings of the 14th International Society of Scientometrics and Informetrics Conference (15<sup>th</sup> to 20<sup>th</sup> July 2013)*, (pp. 1894-1896), Vienna (Austria).

### A.5. List of report chapters

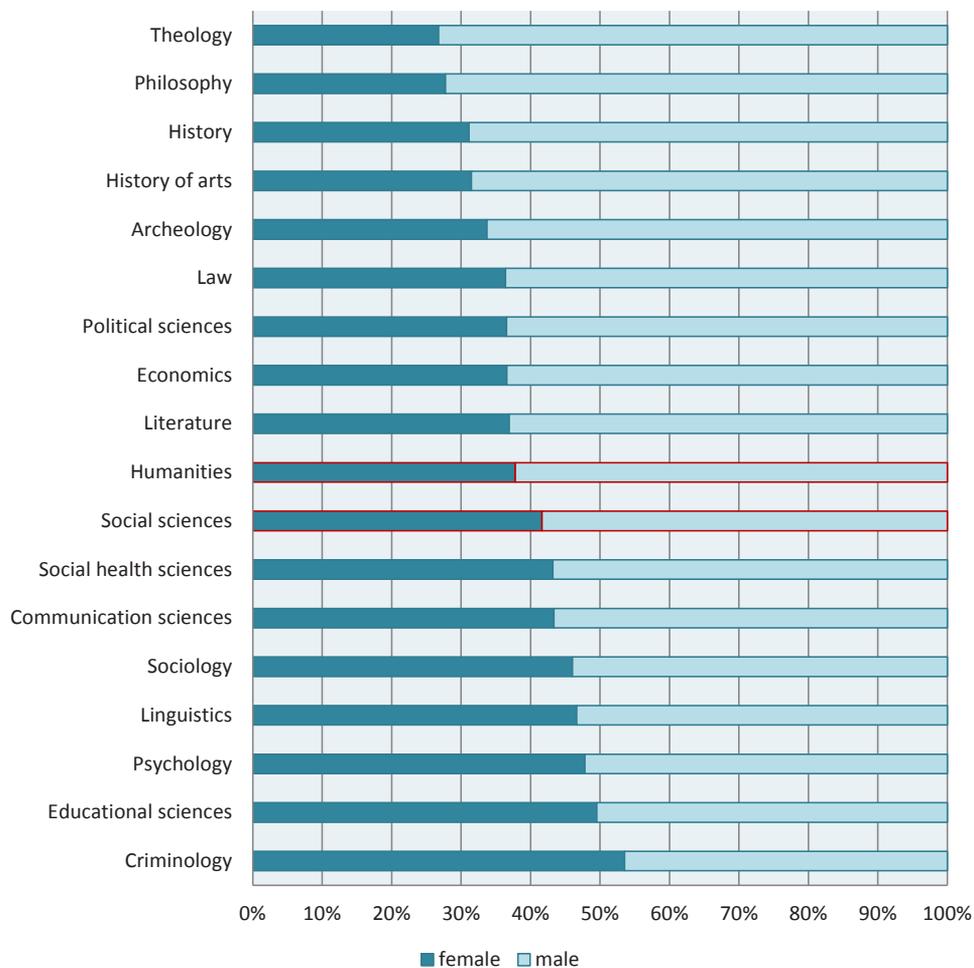
1. **Ossenblok, T.**, Stevens, N., Spruyt, E., & Engels, T. (2011). Bibliometrische analyse van het Vlaams universitair onderzoek in de Sociale en Humane Wetenschappen. De eerste versie van het VABB-SHW. In K. Debackere & R. Veugelers (Eds.), *Vlaams indicatorenboek 2011*, (pp. 173-184). Brussel: Expertisecentrum Onderzoek & Ontwikkelingsmonitoring (ECCOM), Ministerie van de Vlaamse Gemeenschap. <https://www.ecoom.be/sites/ecoom.be/files/downloads/indicatorenboek2011.pdf>
2. **Ossenblok, T.L.B.**, Verleysen, F.T., Spruyt, E.H.J., & Engels, T. C.E. (2013). Bibliometrische analyse van het Vlaamse universitaire onderzoek in de sociale en humane wetenschappen aan de hand van het VABB-SHW. In K. Debackere & R. Veugelers (Eds.), *Vlaams indicatorenboek 2013*, (pp. 181-193).

Brussel: Expertisecentrum Onderzoek & Ontwikkelingsmonitoring (ECOOM), Ministerie van de Vlaamse  
Gemeenschap.  
<https://www.ecoom.be/sites/ecoom.be/files/downloads/indicatorenboek2013.pdf>

3. Verleysen, F.T., **Ossenblok, T.L.B.**, Spruyt, E.H.J., & Engels, T.C.E. (2015). Bibliometrische analyse van het Vlaamse universitaire onderzoek in de sociale en humane wetenschappen aan de hand van het VABB-SHW. In K. Debackere & R. Veugelers (Eds.), *Vlaams indicatorenboek 2015*. (pp. 46-47) Brussel: Expertisecentrum Onderzoek & Ontwikkelingsmonitoring (ECOOM), Ministerie van de Vlaamse  
Gemeenschap.  
[https://www.ecoom.be/indicatorenboek\\_2015\\_files/Indicatorenboek\\_2015.pdf](https://www.ecoom.be/indicatorenboek_2015_files/Indicatorenboek_2015.pdf)
4. Verleysen, F.T., **Ossenblok, T.L.B.** & Engels, T.C.E. (2015). Diversiteit in evolutie boek publicaties in het VABB-SHW (dossier). In K. Debackere & R. Veugelers (Eds.), *Vlaams indicatorenboek 2015*. (pp.71) Brussel: Expertisecentrum Onderzoek & Ontwikkelingsmonitoring (ECOOM), Ministerie van de  
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[https://www.ecoom.be/indicatorenboek\\_2015\\_files/Indicatorenboek\\_2015.pdf](https://www.ecoom.be/indicatorenboek_2015_files/Indicatorenboek_2015.pdf)

