VERSITA

INTERNET, SOCIAL SCIENCES
AND HUMANITIES[1]

FRANTIŠEK STELLNER & MAREK VOKOUN

Abstract: The paper deals with the state of the social sciences after the boom of internet services in the Czech Republic in the 1990s. The results of our survey, based on 512 responses from the economics and history departments of major Czech public universities, show that internet services are considered a quality factor for academic output; however, the issues of plagiarism, a lack of resource criticism, inadequacy of impact factor-based evaluations, poor academic training for the new generation of social scientists, the failure of state academic policy, and the generation gap make further development in the Czech social sciences rather problematic. As a result we recommend creating a better communication link between policy makers and scholars, reforming the current state policy which encourages lower quality academic output, and improving academic training, which requires a more individual approach, and also placing higher demands on social scientists.

Key words: internet; social sciences; academic policy; impact factor; economics; history; generation; gap.

Introduction

This study analyses the consequences of using the Internet in economics and the historical sciences. It deals with academic work and academic preparation at universities. The *network of networks* and the associated internet services also help popularize academia, however, this study deals with academic work only. The aim is to answer a number of questions about the use of electronic services (for example, academic search engines, collaborative sites, and citation management tools), to establish , if they make academic work easier, and trace any potential qualitative change in academic work between 1995 and 2012 in the social sciences and humanities.

In our analysis we evaluate the key problems social scientists face when using internet services, when preparing the next generation of scholars for academic work, and when searching for quality resources for their work. Two fields of study have been selected:

492

Economics and history[2]. These fields represent two traditional, large and methodologically heterogeneous groups of scholars (economists and historians) in the social sciences.

To assess the key problems, we focus on the magnitude and nature of the generation gap in internet service use. We discuss and evaluate the role and adequacy of the impact factor[3], which is also an important element of state funding, i.e. Czech state policy for academia also known as "*Kafemlejnek*" (the Coffee grinder), which is to some extent the Czech equivalent of the phrase "Publish or Perish".

Hypotheses

There is no dispute over the importance of information and communication technology (ICT) and its ability to handle and make use of large amounts of data. ICT services allow users around the world to share information and promote knowledge, i.e. provide relatively cheap, fast, efficient and practical services. Economists and historians can use academic search engine databases[4] in their daily academic work and in engaging in current academic discussions.

Search engines provide bibliographic data, full-text papers, digitalised scanned resources, and other factual data. Lecturers can use these to prepare the next generation of academics. A variety of subsidiary services, such as e-learning tools, presentations, online discussions, videos, podcasts, and live streams, are now a normal part of everyday student life. Global academic collaboration[5] and real-time internet protocol (IP) academic collaboration is still a relatively new and popular feature.

It is generally easier to acquire new academic books, and electronic full-text versions of papers published in respected journals, and keeping up with the current debates and the latest knowledge is faster and requires less effort. Our first hypothesis (h1) is that the internet has enabled a considerable increase in book and journal production. To evaluate this statement we analyse the figures available for the Czech Republic and the world between 1995 and 2012.

The introduction of internet services has meant that bibliometrics is used to monitor the results of academic work (CZSO, 2010). The impact factor has become a standard for academic work and assessment of state-supported R&D projects (Fiala, 2013). Our next hypothesis (h2) assumes that current state academic policy, i.e. the Register of the results of state-supported R&D and (h3) the impact factor are not efficient measures in the social

---

[2] Both disciplines represent the fields in a broader sense. Economics also include business economics, finance, and international trade, etc., and history includes social history, political history, cultural history, economic history, and historiography, etc. On how we define and understand these fields, see Soběhart (2009).

[3] For example Thompson Reuters, ISI Web of Knowledge – Journal Citation Report® or the Scopus® database rankings.

[4] List of trademarks and service marks of respected companies: EBSCO, EconLIT, Google Scholar, Google Books, OVID, ProQuest, JSTOR, SAGE, ScienceDirect, Web of Knowledge, Wiley, Worldcat, etc.

[5] List of sites and products of respected companies: Academia.edu, COS Research Support Suite, Mendeley, ResearchGate, Zotero Groups, and other social mass media used for academic collaboration.

493

sciences. In other words, that neither system is considered useful by economists or historians.

In our opinion impact factor cannot be used to compare the humanities with exact sciences. "…it is utter nonsense to compare apples and oranges and to compare the impact factors of a chemistry or biology journal to a political science or economics journal" (Česal, 2007, p. 47). This system, linked to public funding and academic careers[6] produces only greater quantities and not quality in the humanities. We are not convinced that the increasing number of ISI indexed social science journals (Appendix 4) and current public funding leads to more long-term academic research-based quality publications in the Czech Republic.

Multi-annual social science research projects[7] usually end with the key findings being published in a monograph, which, unlike a journal, is not indexed and has no impact factor. Thus, citing a book in a journal article can be viewed as pointless. We think that the current system is deformed by a number of negative practices. And this unfortunate "elephant-in-the-room" is deformed in two ways, i.e. authors purposely choose who to quote and who not to quote.

A petty affront or insult may have been exchanged and subsequently one author does not include the latest important discovery so as to avoid helping the other author or citing him or her. It may also be one-off "vengeance" against a recent negative review. Authors are more likely include their colleagues. Sometimes out of kindness and in hope of reciprocity in the near future, but sometimes out of pressure, academics have to help to promote the department's academic standing.

