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RESEARCH PRODUCTION IN THE ARTS AND HUMANITIES[1]

A QUESTIONNAIRE STUDY OF FACTORS INFLUENCING RESEARCH PERFORMANCE

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This study explored the main factors influencing the research production in the arts and humanities. A questionnaire was constructed to identify and assess the effects of various factors important for the productivity of the individual researcher as reflected in the number of papers and Ph.D.'s produced. First, respondents were given the opportunity to list in their own words a number of important factors influencing research productivity. Secondly, they evaluated on rating scales the importance of a number of pre-selected factors (e.g. individual characteristics, organisational features, external factors) assumed to be important for research productivity. 50% of a sample of 256 researchers in the humanities responded. Ratings were grouped to produce a number of indices and these were subject to multiple regression analyses. The main results showed that the production of papers was predicted by the number of Ph.D.'s produced and inversely related to the importance of organisational factors. The production of Ph.D.'s was dependent on the year of the Ph.D. and the position of the respondent as well as on the number of papers s/he produced. A number of conclusions were drawn: a) there was support for the academic social position effect also in the humanities; b) organisational factors apparently played a minor role in comparison to individual characteristics in the humanities than in the sciences and; c) the differences in productivity of papers were also related to gender, but not to size, area or language of publications. Implications for further studies were suggested.

Introduction

In the rapidly growing area of science and technology studies,[3] there is a strong emphasis on studying development and performance in the natural and technical sciences in contrast to the social sciences and the arts and humanities. This study is an attempt to add to our knowledge on research production in the latter area.

The knowledge production of a university department mainly takes two forms – publications and degrees. It is, of course, in the interest of governments who finance a large part of this production to monitor and analyse the productivity figures in this respect and to relate them to the resources provided. However, there is also an interest among the scientific community to find out if there is a simple relation between

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magnitude of funding and productivity in research in order to know how to best allocate the resources between research areas, fields, projects and individual researchers in a fair and wise way to achieve the greatest amount of good research. Studies of research production have traditionally focused on the relations between input measures such as funding size and number of staff and output measures such as published articles. The general assumption has been that the more money and the more researchers a university department has the better the performance in terms of the number of papers and degrees in total and per researcher. An investigation of the literature by *Hicks* and *Skea*[4] show that this is wrong. Furthermore, it appears that department size do not explain much of the variation in publication productivity in the sciences.[5]

There is therefore reason to believe that other factors play a significant role influencing research performance. In the literature we find examples of the role played by the individual researcher's ability, age and motivation (e.g. *Rushton* et al.,[6] *Simonton*,[7] *Rodgers & Maranto*[8]), research group characteristics (e.g. size), leadership and communication factors in science,[9-11] and research styles, research policy and research culture influences on the production of good research.[12] From studies of the sciences, we have some knowledge concerning the contribution of these factors in explaining productive research, but there are many gaps. Studies of the arts and humanities in this respect are even more rare. With respect to the growing interest in the humanities such studies are even more needed.[13]

In sum, there are few studies on the effects of economic and social factors on the production of research papers and there is almost a complete lack of information on the arts and humanities.

Purpose

The main purpose of this study is to explore what factors contribute to the academic productivity of papers and Ph.D.'s in the arts and humanities. It extends previous studies into a new area, the arts and humanities, as well as viewing productivity not only as a function of a few mostly economic input factors, but also of a number of social factors. Secondly, an attempt is made to investigate similarities and differences in the research production of the arts and humanities research community.

Previous research

Critique of the input-output model

Several authors have criticized the assumption that research production is a linear function of simple input factors such as funding and staff.[14] The study referred to above by *Hicks* and *Skea*[15] also showed that there is sound evidence against this assumption. Furthermore, in a case study of two disciplines (9 departments) in the humanities, the first author of this paper found that the correlations between the number of researchers and the papers produced in the two disciplines were moderate.[16,17]

An alternative explanation to productivity

There are several studies which have used variables other than the simple input measures such as staffing to explain productivity.