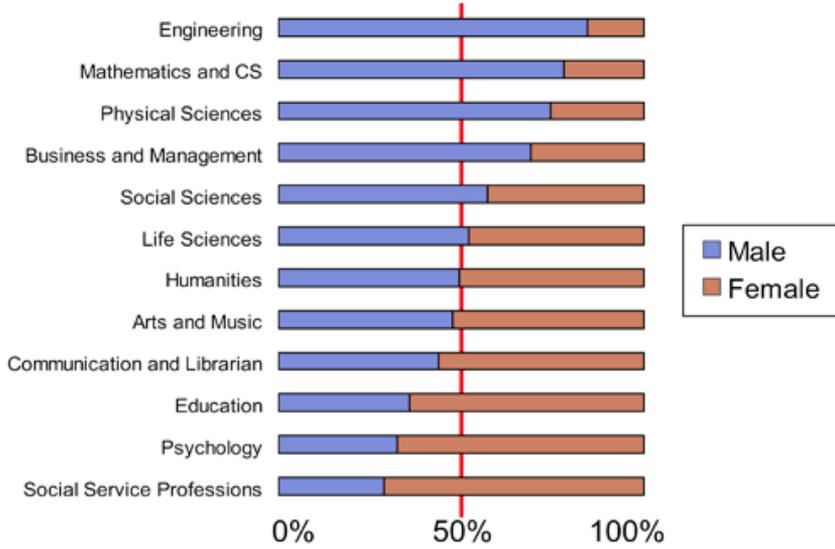
## B. Additional Tables and Figures

### B.1. Share of female and male researchers in the SSH disciplines in the VABB-SHW



**Figure 40:** Share of female and male researchers affiliated with one of the 5 Flemish universities, per discipline included in the VABB-SHW (2000-2011).

## HOW TO CHOOSE WHICH DEPARTMENT HAPPY HOUR TO GO TO (if you're single)



Ph.D. Gender Ratio by Field of Study

Source: Survey of Doctoral Student Finances, Experiences and Achievements.

## B.2. Classification of disciplines

**Table 32:** Knowledge and culture, by disciplinary grouping by Tony Becher (1994).

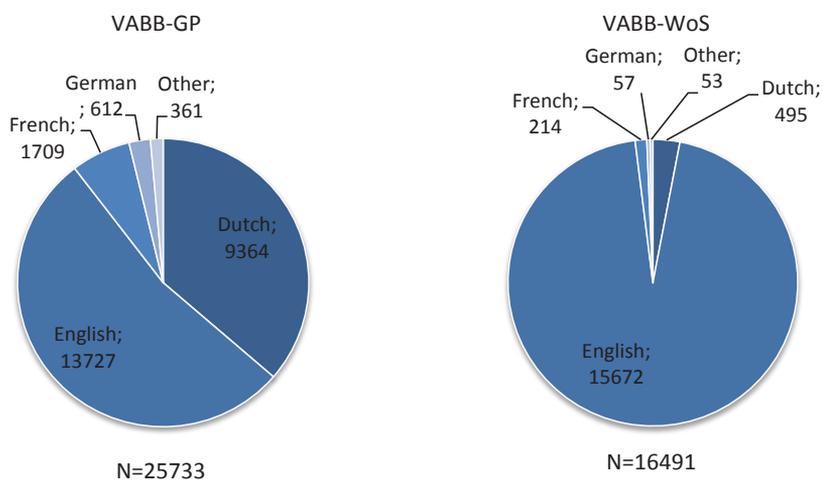
Disciplinary grouping		Examples of disciplines	Nature of Knowledge	Nature of disciplinary culture
Hard	pure	Physics	Cumulative, atomistic (crystalline/tree-like), concerned with universals, quantities, simplification, resulting in discovery/explanation	Competitive, gregarious, politically well organised, high publication rate, task-oriented
	applied	Technologies: e.g. mechanical engineering	Purposive, pragmatic (know-how via hard knowledge), concerned with mastery of physical environment, resulting in products/techniques	Entrepreneurial, cosmopolitan, dominated by professional values, patents substitutable for publications, role-oriented
Soft	pure	Humanities: e.g. history and pure social sciences: e.g. anthropology	Reiterative, holistic (organic/river-like), concerned with particulars, qualities, complication, resulting in understanding/interpretation	Individualistic, pluralistic, loosely structured, low publication rate, person-oriented
	applied	education	Functional, utilitarian (Know-how via soft knowledge), concerned with enhancement of (semi)-professional practice, resulting in protocols/procedures	Outward-looking, uncertain in status, dominated by intellectual fashions, publication rates reduced by consultancies, power-oriented

### B.3. Growth in weighted publication counts

**Table 33:** Growth in weighted publication counts for the humanities (H) and the social sciences (SS) (2000-2011).

	2000-2001	2002-2003	2004-2005	2006-2007	2008-2009	2010-2011	Growth factor (00-01 and 10-11)
Humanities	2508	3132	3243,5	3763,5	4198	4663	1,86
Social sciences	2071	2581	3216,5	3830	4647,5	5204	2,51

### B.4. Share of different languages for VABB-GP and VABB-WoS (2000-2011)



**Figure 41:** Share of main languages for VABB-GP and VABB-WoS (2000-2011).

## B.5. Share of English per publication type (2000-2012)

**Table 34:** Share and evolution of English publications for the different publication types in VABB-GP and VABB-WoS (2000-2011).