To do so "citation mafias" and "citation coalitions" are created. We can then observe some of the manifestations of the basic economic principles – the monopoly power manifestation, that is the exploitation of a dominant position and prevention of entry. The competition, unfortunately, however, is all about public funds. The two most prominent gold mines are large multi-annual public grants and public funding for universities and national scientific institutes. This creates a risk of corruption in the review process and further accentuates the "publish or perish" career pressure.

Authors are accustomed to quoting academic resources without actually reflecting upon them. This way, scholars simply demonstrate their familiarity and comply with the citation routine, which favours traditional and highly cited impact factor resources. This creates framework risks (Popper, 1996) and leads to a general decline in the social sciences. An academic study might not be quoted because is too provocative, interdisciplinary, from someone unknown-without-affiliation or a young author, and contradicts the mainstream and vice versa.

The Internet is a great invention for scholars, who also need to understand the portfolio of internet services available and their potential in relation to the further development of the social sciences. Policy makers require the same level of understanding as well, because sometimes outdated public policy severely distorts academic advances. Our next hypothesis deals with the generation gap and the use of internet services.

---

[6] See Rond & Miller (2005) and their concerns about the impact of "publish or perish" aphorisms in the academic community. They suggest a different approach to tenure and promotion.

[7] For example multiannual Czech Science Foundation (GACR) and Charles University Grant Agency (GAUK) projects.

These services were introduced when the Internet appeared in the Czech Republic in the 1990s. We assume that, on average, the older generation of scholars did not receive proper training and education. (h4) Older scholars do not use internet services to the extent their younger colleagues do. We believe that the generation gap has been growing in size since the 1990s and, in particular, in relation to the use of academic search engines and collaborative academic tools.

The rapid development in academic search engines has meant that there are more resources available for writing a dissertation or thesis in economics and history. The number of references used in dissertations and theses has increased since 1995 (h5). Candidates face an information overload and there is a difference between the references used and actually included in the final thesis.

To evaluate information properly critical skills are needed. Young scholars undergo some theoretical preparation and practical training at universities. They learn how to search, filter, process and archive resources. However, we believe this preparation for academic work using internet services is insufficient and of poor quality at Czech universities (h6).

Our beliefs are also based on the number of plagiarism cases in Czech academia and, in general, also the level of plagiarism in essays, dissertations and theses at universities, which had to be stopped using anti-plagiarism software. This is why we think (h7) economists and historians see plagiarism as a serious problem.

Plagiarists are imitators who do not enhance creativity, but simply take the easiest available resource and appropriate it after making a few changes. Critical thinking is suppressed, description and quick solutions dominate, and little added value is published. The plagiarists do not use new unprocessed resources and are a threat to the development of the social sciences.

Methods

We used several methods to collect the data necessary for our hypotheses. We processed and analysed documents, public databases and carried out a survey. We used basic comparative and multidisciplinary methods typically employed in economics and historiography. Time series analysis and growth analysis was used to assess publication output. The survey was evaluated using statistical methods for testing hypotheses.

To assess publication output, the compound annual growth rate (CAGR) was calculated using this formula:

$$\text{CAGR} = [(\text{Ending Value} \div \text{Beginning Value})^{1/(\text{number of years})}] - 1 \qquad (1)$$

To assess the time series trend, we tested for the existence of a weaker form of time series stationarity (Hamilton, 1994). To do so we employed a trend in the generalised least squares Dickey-Fuller (Dickey and Fuller, 1979) augmented test proposed by Elliott, Rothenberg, and Stock (1996). To assess the existence of a linear trend we reported the tau test statistics, 5% critical value, the number of lags, and the number of observations.

In the survey, our aim was to select experienced researchers with either a PhD or the Czech equivalent (CSc). We attempted to include all potential researchers from

public universities in the Czech Republic. The first step involved collecting data from 19 major public universities where there is a department offering economics and business economics. We sent the questionnaire (see Appendix 1) to 1468 researchers.

We are aware that there are possible systematic and confounding biases considering the survey design. We decided to produce a very short questionnaire with dichotomous Yes/No questions, which included the option of providing additional information. To some extent, we forced the academics to produce an extreme opinion. About 3.3% of researchers pointed this out in their open responses and said they did not like being "forced" to choose, but responded eventually. This may mean other researchers might have felt pressurized and did not respond. Almost half of all the researchers (46.9%) were interested in obtaining the results and willingly provided their email addresses.

We are aware that the design does not make it possibly to draw clear cut conclusions on such broad and complex issues as the use of internet services in the humanities, academic assessment methods, the role of the state, and plagiarism, but the research provides a good starting point for conducting further, more in-depth qualitative and quantitative interdisciplinary analysis. The interpretation and generalisation are thus based on black and white impressions and feelings crystallised from the limited experience of an academic.

The yes/no design also created another problem. We do not have normally distributed data and a standard unpaired t-test would produce only approximate and possibly biased results. Our two sample hypotheses are thus tested by the Wilcoxon rank-sum test (Wilcoxon's, 1945), which is an unmatched data equality test of two independent variables X_1 (for example, age group) and X_2 (a selected question Q number). In other words we can test whether a question from our survey (for example Q7—"The use of citation manager") contrasts significantly if we consider a group of academics (for example the younger generation by age group variable) ceteris paribus.

This rank-sum test is reflected in the single z-test Wilcoxon statistics, which tests the null hypothesis of equality on a sample of n observations. The probability of Type I error was chosen to be $\alpha = 5$ % ($p < 0.05$) and the results are interpreted as statistically significant and the mean difference between groups is used as a rough approximation of equality dissimilarities and ceteris paribus applies. In this analysis we do not allow for multiple variable interactions.