For example, environmental factors important for research productivity in the sciences and engineering were studied by *Pelz* and *Andrews*[18] as well as by *Andrews* et al.[19] The former authors drew upon findings like freedom and good management (e.g. leadership) while the latter reported a study by *Knorr*, *Mittermeier*, *Aichholzer* and *Waller*[20] which showed that individual productivity reflected in numbers of published papers was determined by the social position of the researcher in natural and technological sciences in universities as well as for researchers in technical sciences in industry.

In the same vein, *Prpic*[21,22] found in a study of a large sample[23] of Croatian researchers that academic degree, rank and leadership of regular projects were the best predictors, in that order, of scientific productivity as measured in the number of publications per researcher during their careers.

However, the aforementioned studies view the research production in a restricted way. In line with organisational theories, *Christiansen* and *Foss Hansen*[24] suggest that mediating process factors are as important as input factors in influencing research output. Also, *Whiston*[25] has criticized the input-output model of research evaluation in a similar manner. These ideas were the starting point for the design of the study.

More specifically, we wanted to test whether other factors than typical input data might contribute to explain performance as measured by two simple outputs, namely papers and Ph.D's. It was assumed, drawing on findings from the previous mentioned case study[26] that researchers in the humanities were producers of individual rather than collaborative works spending a large amount of time doing solitary research. This style

might affect the production of papers in several ways. First, the departmental organisation and leadership ought to play only a minor role in relation to individual aspects of research. Secondly, the communicative aspects of research, writing aside, might be less important in the humanities. Thirdly, one might assume the writing process to be particularly important in the arts and humanities. Fourthly, the academic rank was supposed to be linked to the research production since a higher rank normally means more working years and research assistance than a lower rank. Finally, with respect to Ph.D. production it was assumed that student ability in particular, but also supervising and doctorate student financing ought to be important.

Method

General design of the study

In order to reach a large sample of researchers we chose to construct a questionnaire to assess the factors influencing research productivity. The target group for responding to such questions were the researchers themselves. By means of this design we would also be able to use multivariate techniques to predict high performance in research production.

Questionnaire

The questionnaire was designed to collect four main types of information. First, a number of background variables of the respondent and the department (gender, year of Ph.D., discipline[27] and position). Secondly, three open questions were asked about factors contributing to productivity and factors constraining high performance in productivity. Thirdly, respondents were prompted to rate on a seven point rating scale (ranging from 1 = "To a very small extent" to 7 = "To a very high extent") the importance of a number of research mediating or process factors, assumed to be important to research production. The factors concerned seven issues important for the production of papers, namely, the writing process and publication, researcher characteristics, Ph.D. students, internal and external research contacts, research utility, research policy, funding and management, and three in relation to Ph.D. production, namely, student's talents, supervisor efforts, and the organisation of post-graduate studies. Fourthly, respondents were asked to provide information on the number of papers and Ph.D.'s produced during their career.

Respondents

The sample consisted of 256 researchers from arts and humanities departments at the five Swedish universities with a faculty of the arts and humanities. Two individuals were randomly chosen from the research staff list for all disciplines in the arts and humanities (including theology) in university staff catalogues.[28] After three reminders, 128 respondents (50% of the sample) answered by returning the questionnaire. Drop outs did not diverge markedly on important background variables (gender, area, position).

Procedure

The questionnaire was distributed by mail to the sample. In addition to three postal reminders, a telephone call was made to the remaining non-answering individuals. Information of the local or cosmopolitical direction[29] of papers in a discipline and departmental size was collected from the humanities annual faculty reports and from university staff catalogues. Answers to the open questions were analysed qualitatively and classified according to significant content. Ratings were computed by means of statistical multivariate techniques.