% English in		2000	2002	2004	2006	2008	2010	2012	Total
VABB-GP	Articles	41,8	40,1	42,9	42,5	45,6	44,9	50,7	44,1
	Monographs	69,2	69,6	74,4	65,5	72,4	74,3	64,6	68,9
	Edited books	72,3	71,4	75,8	77,3	81,9	74,0	82,4	76,8
	Book chapters	79,1	67,6	74,8	72,6	82,9	73,8	79,0	76,0
	proceedings papers	41,7	89,7	75,0	78,9	84,3	83,1	87,5	77,4
VABB-WoS	articles	92,6	94,6	95,1	95,9	94,9	94,8	96,3	95,1
	proceedings papers	100,0	95,3	98,7	95,7	95,0	100,0	98,0	97,6
Total		60,4	60,9	66,3	68,4	73,5	74,5	78,5	70,9

Source: Indicatorenboek 2015 and additional totals

## B.6. Selection of book publications in 2010

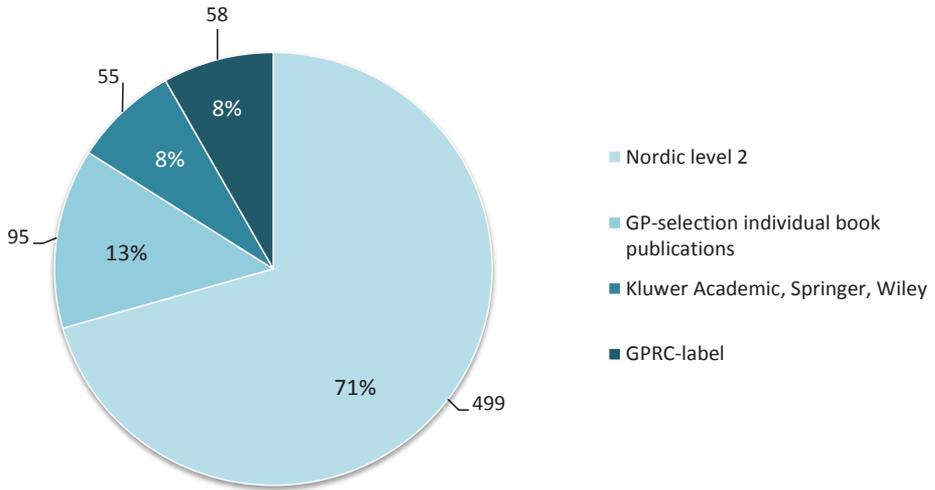


Figure 42: Selection of book publications in 2010 (source: Verleysen, Ossenblok & Engels, 2012).

## B.7. Collaboration in monographs

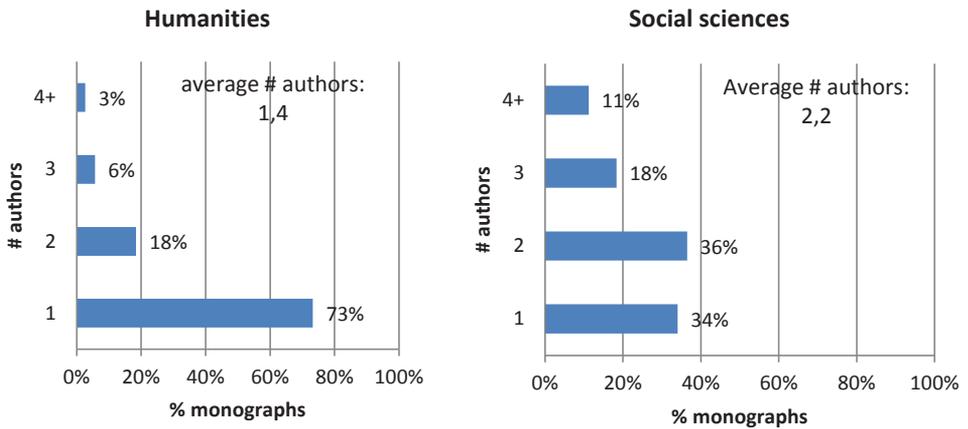


Figure 43: Share of monographs per number of authors (VABB-SHW; 2000-2011)

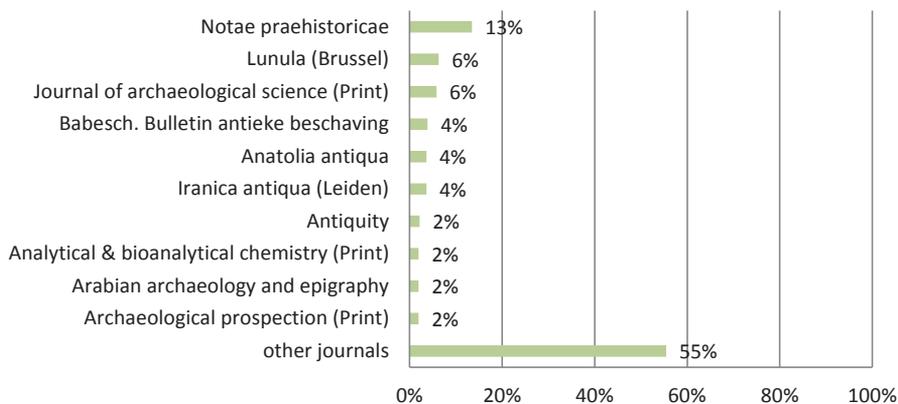
## B.8. Disciplinary dissemination patterns in the SSH disciplines: concentration in journals in the VABB-SHW (2000-2011).

**Table 35:** Per discipline number of journals, number of articles, share of journals that cover half of the articles and share of articles in the first 10% of the journals.