For multiple question hypotheses and multiple variable interactions, we used a bootstrapped multivariate analysis of variance (Anderson, 2003) to test the null hypothesis that the n-dimensional mean vectors for the n-interacting-question variables are equal. For example we can test a generation effect considering the interaction between current state policy (Q2) and adequacy of impact factor (Q3) variables. As noted before our data do not show normal distribution and the simple Manova, which requires at least approximate normality, could be biased.

To correct for this bias, Zhang (2012) suggests additional bootstrapping, which performs satisfactorily compared to other competing nonparametric heteroscedastic Manova approaches. To obtain a single statistic, the robust Wald test (Wooldridge, 2002) of Manova post-estimation results is performed and compared with possibly biased Manova Wilks' lambda.

496

Publication analysis

To test our assumptions that the Internet led to a considerable increase in book and journal production between 1995 and 2012, we used data from the National Library of the Czech Republic (NLCR) annual reports. Data are also published by the Czech Statistical Office (CZSO, 2014). We assume the positive time trend (1995-2012) to be the key proxy variable for technological development.

The NLCR book and journal data are aggregated and imperfect. For example, a book is a non-periodic publication with 45 or more pages and there is no way of distinguishing academic publications from a 50 page long official report or a journal from a lifestyle magazine published less than 12 times a year ("Other journals and magazines").

There are some statistics on publications which can be broken down by topic such as economics and history (appendix 3) but they are not available for the whole 1995-2012 period and it is not possible to tell if we are dealing with truly academic literature. We decided to assess the aggregated publication trend of books (unique titles) and other periodicals (Figure 1, Appendix 2).

The annual growth rate (ACGR) between 1995 and 2012 is 3.90% for books and 3.78% for other periodicals. From the TS analysis we observe that there is no linear trend in Czech book publishing and the TS follows a random walk process. For all the "other" journals, which includes academic journals, we can observe a trend stationary TS (τ=-5.459, CV= -3.012, l=4, n=13) with an average annual increase of 129 journals.

In comparison with the US market, Czech publishers produce more books per million inhabitants. In our social science sample, there are more books published in the US. In addition to the traditional book market, we can observe a boom in electronic publishing. E-books accounted for about 17% of the US market in 2011. There are also audio books, but we focus only on the paper book market since most titles are published in paper form.
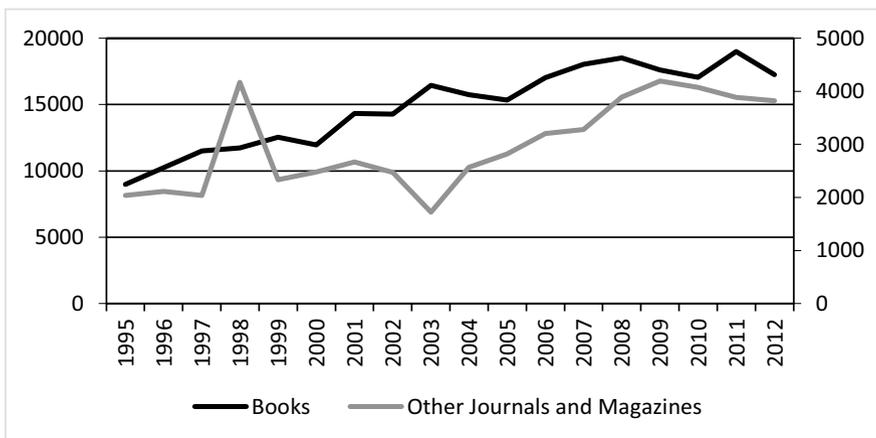

Figure 1. Number of books and periodicals published in the Czech Republic 1995-2012
Data: CZSO (2014). **Note**: Number of books is on the left axis
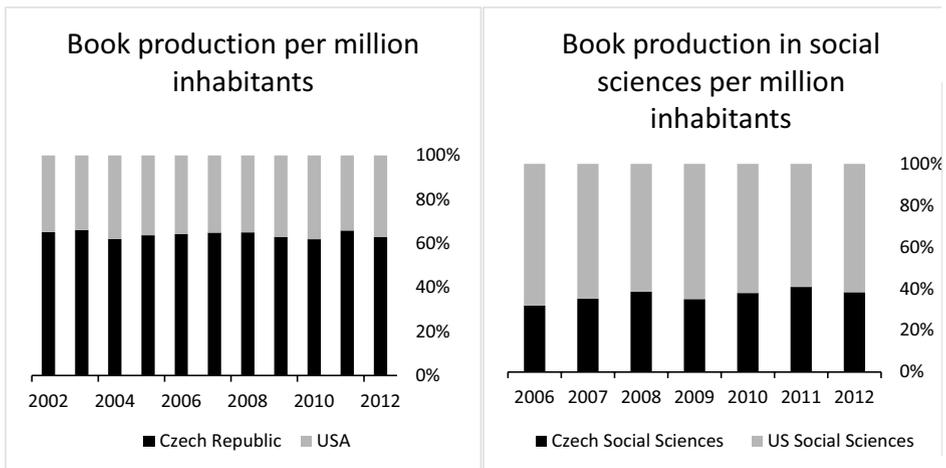
497

Figure 2. Number of books published in the Czech Republic and the US per million inhabitants total and in social sciences between 2002 and 2012

Data: Bowker (2012), FEP (2012), CZSO (2014), SCKN (2014). **Note**: Social science sample includes business economics, economics, history, law, philosophy, psychology, and sociology.