Results

Construction of index variables from ratings

By means of a principal component analysis using the OBLIMIN oblique rotation of the SPSS program four index variables were constructed from the variables of the part of the questionnaire regarding ratings of factors important for the production of papers.[30] The first one was called *Organisation (papers)*. The five variables of this index were related to organisational matters for the production of papers (leaderships, positions, funding and policy). Secondly, one index titled *Individual characteristics* grouped variables concerning talent and four other person related characteristics which have been found important for the successful researcher (endurance, engagement, experience, motivation). Thirdly, six variables were grouped into an index called *Communication*. Besides three variables on research interaction it also included research utility, doctoral students and writing of which the last three were viewed as communicative aspects of research in a broader sense than the first mentioned variables. Finally, a fourth index titled *External factors* was formed, which comprised evaluation, publishing tradition and equipment.

In the same vein, the principal component analysis was applied on the six variables dealing with the production of Ph.D.'s, resulting in two factors which were the basis for index construction.[31] First, one index was formed by grouping five variables concerning organisational aspects of Ph.D. production including Ph.D. training policy, financing and courses. The index was called *Organisation (Ph.D.)*. Secondly, the one remaining variable formed a single factor called *Talent (Ph.D.)*. The indices were tested for homogeneity by Cronbach's Alpha resulting in values above .65 for all.

Which factors explained the production of papers and Ph.D.'s?

A multiple regression analysis (SPSS) showed (see Table 1) that the number of Ph.D. exams was the strongest predictor of how many papers respondents produced. The organisation index contributed negatively to explain the production of papers, implying that this index contained variables inversely related to the criterion variable.

Altogether, 42% of the variance was explained by the predictors of papers. Interestingly, the year of the respondents' Ph.D. degree and position did not contribute to explain the size of paper production. Also, the ratings on the indices communication, individual characteristics and external factors were not significant predictors to the size of paper production.

There were two strong predictors of the production of Ph.D.'s as can be seen in Table 1. The respondents' own year of Ph.D. degrees had the highest value, which means that the "oldest" doctors produced the majority of new doctors. Almost as strong a predictor was the number of papers produced. The third predictor was the position of the respondent, implying that professors produced more Ph.D.'s than researchers holding lower positions.

A Pearson correlation was computed for gender, Ph.D. year, position, the number of produced papers and Ph.D.'s (see Table 2). First, as expected from the results of the regression analysis, there were fairly strong correlations between the respondents' Ph.D. year, the positions they held and their research production in terms of the number of papers and Ph.D.'s. Secondly, the number of papers and Ph.D.'s produced correlated also fairly strongly as was also expected. Thirdly, gender and position were related meaning that a number of men held higher positions than women. Furthermore, the negative correlation between gender and papers supports previous results from the sciences that women produce less research papers than men, however not of less quality.[32,33] Gender and Ph.D. production was not significantly correlated. These results enhance the impression that academic rank is an important determinant for research production and that the two measures of this production are linked.

Table 1
Multiple regression on variables explaining the number of papers and Ph.D.'s produced in the arts and humanities

Variables	Papers		Ph.D.'s	
	Beta	p	Beta	p
Ph.D. year	–	–	0.343392	0.0000
Gender	–	–	–	–
Position	–	–	0.231155	0.0065
Area	–	–	–	–
Size	–	–	–	–
Media Language				
Communication	–	–		
Organisation (papers)	-0.203211	0.0260		
Individual chr.	–	–		
External factors	–	–		
Talent (Ph.D.)			–	–
Organisation (Ph.D.)			–	–
Papers			0.31642	0.0001
Ph.D.'s	0.3820	0.0002		
Stepwise regression:				
Multiple R	0.66460		0.72674	
R square	0.41550		0.52815	
R square adjusted	0.35185		0.48731	
F	6.5711, $p<0.0000$		12.93409, $p<0.0000$	
N	101		104	

Table 2
Correlations between gender, Ph.D. year, size, position, papers and Ph.D.'s

Variables	0	1	2	3	4
0 Gender	–				
1 Ph.D. year	0.1429	–			
2 Position	0.2289*	0.4913***	–		
3 Papers	-0.2543**	0.4157***	0.4193***	–	
4 Ph.D.'s	-0.1533	0.5688***	0.4287***	0.3947***	–

* $p<0.05$.
** $p<0.01$.
*** $p<0.001$.