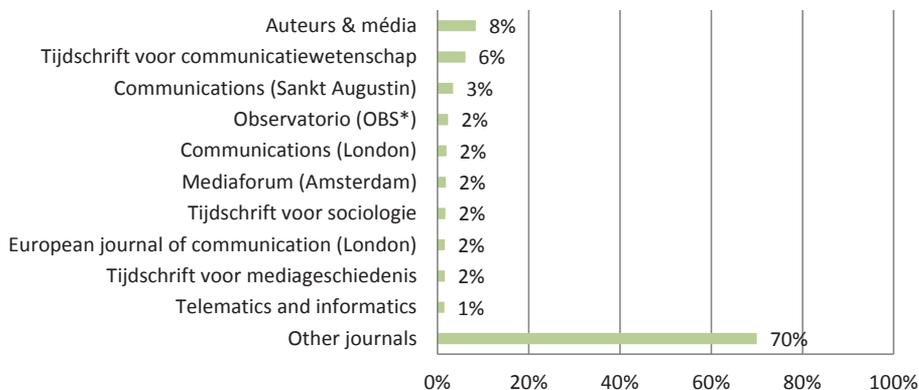
	# journals	# articles	% of journals that covers 50% of articles	% articles in first 10% of journals*
Archaeology	150	415	9	52
Communication studies	369	820	11	48
Criminology	237	1064	3	69
Economics & business	1616	4931	11	47
Educational sciences	688	1654	12	46
History	397	1220	8	53
History of arts	328	668	17	39
Law	678	5127	3	74
Linguistics	751	1907	12	45
Literature	345	963	11	47
Philosophy	698	1849	10	50
Political science	463	1383	9	52
Psychology	1029	3828	9	51
Social health sciences	1243	3935	12	47
Sociology	760	1743	14	44
Theology	258	935	6	56

\*. E.g. in case of communication studies, the first 36 journals belong in the top 10%, the 37<sup>th</sup> journals not.