In 2012, around three quarters of all ISI indexed journals in the field were published in the UK, the US, and Australia (see appendix 3). The average growth rate (CAGR) of Czech journals is 6.76% which is higher growth than in the world (3.17%), however, the 2012 share was around 0.3% which seems to be quite low. But if we consider that only 52 countries are indexed it is higher than the global average (0.2% in 2012).

The TS of Czech ISI indexed journals is a trend stationary process (=-2.68, CV= -2.67, l=3, n=11) with average annual growth of 0.3 journals. In 2000 there were 2504 journals published in the Czech Republic and a total of 27 were ISI indexed, which is only around 1.1%. There is, for the time being, a non-random positive development in the Czech social sciences. The rest of the series in Figure 3 are expected random walk processes with no linear time trend and we cannot predict the future movement of the number of total ISI indexed social science journals.

There are plenty of peer reviewed journals that are not ISI indexed in the Czech Republic. One reason is that current state academic policy can stipulate certain assessment rules, which also positively rate (RIV scores) publications in non-impact peer reviewed journals. These journals are listed in the Information register (RIVabout state funded R&D projects. The official RIV list of non-impact peer reviewed journals indexed 554 journal titles in 2010 and this number decreased to 397 titles in 2014. The constriction occurred because of the general boom in peer reviewed journals, many of which were established in order to meet state policy on publishing requirements.

A large and growing number of indexed journals can be found in Die Elektronische Zeitschriftenbibliothek. This database indexed 66864 full text journals and 37855 of them
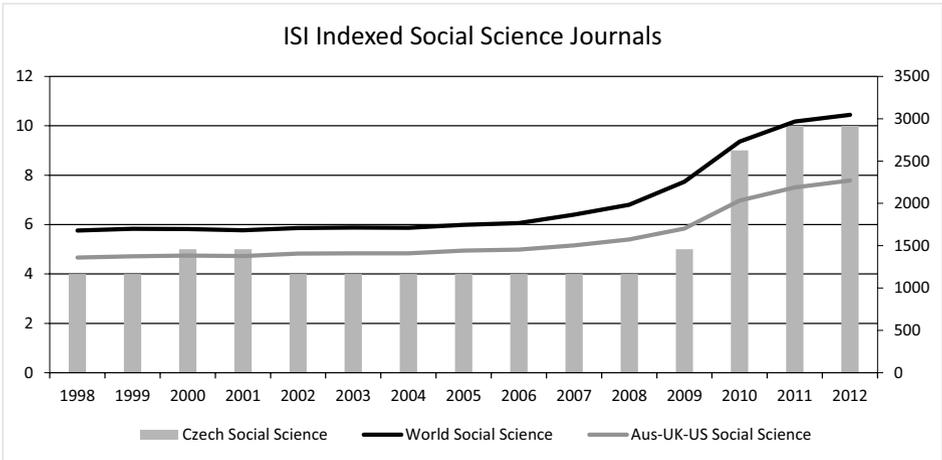
498

Figure 3. ISI indexed social science journals in the Czech Republic and the world between 1998 and 2012
Source: Web of Knowledge. **Note**: Czech output is on the left axis. Aus-UK-US sample represents Australia, USA, and the UK.

were published as open access. In the history section there are 3860 journals and 15602 economic journals. The Scopus database indexes more than 21000 journals, while the Directory of Open Access Journals (DOAJ) indexes 10027 journals. The largest German library Staatsbibliothek zu Berlin reported 23998 indexed paper journals and 24999 electronic journals and periodicals.

The data demonstrate that there is a large database of journals for social scientists. However, one of the respondents in our survey says:

> The internet services in Prague are very different from the internet services at Harvard University. If I have a Czech National Library card or even any Czech university library card most of the resources are still behind a paywall.

Survey

The majority of researchers we addressed were from the University of Economics, Prague (UEP, 36%) and Mendel University in Brno (MENDELU, 11%). In stage two, we collected data from 19 major universities and state history departments. We sent questionnaires to 431 researchers. The majority of researchers were from Charles University (CUNI, 21%) and Czech Academy of Science departments (CAS, 13%).

Altogether we approached 1899 researchers, of whom about 23% were from history departments and 77% from economics departments. After three weeks we collected data from 535 of the researchers (28.2% response rate). Some of the researchers (7) did not feel
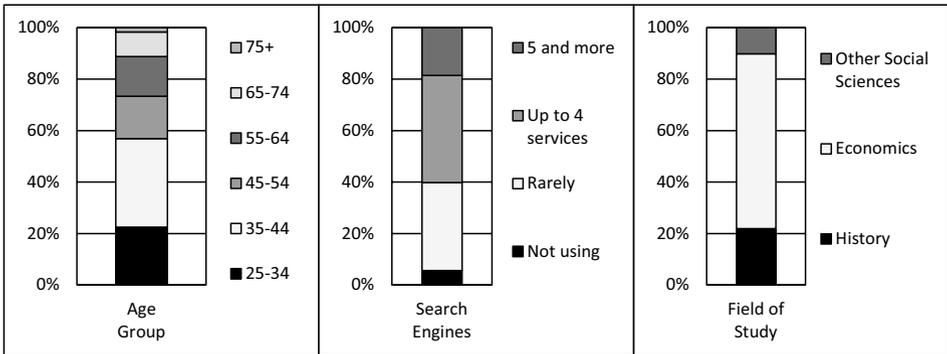
499

Figure 4. Age groups, frequency of search engine usage, and fields of study – Relative shares

qualified to answer the questionnaire, or were not able to read it in time and responded by automated response (25). This adds up to a rough response rate of almost 30%.