What differences were found in ratings?

Two-way ANOVA's (gender × Ph.D. year, gender × position, area × size, area × media language) were carried out on the index variables to detect differences in ratings and performance in terms of papers and Ph.D.'s (see Tables 3 and 4).

Overall, the results of the ratings showed, first, that respondents rated the individual characteristics as strongest in importance and external factors as the least important for the production of papers. Secondly, the talent of the doctoral student was rated highest for the production of Ph.D.'s. The differences in ratings with regard to background variables are shown in Tables 3 and 4.

In Table 3, the background variables gender, Ph.D. year (for respondents) and position are related to the index variables and to the two research production measures, number of papers and Ph.D.'s.

Gender and Ph.D. year. The two groups of Ph.D. years 1951–1975 and 1976–1995 were introduced with gender, which resulted in three main effects. First, a main effect was found on the index variable Organisation (Ph.D.) $F(2,120)=3.070$, $p<0.050$, which showed that older researchers in terms of the Ph.D. year rated this index higher than younger researchers. Presumably, older and more experienced tutors attributed greater importance to the financing and organising of doctoral training for producing Ph.D.'s. A simple effect of Ph.D. year was also found, $F(1,120)=6.116$, $p<0.015$. Second, there were not very surprisingly differences between the production of papers and Ph.D.'s with respect to Ph.D. year and gender ($F(2,118)=13.041$, $p<0.000$) meaning that older Ph.D.'s as well as males produced more papers. Also, simple effects of both independent variables were found, namely by Ph.D. year, $F(1,118)=8.027$, $p<0.005$, and by gender, $F(1,118)=9.007$, $p<0.003$. Third, and more interestingly, no effect was found on the production of Ph.D.'s by gender alone. Men and women in the humanities produced an equal amount of Ph.D.'s. However, a main effect was found $F(2,117)=13.201$, $p<0.000$ and a simple effect of Ph.D. year, $F(1,117)=16.168$, $p<0.000$, which means that more experienced researchers (in terms of the time since they graduated) produced more Ph.D.'s than less experienced.

Gender and position. Gender and position (full professors and lecturers, respectively, the latter including contract researchers and research assistants) differed in ratings of the communication index. A main effect $F(2,119)=4.072$, $p<0.019$ was found of the two background variables and a simple effect of the position variable, $F(1,119)=8.128$, $p<0.005$. Professors rated the importance of communication factors higher then other research staff categories. This result might be explained by the extensive number of contacts often found with successful researchers in the sciences,[34] which in this case might be the case also for professors in the arts and humanities.

Table 3
Means of ratings for gender, Ph.D. year and position on index variables and frequencies of productivity in papers and Ph.D.'s

Dependent variable	Background variable					
	Gender		Ph.D. Year		Position	
	n=33 Female	n=93 Male	n=34 1951-1975	n=57 1976-1995	n=28 Professor	n=96 Lecturer
Communication	4.52	4.64M	4.80	4.53	5.00	4.49MS
Organisation (papers)	4.95	4.68	4.94	4.67	4.94	4.69
Individual characteristics	5.92	5.90	6.13	5.80S	5.99	5.85
External factors	4.54	4.26	4.27	4.39	4.22	4.38
Organisation (Ph.D.)	4.23	4.25	4.49	4.13MS	4.50	4.20
Talent (Ph.D.)	5.87	6.04	6.15	5.93	6.07	5.96
Papers	24.5	40.8MS	52.1	31.0MS	57.8	30 MS
Ph.D.'s	1.7	3.2M	5.1	1.6MS	6.8	1.6MS

Note. Ratings above dashed line were made on a scale from 1= "To a very small extent" to 7= "To a very high extent". Figures below dashed line indicate frequencies. M= main effect, S= simple effect.