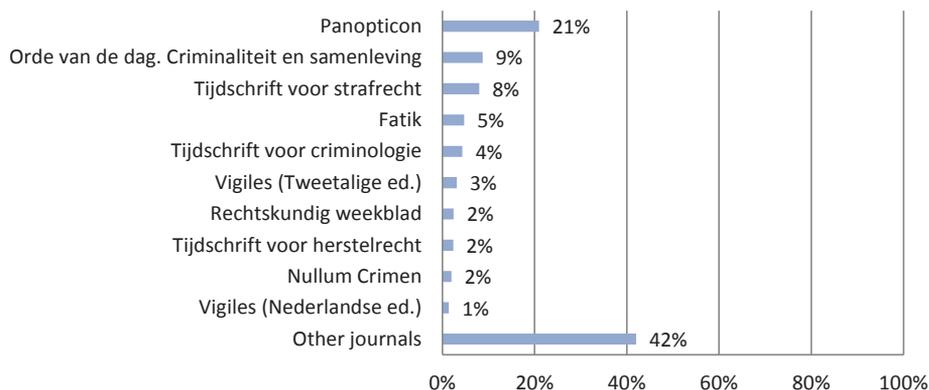
### Archaeology



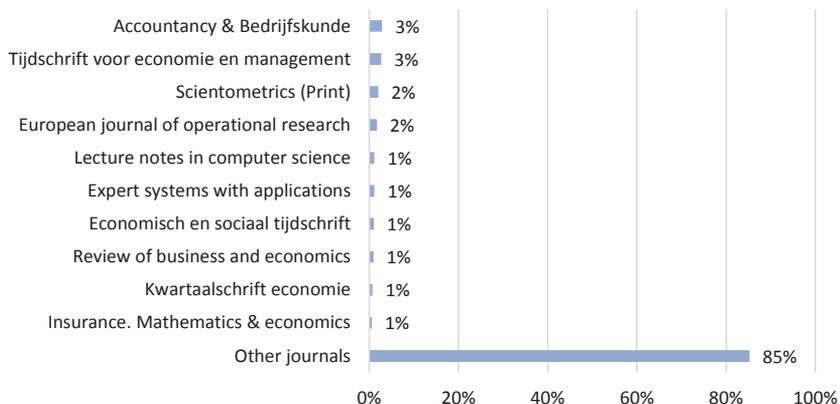
### Communication studies



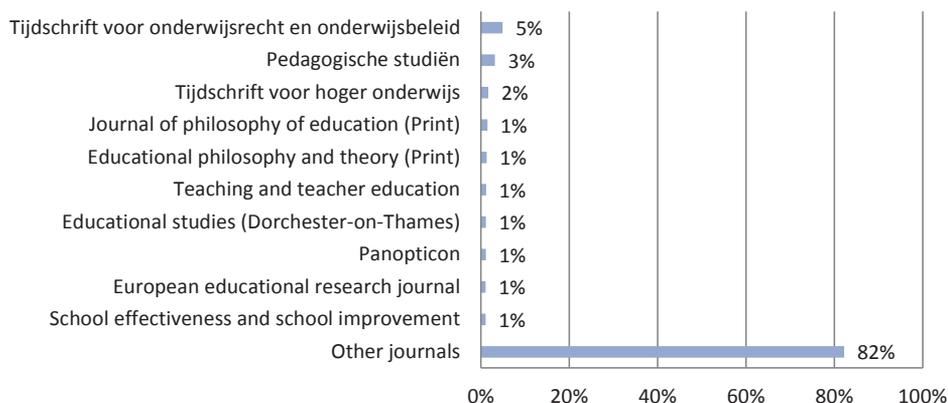
### Criminology



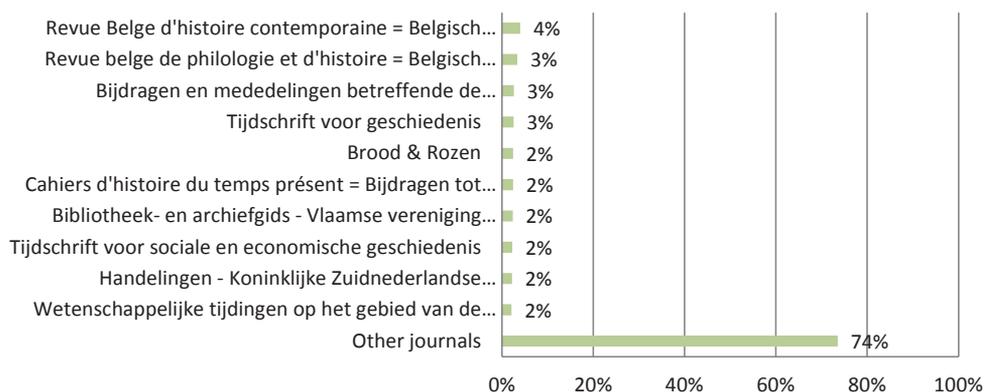
### Economics & Business



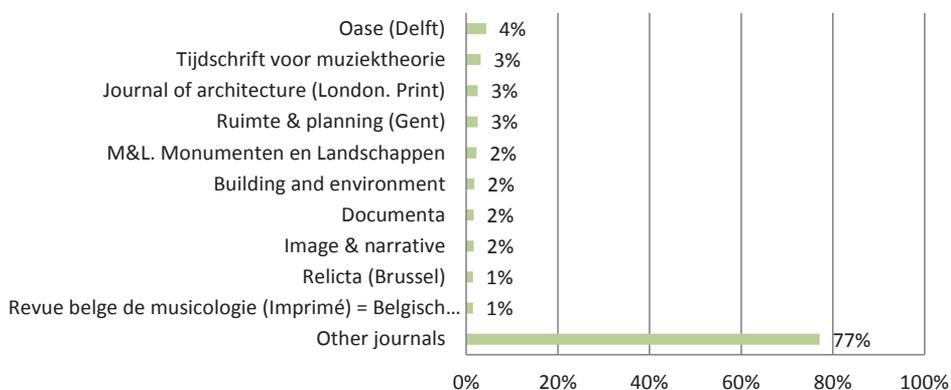
### Educational studies



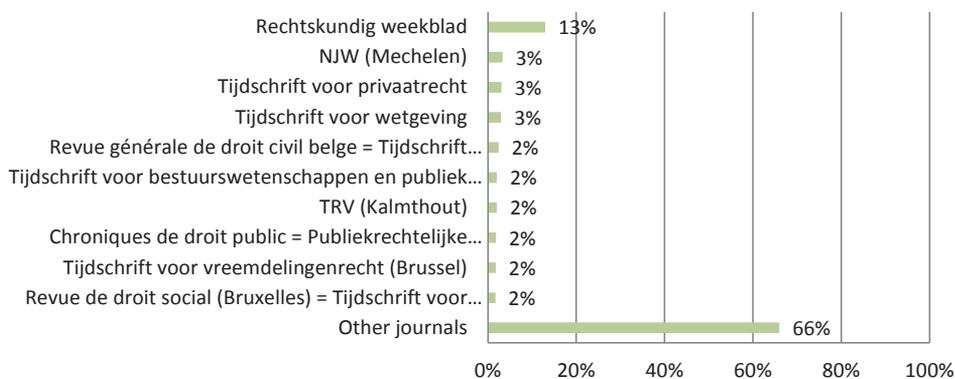
### History



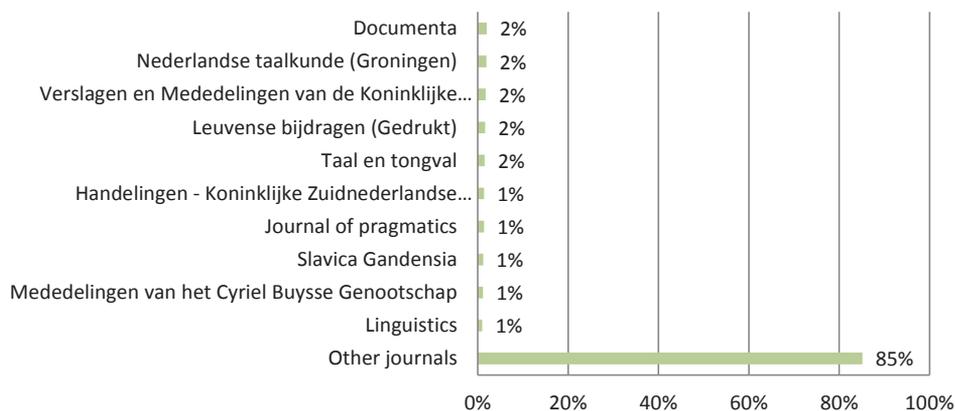
### History of arts



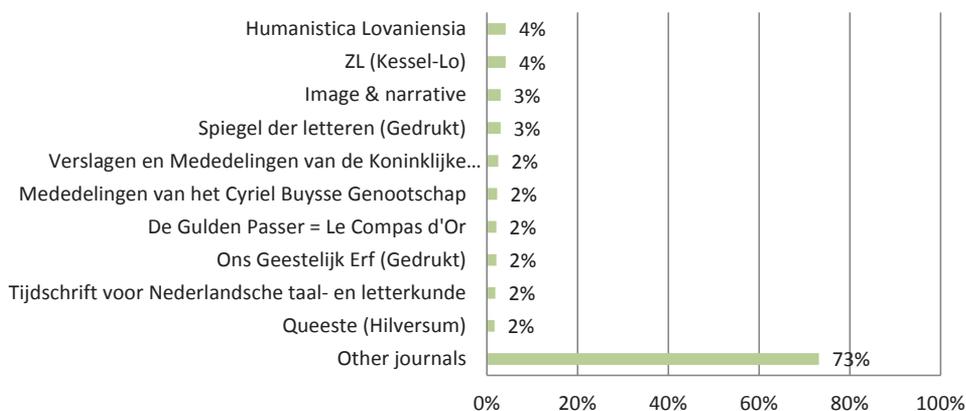
### Law



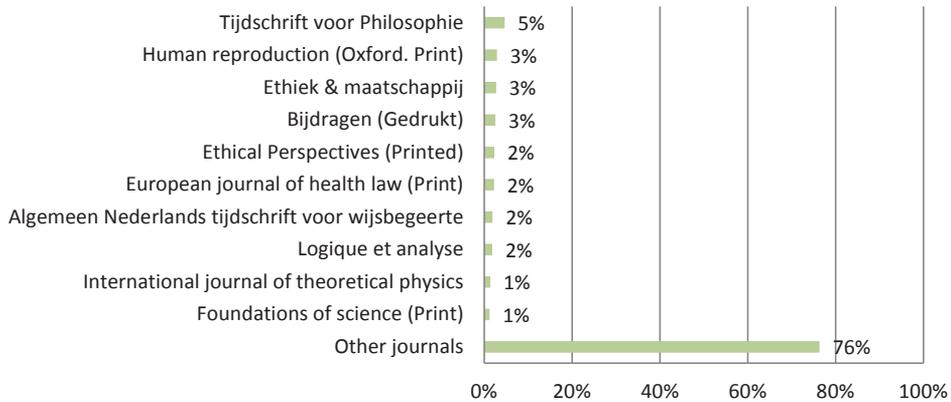
### Linguistics



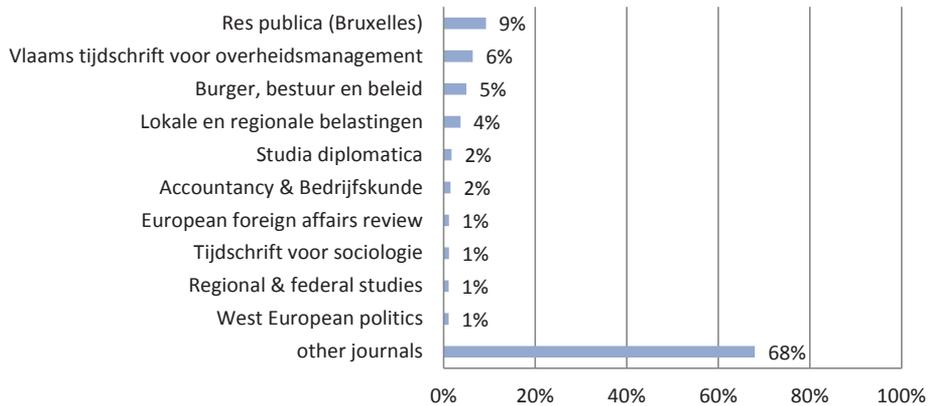
### Literature



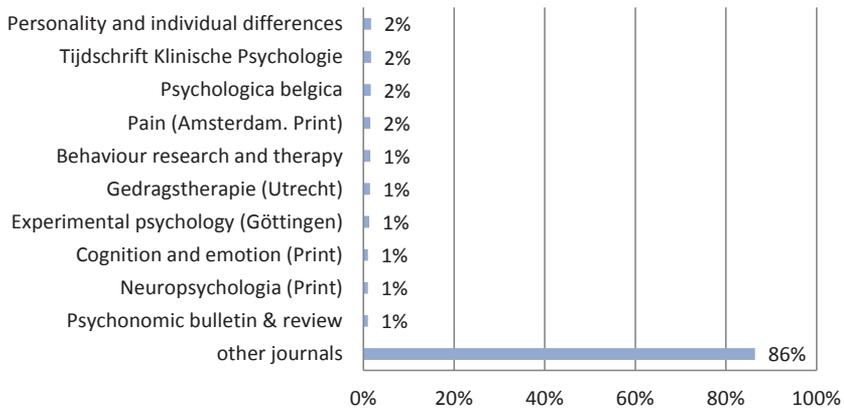
### Philosophy



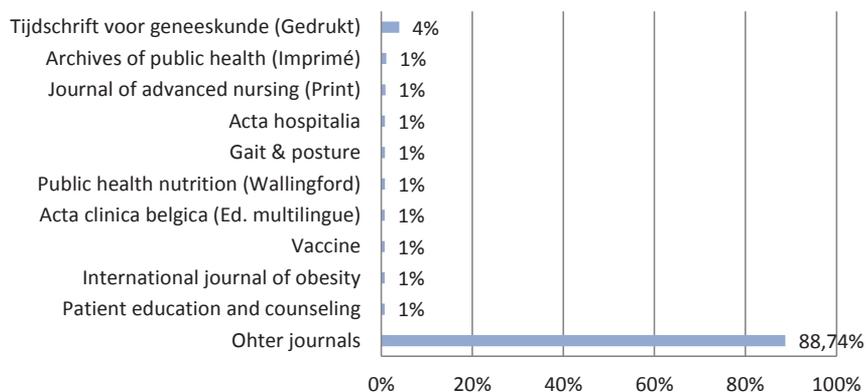
### Political science



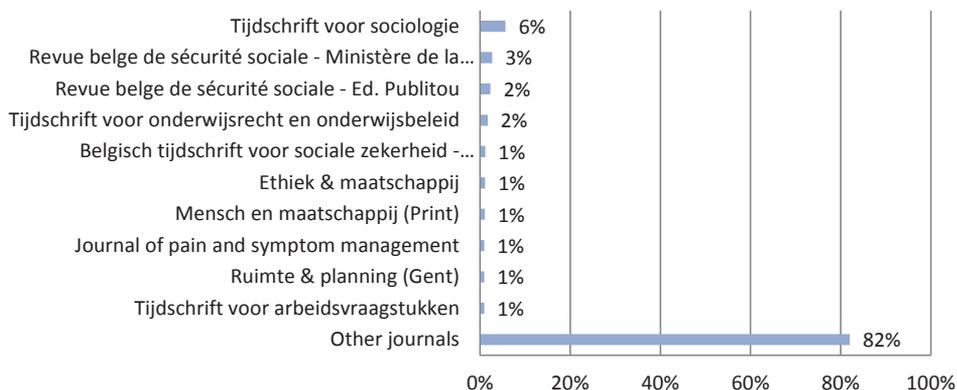
### Psychology



### Social health sciences



### Sociology



### Theology

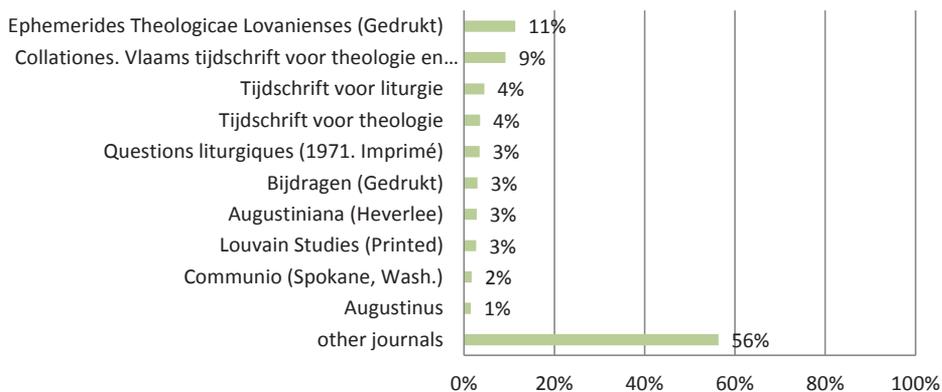


Figure 44: Share of articles with top 10 journals within SSH disciplines (VABB-SHW; 2000-2011).