As expected most of the responses were collected from economics and business economics related fields of study (66%) and history related fields of study (21%). The rest of the responses (13%) were from different fields of study (philosophy, psychology, sociology, law, and exact sciences). Since we are dealing with the humanities, the exact science responses (23 from mathematics, statistics, and information technology, for instance) were omitted from the final data sample.

This makes our final sample (512 responses) relatively robust in terms of representative-ness of the data sample. We are aware that there is still a selection bias and our data are not exactly randomly selected. We selected only economics (69%) and history based fields of study (22%). In our opinion this is a representative sample of the social sciences in the Czech Republic. In fact there are other fields of study, such as philosophy and sociology, and they could influence the results as well to some extent. As a control group these other social sciences (8.6%) were kept in our final data sample.

For the various hypotheses to be tested, we created 3 interest variables (based on the frequencies in Figure 4): age group, frequency of database usage, and field of study. These variables are not strongly (<36%) correlated. The age group variable refers to the younger generation as a group of 25-44 year olds. The database-search-engine usage variable refers to a group of academics who use quality scientific bibliographic search engines on a regular basis. Field of study divides academics into economics and history based fields of study. The variable interest, denoted as X_i, is then used in various hypotheses which test possible significant group differences (see methods).

We observe that the Internet (Q1) is on average considered a significant positive quality factor (84%) for academic output. There are no statistically significant (z=0.98, n=512) age differences; however, historians are about 19% more sceptical (z=-4.973, n=468) than economists, and academics who use search engines regularly are 7.6% (z =-2.294, n=512) more optimistic than those who rarely use them.

500

Current state policy (Q2) is not viewed as a positive contributor (21%). Again there are no age differences and historians are about 17.1% more sceptical than economists (z=-3.888, n=468) and search engine users are 10.4% more optimistic (z=-2.867, n=512).

Impact factor (Q3) is viewed as more likely to be an inappropriate measure in the social sciences and humanities (35% positive answers). There are significant age differences (z=-2.364, n=512) and the younger generation is 10% more optimistic. The group of historians (z= -6.068, n=468) is 31.6% more distrustful of impact factor. Users of academic search sites are 19.3% more optimistic. In general neither interest group was more than 43% in favour of impact factor.

The Manova interaction analysis on the younger generation failed to reject a difference in respondents to both Q2 and Q3 questions, i.e. there is no age difference (χ^2=6.38, 3 Df.) considering the interaction of both issues. As expected, there is a significant field ($\chi2$=111.90, 3 Df.) and usage effect ($\chi2$=27.35, 3 Df.), i.e. we can distinguish the behaviour of economics and search engine users. For example economist and search engine users are more likely to give positive answers.

We ask about the quality of scientific output in the first three questions (Q1, Q2, and Q3). Using the Manova interaction analysis we rejected all the null hypotheses on equality for all group variables (all χ^2 <52.77, Df.⊠7). The older generation is more likely to consider current state policy to be adequate, impact factor to be problematic and the Internet not to be a positive quality factor. The younger generation consider state policy to be adequate and the Internet not to be a positive quality factor but differs in its positive attitude towards impact factor.

Economists are more likely consider the Internet to be a positive quality factor, regardless of their attitude to impact factor and state policy. Historians do not consider the Internet and impact factor to be positive quality factors and they are more likely to have positive attitudes toward current state policy. Search engine users regardless of their attitude to the state policy consider impact factor and the Internet to be a positive quality factor affecting scientific output.

The internet skills (Q4) of the younger generation are considered to be better (84%), and age group (z=0.953, n =512) and field of study (z=1.565, n =468) have no impact. There are quite interesting differences in views among those who use search engines on a regular basis. They are 7% more sceptical than users who do not use academic search engines.

Academics consider students to be more likely (74 %) to have more references (Q5) in their dissertations and theses. This view does not differ across age groups and skilled search engine users. There are however significant dissimilarities (z= -3.925, n =468) among historians, who are 18.4% more sceptical.

The issue of plagiarism (Q6) is not clear and almost split academics' views in half (45%). Plagiarism is thus seen as an unresolved issue regardless of age group (z=-1.092, n =512) and whether or not they are search engine users (z=-0.153, n=512). The group of historians is 15.4% more sceptical and tends to see plagiarism as still being a problem, compared to the group of economists who are divided in their views.

Despite their proclaimed advantages, citation managers (Q7) are used only by a fraction (25%) of Czech academics across age groups. As expected, regular search engine users are 19.2% more likely (z=-4.928, n=512) to use a citation manager. Historians use citation managers 10.8% less than economists (z= -2.305, n =468).

501

We also look at one of the variables of interests. Search engines (Q8) are used regularly by more than 60% of academics. The younger generation uses search engines 35.3% more frequently (z=-8.051, n=512) and economists use them 16.4% more frequently (z=-3.116). Age and search-engine-usage variables therefore correlate but as stated before, this correlation is not strong (<36%) and in Q2 and Q4 there are substantial and statistically significant differences between the two groups and where field of study is concerned this correlation is less than 5%.