A main effect ($F(2,117)=17.645$, $p<0.000$) and simple effects by gender ($F(1,117)=5.851$, $p<0.017$) and position ($F(1,117)=10.630$, $p<0.001$) was found on the number of papers produced, which shows that male researchers produced more than female researchers and professors more than other researchers in the humanities. These result have been found previously in the sciences and in the gender case, explained by the shorter time for paper production by females because of child births and domestic works.[35] The higher academic position effect on the production of papers was explained by the hierarchical structure in academic organisations leading to advantages for chairs to publish more than others lower in rank.[36] Consequently, there seem to be no differences in position effects between the sciences and the humanities with regard to paper production. As expected, the position effect was also found with the production of Ph.D.'s, i.e. that professors produced more Ph.D.'s than other research staff. A main effect $F(2,116)=17.431$, $p<0.000$ and a simple effect of position $F(1,116)=18.366$, $p<0.000$ was discovered.

Table 4

Means of ratings for area, size and medial language on index variables and frequencies of productivity in papers and Ph.D.'s

Dependent variable	Background variable					
	Area		Size		Media language	
	n=70 Hi-Ph	n=55 Lang	n=57 Large (>6)	n=68 Small (1-6)	n=80 Local	n=44 Cosmop
Communication	4.82	4.34MS	4.65	4.55M	4.77	4.54M
Organisation (papers)	4.79	4.69	4.75	4.78	4.82	4.70
Individual characteristics	5.82	6.01I	5.86	5.94I	5.84	5.90
External factors	4.38	4.29	4.40	4.37	4.46	4.29
Organisation (Ph.D.)	4.11	4.36	4.20	4.23	4.39	4.18
Talent (Ph.D.)	5.95	6.05	5.87	6.09	5.73	6.08
Papers	38.7	33.4	38.4	35.4	30.3	39.7
Ph.D.'s	2.8	2.3	2.6	2.4	2.37	3.54

Note. Ratings above dashed line were made on a scale from 1= "To a very small extent" to 7= "To a very high extent". Figures below dashed line indicate frequencies. M= main effect, S= simple effect, I= interaction in two-way ANOVA. Hi-Ph=History-Philosophy area, Lang= Language area, Local= local media language, Cosmop= cosmopolitical media language.

Area and size. The two areas in the humanistic faculty (history-philosophy and language, respectively) differed in respect to the communication index. A main effect of size, i.e. large departments (more than six scholars) and small departments (less than seven scholars), was computed $F(2,120)=4.236$, $p<0.017$ and a simple effect $F(1,120)=5.676$, $p<0.019$ of area, where the history-philosophy area rated communication higher than the language area, which is perhaps a paradox since one might assume that communication factors would be particularly important to researchers in the languages. Secondly, there was an interaction effect by area and size on individual characteristics $F(1,120)=6.529$, $p<0.014$. This result suggests that respondents in large history-philosophy departments ($M=5.99$, $SD=0.87$) rated this index higher than large language departments ($M=5.66$, $SD=0.58$) and small language departments rated it higher ($M=6.13$, $SD=0.54$) than small history-

philosophy departments ($M=5.77$, $SD=0.71$). One possible interpretation is that the personal qualifications are more important for research in bigger history-philosophy and smaller language disciplines because the demands on the individual research output are higher, implying a hypothesis of more single-authored papers in these disciplines.

No simple effects of size and area regarding research production was found, although there was a weak tendency of differences between areas ($p<0.16$) found on the number of Ph.D.'s produced. That size is unimportant is in line with *Hicks* and *Skea*[37] who reported that the published output of individuals in physics, chemistry and earth sciences in British universities was unrelated to departmental size.

Area and media language. The media language of a discipline was defined according to the language of the papers after an idea by *Nederhof* et al.[38] First, we found local disciplines which produced mainly Swedish papers. Secondly, cosmopolitical disciplines were producing the majority of papers in international languages such as English. A main effect, $F(2,118)=3.528$, $p<0.033$, and a simple effect of area, $F(1,118)=6.838$, $p<0.010$, was found on the communication index in line with the finding above. Furthermore, there was a weak tendency of a main effect that area and media language together differed ($p<0.13$) on the organisation variables related to Ph.D. training, where departments of local media language in the language area rated the importance higher.