## B.9. Inequality in number of publications (2000-2011)

**Table 36:** Gini-index and coefficient of variation of the total number of publications per two years for both the humanities and the social sciences (VABB-SHW, 2000-2011).

Discipline	2000-2001	2002-2003	2004-2005	2006-2007	2008-2009	2010-2011
<b>Humanities</b>						
archaeology	61	68	81	93	126	125
art history	88	142	151	190	221	269
communication studies	80	106	160	195	259	302
history	205	185	243	323	369	401
law	754	950	960	1.009	1.012	1.252
linguistics	335	467	468	600	641	690
literature	180	288	308	316	389	325
philosophy	291	368	376	443	493	625
theology	191	174	275	288	403	365
Gini-index	0,404	0,419	0,365	0,349	0,301	0,331
coefficient of variation	0,878	0,897	0,782	0,723	0,608	0,696
<b>Social sciences</b>						
criminology	139	130	155	193	283	327
economics & business	623	741	870	1.102	1.233	1.307
educational sciences	159	220	284	370	445	447
political science	125	238	275	306	427	462
psychology	325	443	588	732	941	1.053
sociology	202	227	318	328	419	501
social health sciences	291	495	634	739	844	1.046
Gini-index	0,306	0,298	0,290	0,303	0,268	0,263
coefficient of variation	0,656	0,601	0,573	0,607	0,536	0,528