Rapid development in social media and information and communication technologies mean that collaboration (Q9) is a popular and a cheap way to get in touch. However, as is the case with citation managers, the science social media sites selected are not used very frequently (24%) regardless of age group (z=-0.254, n=512) and field of study (z=-0.002, n=468). As expected search engine users are 20.2% more likely to engage in collaboration via an academic social media site because many search engines provide these services.

We asked about the most common internet services, search engines (Q8) and academic collaboration sites (Q3). Using Manova we observe distinguishable results for the younger generation (χ^2 =129.23, 3 Df.). Younger academics are more likely to be users of search engines regardless of their attitude to academic participation via collaboration websites. The economists are more likely to use search engines and not collaboration websites.

The use of citation managers (Q7) and search engines (Q8) by academics can be viewed as an additional service. The Manova results suggest that younger academics and economists are more likely to be search engine users regardless of whether or not they use citation managers.

The last question (Q10) deals with the adequacy of internet-for-academic preparation at universities. It is seen as inadequate, i.e. only 34% scientists believe it is adequate. This view hold equally (z=-0.490, n=468) among historians and economists regardless of whether they regularly use search engines (z=1.348). The younger generation is 11.5% more optimistic (z=2.707, n=512).

In general, historians seem to be more pessimistic and less frequent users of particular internet services, however, along with search engines users, they are about 12% more interested in seeing the results of this survey (z=2.242, n=468 and z=-2.643, n=512).

Conclusions

Since the invention of the Internet, book and journal production have been growing fast. An increasing number of resources is available for academic work via academic search engines. The annual growth in Czech books was 3.90% between 1995 and 2012. Since we could not describe the linear trend due to the random-walk property of the series we cannot say whether this is changing or even if there is a trend.

Our Manova results suggest that younger academics and economists are more likely to be search engine users regardless of whether they use citation managers. However, only about a quarter of all academics use a citation manager and around 40 % of them do not use any of the popular search engines.

The survey has identified a generation gap. The older generation do not use internet based services so frequently as their younger colleagues. For academics the most common

internet services (academic search engines and collaboration sites) are also more likely to be used by younger scholars.

The hypothesis about the growing number of used references in final dissertations and theses is valid. One respondent suggests:

> The costs of doing social science are lower now, one does not have to travel abroad to obtain a publication. […] This places higher demands on scholars and their language skills. […] …authors and students are not aware that there are A-level journals which they should draw inspiration from. […] The endless supply of information and full-texts only encourages minimum use.

The internet-for-academia preparation at universities is considered inadequate especially by the older generation. Students are overloaded with information and have problems searching, and critically analysing resources. Neither do they differentiate between: "grey literature, Wikipedia entries, newspaper stories and peer reviewed journals", as one of the respondents added in our survey. The inadequate preparation at universities is not going to improve. The individualized approach to essay writing is overshadowed by the mass education nature of Czech public universities, which are financially motivated to increase the quantity rather than the quality of students.

We are aware that this research is a small step towards a further research. For example a bibliometric analysis of final dissertations and theses would be a testing ground for counting the number of journal papers, foreign language publications, and grey literature resources. The generation gap is an interesting issue and there are hypotheses to be explored here. The older generation may have problems dealing with new technologies and their younger colleagues could be better at using quality resources adequately.

The Internet is considered a significant positive (84%) quality factor for academic output. In our survey one respondent wrote: "The Internet is a part of a larger body of technological tools, which is changing the system of research and development work. It is similar to new equipment and scientific apparatus. One of the interesting questions is the contribution of the Internet to the methodology of academic work and how effectively this invention is applied." Karpf (2012) brings to mind Moore's Law and describes the rapid development of internet services and their impact, both good and bad[8], on the methodology of academic work.

The results show that there are still problems with plagiarism. More than half of the respondents think that it is still a problem and that the recently adopted measures have no effect at all. Historians are even more sceptical than other respondents. Future research could encompass the problem of auto-plagiarism, which would require qualitative and bibliometric analysis.

The Czech social sciences, particularly economics and history, have not become globally competitive. The results suggest that Czech social sciences and scholars remain locked in their work and limited in topic. These results are consistent with the findings of Kozak et al. (2013).

---

[8] He uses the phrase "Promising mess" when referring to the current state of the Internet in the social sciences. He suggests greater transparency in the peer review process and that authors be honest in disclosing methodology limitations, collaborative and interdisciplinary approaches, and resource criticism etc.

The public financing of the social sciences and the system of evaluation, which depends on impact factor and indexed journals, has not convinced economists and historians. They consider it to be inefficient (79%) and think that it does not help to produce quality academic output. This percentage is even higher among historians.

The impact factor is viewed as more likely to be an inappropriate measure in the social sciences and humanities (65%). Historians are far more distrustful of the impact factor; however, users of academic search sites and the younger generation are more optimistic. In general neither interest group was more than 43% in favour of impact factor. Another approach is needed[9] and one of the reasons for this might be the skewed distributions of citation statistics between the social sciences (see the examples of sociology and psychology in Leydesdorff, 2012).

The interaction analysis of the mutual effect of impact factor and academic policy shows that there is no age difference and, as expected, there are significant field and search engine usage effects, i.e. we can observe slightly different views amongst economists and search engine users.

Many of the respondents said that the points, i.e. the rating and the state evaluation system behind them, lead only to the overproduction of lower or low quality academic output. Also they stated that there is clearly an increase in the "recycling" of ideas. Some of them believe that authors often have no choice; they have to do it in order to gain proper remuneration for their work.