Which factors were important for research production as they appeared in the respondent's own words?

The answers to the first open question on important factors for the production of papers and Ph.D.'s resulted in a number of factors shown in Tables 5 and 6, respectively.

There was clearly an emphasis on non-material issues and the dominant view was that the individual characteristics were the most important factors in the respondents' free answers both with respect to the production of papers and Ph.D.'s. This result is consistent with the findings in respondents' ratings (see Tables 3 and 4). Moreover, the remaining categories taken up by respondents after individual characteristics indicates that research methods play an important role in the production of papers in particular in the arts and humanities.[39]

With respect to the production of paper's respondents were highlighting researcher skills such as theoretical and methodological knowledge, practical aspects of research (e.g. time for the evaluation of results, seminar discussions), personal research contacts and exchange, and, finally, good publication possibilities.

Table 5
Frequency of statements on factors important to achieve a good production of scientific papers

	Response category		
Non-material factors	n	Material factors	n
Individual characteristics	12	Research funding	9
Researcher skills	11	Equipment	2
Research practice	8		
Personal communication	7		
Publication factors	7		
Research-teaching balance	3		
Extra-scientific utility	2		
University policy	2		
Sum	52		11

Table 6
Frequency of statements on factors important to achieve a good production of Ph.D.'s

	Response category		
Non-material factors	n	Material factors	n
Individual characteristics	8	Research funding	5
Psycho-social factors	6	Localities, equipment	4
Personal contacts	5		
Ph.D. education	5		
Research practice	5		
Supervising	5		
University policy	5		
Extra-scientific utility	2		
Publication	1		
Sum	42		9

In relation to the production of Ph.D.'s, six factors were emphasized besides individual characteristics such as ability and independence. First, the working climate and social relations within the doctoral student group were mentioned (psycho-social factors). Secondly, personal contacts abroad and outside the department were emphasized. Thirdly, a good Ph.D. training was mentioned as important. Fourthly, some respondents stressed research practice questions such as the importance of choosing the "right" problem or time for doing research. Fifthly, regular and good supervision was highlighted. The sixth factor concerned the importance of a sound university policy for entrance into the Ph.D. program.

Conclusions and discussion

The social position effect in academic work

Apparently, the social position effect is strong with regard to research production in the arts and humanities as has been previously found in the sciences (e.g. *Knorr* et al.).[40]

First, the Ph.D. year of the researchers was the strongest predictor for Ph.D. production, implying that the longer time period as an academic, the more Ph.D.'s will be produced. Also, a large number of papers and a high position in academia contributed to explaining this type of research production, although to a lesser degree. Secondly, the number of Ph.D.'s produced was the only strong predictor of paper production.

It is perhaps a bit surprising that paper production is not explained directly by academic rank, but only by Ph.D. production. The relation between these two output measures was not perfect, but moderately strong (0.39), which means that other circumstances than rank were more influential for the production of papers. In addition to the effect of academic rank, it was found, as was previously shown in the sciences by *Cole*[41] and *Rodgers* and *Maranto*,[42] that female academics because of a shorter career as academics produced less papers than males during their career in the arts and humanities. Notwithstanding, there was no difference between female and male respondents with regard to Ph.D. production in the humanities, despite the fact that female researchers in the sample held lower positions and had a more recent Ph.D. degree.

The relative importance of individual and organisational characteristics for research productivity

Two important results were found regarding individual or organisational contributions to research production. First, individual characteristics were rated and mentioned in the free answers as an important factor in the research process for the production of papers and Ph.D.'s across all categories, but this factor was not instrumental in explaining the research production in the multiple regression analysis. Previous studies of reasons for the successful research production in the social sciences[43] and the humanities[44] have found clear links to the ability of the individual researcher. It might be that this factor was masked by the other factors in the pertinent investigation or that this factor is important, but not the most important as was shown here.