As is shown in this thesis, the number of publications included in the VABB-SHW is on the rise, for the social sciences and humanities (see Figures 12 and 18), but also for the individual disciplines (see Tables 3 and 6<sup>45</sup>). However, differences between disciplines remain. The growth rate in number of publications in the social sciences is higher than this in the humanities. A Gini-index (Egghe & Rousseau, 2009) and coefficient of variation, both measures of inequality, (Egghe & Rousseau, 2009) have been calculated to compare the number of publications between the disciplines of the social sciences and the humanities as well as the evolution of the inequality over time.

<sup>45</sup> The number of publications in Table 3 are updated using all data from 2000-2011 included in the VABB-SHW.

$$\text{Gini-index } G = \frac{2\left(\frac{N+1}{2} - \sum_{i=1}^N i a_i\right)}{N} \text{ with } a_i = \frac{x_i}{\sum_{j=1}^N x_j}$$

$$\text{Coefficient of variation: } V = \frac{S}{\bar{X}}$$

S = standard deviation

X = Vector  $(x_1, \dots, x_N)$

N= total number of disciplines

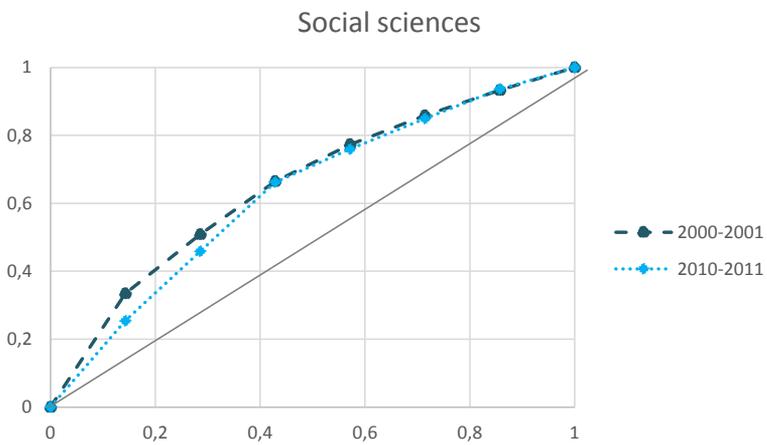
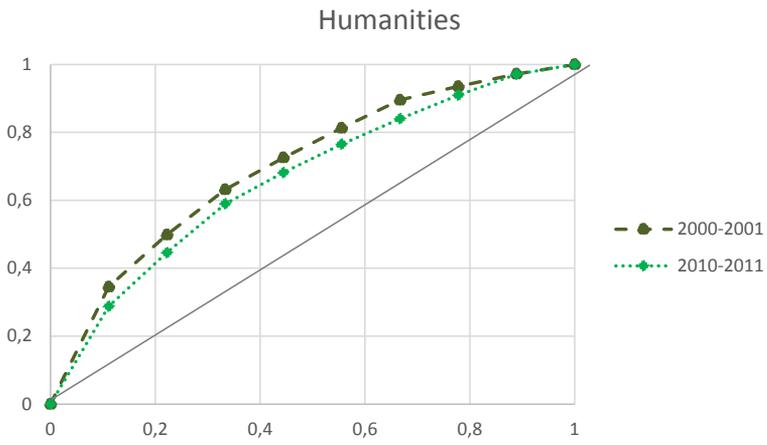
x = number of publications