The key problem is the public financing of the social sciences. This indicates that there is poor communication and an ineffective policy debate between scholars and politicians. Czech scholars are not convinced of the meaningfulness of either state policy or of the use of the impact factor.

---

[9] Possible alternatives are for example the Eigenfactor.org index, H-index, G Index, SCImago Journal & Country Rank, Article Influence, Altmetrics based indexes, Google Scholar citation index and augmented indexes which use online visits, particular citation thresholds, and a combination of two or more indexes. A combination or more indexes seems more useful since no direct comparison was made in the Czech social sciences.

APPENDICES

Appendix 1: The questionnaire
The survey was conducted in Czech.

Dear colleagues,

We would like to ask you to participate in our project called "The Internet, social sciences and humanities" for *Human Affairs: Postdisciplinary Humanities & Social Sciences Quarterly*, a peer reviewed journal. We are looking at the impact of the Internet on economics and history in the Czech Republic between 1995 and 2012. Among other things, we wish to ascertain whether there have been any changes in the quality of economic and historical academic output as a consequence of using information technology, electronic databases, text editors, full-text resources, etc. We also wish to contribute to the debate on the bibliometric assessment of academic output.

We have chosen you because you have the required academic and creative experience, have supervised dissertations or theses, written academic studies, published papers, and are part of the system affected by the state score policy (also known as "Kafemlejnek"), which assesses academic output. You are also aware of the means of assessing academic output developed by Thompson Reuters – the Impact factor. This direct experience qualifies you to answer all our questions properly. Please fill in the whole questionnaire, which has several Yes/No questions. It will take approximately 10 minutes and we encourage you to share this questionnaire amongst your colleagues should you wish.

Thank you very much for helping.

1. Has the use of the Internet in academia increased the quality of academic output? We are interested in comparing internet use in the 1990s and today. Please assess the quality of academic output in relation to the work conducted within your discipline.
   - ☐ Yes
   - ☐ No

2. Does the state policy scoring system ("Kafemlejnek") improve the quality of academic output? Should you have any comments on the subject please use the form field at the end of the questionnaire.
   - ☐ Yes
   - ☐ No

3. Do you consider the use and monitoring of impact factor appropriate to the social sciences? Should you have any comments on the subject please use the form field at the end of the questionnaire.
   - ☐ Yes
   - ☐ No

4. Do younger academics make better use of the Internet than middle-aged and older social science academics? We are interested in the resources used and obtained from online databases, libraries, statistical offices, and services such as J-Store, EBSCO, ProQuest, and tools such as videoconferences, the intranet, document management systems, such as SharePoint and Google Apps, and academic collaboration conducted via ResearchGate and COS.
   ☐ Yes
   ☐ No

5. Do you think that the Internet has meant that students use more resources when writing their dissertations and theses?
   Again, we are particularly interested in comparisons of internet usage in relation to students writing their final dissertations and theses (BA, MA, and PhD) in the1990s and today.
   ☐ Yes
   ☐ No

6. Do you agree that plagiarism is declining in the Czech Republic due to greater controls? We are interested in student essays, dissertations and theses, and also academic articles, and other academic output.
   ☐ Yes
   ☐ No

7. Do you use a bibliographic manager (for example Citace.com, Zotero, Mendeley, and/or EndNote)?
   ☐ Yes
   ☐ No

8. How often do you use academic internet portals and electronic resource search engines?
   In particular: EBSCO, EconLIT, Google Scholar, OVID, ProQuest, JIB – your library search engine, JSTOR, SAGE, ScienceDirect, Web of Knowledge, Wiley, and Worldcat.
   ☐ I do not use them.
   ☐ I use them but only rarely.
   ☐ I use them and have experience with up to 4 of the portals.
   ☐ I use them and have experience with 5 or more of the portals.

9. Do you use selected academic networks for academic collaboration and communication?
   In particular: Academia.edu, COS Research Support Suite, Mendeley, ResearchGate, Zotero Groups.
   ☐ Yes
   ☐ No

506

10. Do you think that the training and preparation for using the internet at universities is adequate and of sufficient quality?
Should you have any comments on the subject please use the form field at the end of the questionnaire.
☐ Yes
☐ No

11. Should you have any comments please use this field.

12. Your age category:
☐ Up to 24 years old
☐ 25-34
☐ 35-44
☐ 45-54
☐ 55-64
☐ 65-74
☐ 75 years old or more

13. Your main field of academic study:
☐ Economics
☐ Philosophy
☐ History
☐ Sociology
☐ Other (specify):

14. Do you want us to send you the results of the analysis?
Please fill in your email address.

Appendix 2: Publications in the Czech Republic between 1995 and 2012

Year	Books	Other journals and magazines	Periodicals
1995	8994	2037	4380
1996	10244	2112	5028
1997	11519	2037	4380
1998	11738	4168	5440
1999	12551	2336	3894
2000	11965	2480	3295
2001	14321	2667	3469
2002	14278	2474	3636
2003	16451	1722	3372
2004	15749	2568	3835
2005	15350	2822	4283
2006	17019	3203	4832
2007	18029	3283	4947
2008	18520	3894	5687
2009	17598	4193	5481
2010	17054	4074	5265
2011	18985	3884	5098
2012	17247	3825	5028

Source: CZSO (2014). Note: "Other journals and magazines" – category of periodicals with less than 12 issues in a year. "Periodicals" – category of periodicals with more than 12 issues in a year.