Secondly, the organisational factor was negatively related to paper production, implying its relatively minor important role in the arts and humanities. It is interesting

to note that this factor is unanimously rated irrespective of department size and position. This finding supports the idea of the individual character of research conducted in the arts and humanities.

Is there a homogeneity or heterogeneity in the arts and humanities?

One might have expected that respondents in the two areas in the arts and humanities, history-philosophy and languages, as well as the two media languages (local and cosmopolitical) would show different productivity patterns. Researchers in the first mentioned area were assumed to be less productive, because they are engaged in producing books, while cosmopolitical researchers in the latter area, were seen as more internationally oriented and more "scientific", and so would produce shorter papers (e.g. articles in international journals). However, the productivity was not affected by area or the language of the papers produced. As was the case in the sciences[45] size of departments did not affect individual production figures. With regard to research production and these three structures, it seems as if the arts and humanities are homogeneous. Also, the agreement in ratings of organisation variables and variables related to individual characteristics for the production of papers supported a homogenous picture of the arts and humanities.

However, other results pointed in another direction. First, there was a heterogeneity in the arts and humanities, as previous studies in the sciences have found, in that older male professors produce more papers than others. Secondly, there were differences concerning the communication factor for research production. This difference was related to the position, in the sense that chairs stressed the importance of communication more than other researchers. Thirdly, individual characteristics were regarded as more important to respondents in large history-philosophy and in small language departments, which lead to the hypothesis that more single-authored papers were produced in those departments. In sums one finds heterogenities on production and ratings of communication and individual characteristics with respect to academic rank, Ph.D. year, area and the influence of the publishing language in the arts and humanities.

Implications for further studies on research productivity

This study attempted to explore research production factors in the arts and humanities. At least three findings in this study deserve a special attention with regard to further research. First, the differences in predictor variables for paper and Ph.D. production is not fully explained and should be investigated further. A social position effect was found in the second case but only indirectly in the first. It is not clear what

other factors might contribute to the production of papers in the humanities. Secondly, the finding that the organisation factor was negatively related to the production of papers is remarkable. If this effect can be replicated, it has interesting implications for how to organise research in the humanities. The importance of the individual's qualifications and abilities for the production of papers and Ph.D.'s was clearly demonstrated in ratings and free answers and different measures of this variable ought to be tested to find out whether it is a good predictor or not of research production.[46]

Since the study was designed not only to relate input factors to the research production, but also involved the investigation of research process factors, the results would be strengthened if important process factors (individual or organisational) in samples of the social and natural sciences were found. In such a case, the questionnaire must be further developed, since the social and natural sciences have different characteristics than the humanities.

Notes and references

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14. See e.g. CALLON, M., COURTIAL, J.-P., LAVILLE, F., (1989), *Co-word Analysis: A Tool for the Evaluation of Public Research Policy, The Case of Polymers*, Centre de Sociologie de l Innovation, Ecole de Mines de Paris.
15. See Note 4.
16. r=0.58 and r=-0.38.
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27. The Swedish faculty of the humanities is divided into a history-philosophy and a language which were used for categorizing disciplines.
28. The criterion of belonging to the population being a listed doctor of the discipline in the catalogue.
29. The media language of papers in a discipline was determined in accordance with the dominating language of produced papers in the annual reports from the faculties. (Partly after *Nederhof* et al., 1989, see Note 38).
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39. cf. HEMLIN, S., MONTGOMERY, H., (1993), Peer judgements of scientific quality: A cross-disciplinary document analysis of professorship candidates. *Science Studies*, 6, 19-27.
40. See Note 10.
41. See Note 32.
42. See Note 8.
43. See Note 8.
44. See Note 17.
45. See Note 4.
46. *Rodgers* and *Maranto* (See Note 8) have for example used multiple indicators of ability from different data sources and found that it was a strong factor influencing research performance in psychology by means of a LISREL path analysis.