i = rank of the discipline when sorting the number of publications descending

j = discipline

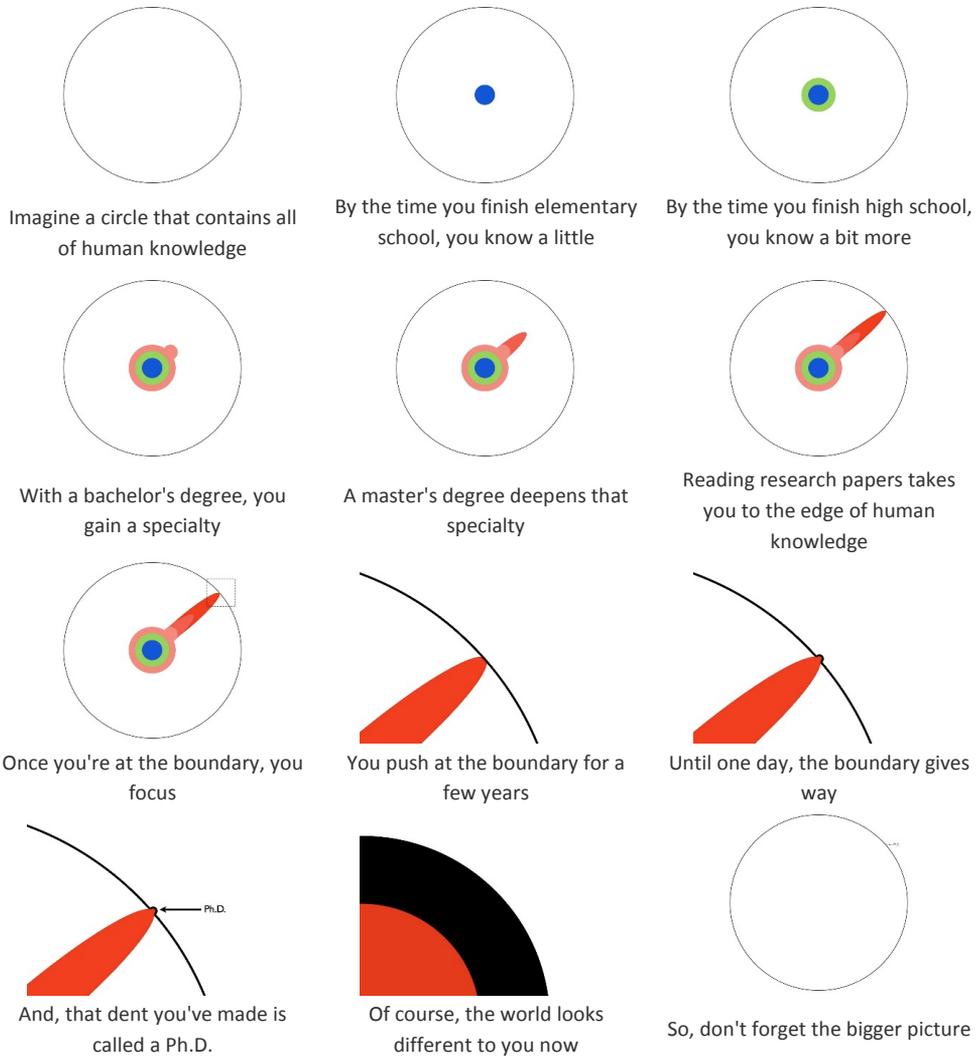
Both the Gini-index and the coefficient of variation are higher for the humanities for the social sciences, indicating a larger inequality in number of publications between the humanities disciplines than between those in the social sciences. Furthermore, both the Gini-index and the coefficient of variation are decreasing over time, for both the social sciences and the humanities. However, the decline appears to be sharper in the humanities than in the social sciences, indicating that some humanities disciplines with a lower number of publications in 2000-2001 are increasing their number more rapidly compared to the other disciplines in the humanities. As is shown in Table 36, communication studies, a discipline with the lowest number of publications in 2000-2001 after archaeology, more than tripled their number of publications and is therefore the fastest growing humanities discipline. In contrast, law, linguistics and philosophy, the three disciplines with the highest number of publications in 2000-2001, increased their number of publications at a much slower rate (see also Tables 3 and 6). The more modest growth in law, the discipline with the highest number of publications, both in 2000-2001 and 2010-2011, influences the decrease in inequality between the humanities disciplines.

In addition, in Figure 45, a Lorenz-curve, a visualization for inequality, has been plotted for the periods 2000-2001 and 2010-2011, for both the social sciences and the humanities. The X-axis represents the relative rank of the disciplines, i.e.  $\frac{i}{N}$  and the Y-axis represents the cumulative relative number of publications, i.e.  $a_1 + a_2 + \dots + a_i$  ( $i=1, \dots, N$ ) (Egghe & Rousseau, 2009). The diagonal represents perfect equality, or all disciplines in the study have the same number of publications (Egghe & Rousseau, 2009). In both the humanities and the social sciences, the curve for the 2010-2011 period is closer to the diagonal than the curve for the 2000-2001 period, indicating the difference between disciplines in number of publications is decreasing for both fields.



**Figure 45:** Lorenz-curve for both the humanities and the social sciences for the periods 2000-2001 and 2010-2011.

## POSTFACE



**Figure 46:** The circle of human knowledge (source: <http://matt.might.net/articles/phd-school-in-pictures/>)