Appendix 3: Social science output in the US and Czech Republic between 2002 and 2012

Year	US Economics and Sociology	US History	US Total without reprints	EU total estimate	CZ Economics	CZ Social sciences	CZ total
2002	20969	11362	215138	-	-	-	14278
2003	23530	13192	240098	-	-	-	16451
2004	23222	14191	275793	-	-	-	15749
2005	23750	12686	251903	-	-	-	15350
2006	27675	15241	274416	475000	143	982	17019
2007	24546	14406	284370	490000	108	1100	18029
2008	24737	13477	289729	510000	121	1281	18520
2009	26904	15480	302410	515000	162	1155	17598
2010	28581	14659	308628	525000	150	1377	17054
2011	28356	12270	292037	530000	197	1440	18985
2012	28059	11447	301642	535000	187	1340	17247

Appendix 4: Social science ISI indexed output in the Czech Republic and the world between 2002 and 2012

Year	CZ Social Science	CZ Science	CZ Total	World Science	World Social Science	World Total	AUS, UK, and US Social Science
2012	10	34	44	8471	3047	11518	2270
2011	10	33	43	8336	2966	11302	2190
2010	9	32	41	8073	2731	10804	2034
2009	5	31	36	7387	2257	9644	1703
2008	4	22	26	6620	1985	8605	1573
2007	4	23	27	6426	1866	8292	1505
2006	4	22	26	6166	1768	7934	1453
2005	4	21	25	6088	1747	7835	1442
2004	4	23	27	5969	1712	7681	1411
2003	4	23	27	5907	1714	7621	1411
2002	4	22	26	5876	1709	7585	1406
2001	5	22	27	5752	1682	7434	1378
2000	5	22	27	5686	1697	7383	1384
1999	4	23	27	5550	1699	7249	1375
1998	4	23	27	5467	1679	7146	1362

References

Anderson, T. W. (2003). *An introduction to multivariate statistical analysis*. Hoboken, N.J.: Wiley-Interscience.

Bowker. (2012). New Books Titles and Editions, 2002-2012. ProQuest. Retrieved from http://www.bowker.com/assets/downloads/products/isbn_output_2002_2012.pdf

Česal, J., & Liška, V. (2007). *Vědecké psaní a prezentace*. Professional Publishing.

CZSO. (2010). Statistická ročenka vědy, technologií a inovací. *Česká republika a mezinárodní srovnání v období 2000 – 2008*. Retrieved March 31, 2014, from http://www.czso.cz/csu/2010edicniplan.nsf/p/1005-10

CZSO. (2014). Vydávané noviny a časopisy. *Česká republika od roku 1989 v číslech*. Retrieved from http://www.czso.cz/cz/cr_1989_ts/1210.pdf

Dickey, D. A., & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American Statistical Association*, *74*(366a), 427-431.

Elliott, G., Rothenberg, T. J., & Stock, J. H. (1996). Efficient tests for an autoregressive unit root. *Econometrica*, *64*, 813-836.

FEP. (2012). European Book Publishing Statistics 2012. Federation of European Publishers. Retrieved from http://fep-fee.eu/IMG/pdf/

Fiala, D. (2013). Science evaluation in the Czech Republic: The case of universities. *Societies*, *3*(3), 266-279.

Hamilton, J. D. (1994). *Time Series Analysis*. Princeton N.J.: Princeton University Press.

Karpf, D. (2012). Social science research methods in internet time. *Information, Communication & Society*, *15*(5), 639-661.

Kozak, M., Bornmann, L., & Leydesdorff, L. (2013). How have the Eastern European countries of the former Warsaw Pact developed since 1990? A bibliometric study. *arXiv:1312.3077 [cs, Stat]*. Retrieved from http://arxiv.org/abs/1312.3077

Leydesdorff, L. (2012). Alternatives to the journal impact factor: I3 and the top-10% (or top-25%?) of the most-highly cited papers. *Scientometrics*, *92*(2), 355–365.

Popper, K. (1996). *The myth of the framework: In defence of science and rationality* (New ed.). Routledge.

Rond, M. D., & Miller, A. N. (2005). Publish or perish bane or boon of academic life? *Journal of Management Inquiry*, *14*(4), 321-329.

RVAV. (2002). Bibliometrická analýza výsledků výzkumu a vývoje. *Analýza stavu výzkumu a vývoje České republiky a jejich srovnání se zahraničím*. Retrieved from http://www.vyzkum.cz/Priloha.aspx?idpriloha=25921

SCKN. (2014). Svaz českých knihkupců a nakladatelů. *Vyhledávání v databázi*. Retrieved from http://www.sckn.cz/ceskeknihy/html/vyhledavani_rozsirene.php

Soběhart, R. (2009). Hospodářské a sociální dějiny – stále živé spojení? In *Hospodářské dějiny v České republice na počátku 21. století* (Sborník z konference, pp. 73-80). KHD NF VŠE Praha: Oeconomica.

Wilcoxon, F. (1945). Individual comparison by ranking methods. *Biometrics*, *1*, 80-83.

Wooldridge, J. (2002). *Introductory econometrics: A modern approach* (2nd ed.). Cincinnati, OH: South-Western College Pub.

Zhang, J.-T. (2012). An approximate hotelling T2-Test for heteroscedastic one-way MANOVA. *Open Journal of Statistics*, *02*(01).

Department of Economics and Management,
The Institute of Technology and Business in České Budějovice,
Okružní 517/10, 370 01 České Budějovice,
Czech Republic
E-mail: stellner@mail.vstecb.cz
E-mail: marek.vokoun@gmail.com