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A bibliometric analysis of publications from NABIIT projects

Evaluation of the strategic research programme NABIIT - Report no. 3

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1 Introduction and key findings

This report presents the results of a bibliometric analysis of projects funded by the strategic research programme “Interdisciplinary Use of Nanotechnology, Biotechnology and Information and Communication Technology” (NABIIT).

The findings of the bibliometric analysis yield vital insights, e.g. into

- The scientific quality, scientific impact and interdisciplinarity of research publication from NABIIT funded projects, and
- Research collaboration (i.e. international and collaboration with industry) as indicated by co-publication of scientific articles.

The nature of an interdisciplinary research program like NABIIT implies that the scientific output of the funded projects is of very diverse nature. Some projects are primarily devoted to research within one of the three fields covered by the program. It is recognised that the different nature of the research fields covered by NABIIT holds different traditions in terms of publication output; the nano- and biotechnology fields both have well established research outlets in terms of peer reviewed journals and periodicals. For the ICT areas the tradition is that most research is presented and published in conference proceedings, some which is peer reviewed too. The bibliometric analysis present a comprehensive analysis of all NABIIT projects and NABIIT derived publications which mean that the individual differences in publication patterns among the research areas are not taken into account. And the results presented in this report should be seen in this light.

This report is structured as follows:

- **Chapter 2, *Contribution to the evaluation of NABIIT***, explains how this bibliometric analysis contributes to the overall evaluation of NABIIT.

- **Chapter 3, *On the bibliometric analysis of the NABIIT programme***, introduces the data behind the bibliometric analysis.
- **Chapter 4, *Bibliometric analysis***, presents finding from the analysis of both completed and ongoing projects.
- The report concludes with a short discussion of the **methodology** behind the bibliometric analysis.

Data and method

- A bibliometric analysis based on lists of scientific publications provided by grant holders from the 36 NABIIT funded projects

Key findings

- A total of 19 projects out of the 36 projects funded by NABIIT were completed at the time of evaluation. As such, this bibliometric analysis is very preliminary in nature.
- **Scientific productivity:** Grant holders reported 818 publications. 455 of these publications were articles in scientific journals; 389 of these articles (85 percent) could be retrieved from the Web of Science bibliometric database.
- **Scientific quality:** 47 percent of the publications appeared in top journals, the so-called “level 2”-journals in the Danish authority lists.
- **Scientific impact:** 28 percent of the publications appeared in journals that have a Journal Impact Factor (JIF) score of 5 or higher.
- **Interdisciplinarity:** The average number of subject categories is slightly higher for publications from ongoing projects than for articles from completed projects, which may indicate that more recent NABIIT projects address more scientific fields.
- **National co-publication:** The majority of the publica-

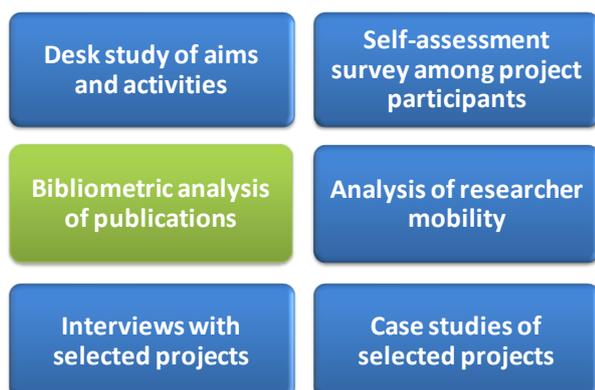
tions from NABIIT funded projects are co-authored by scientists from the grant holder's organisation. Firms and other universities are less frequent Danish co-authors.

- *Internationalisation*: 43 percent of publications (or 168 articles) were co-authored by one or more international collaborators. Key collaborating countries are the USA, the Netherlands and Poland.

2 Contribution to the evaluation of NABIIT

The bibliometric analysis is one of six studies undertaken in connection with the evaluation of the NABIIT programme (cf. figure 2.1).

Figure 2.1. NABIIT evaluation methodology



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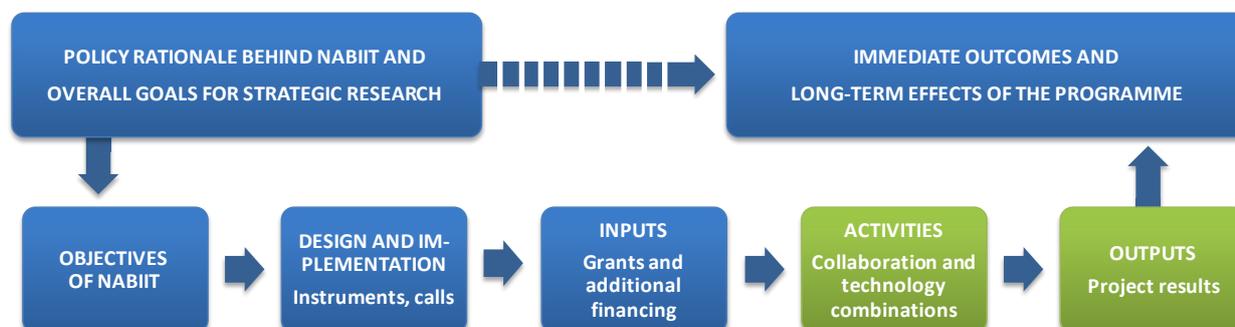
The evaluation is carried out on behalf of the Danish Council for Strategic Research under the Ministry of Science, Innovation and Higher Education by an independent, international peer review panel, assisted by the consultancy firm DAMVAD.

The evaluation of NABIIT is based on the evaluation design illustrated in figure 2.2. The bibliometric analysis sheds light on the following evaluation elements, which are also highlighted in green in

figure 2.2:

- *Activities* refer to the actual behaviour and activities that occur and create value in the projects supported by NABIIT. This includes understanding how project participants interact and collaborate and how they approach the combination of technologies.
- *Outputs* refer to the measurable results of investments under the NABIIT. It includes concrete results from projects funded by NABIIT (e.g. new knowledge, scientific publications, doctoral graduates, etc.).

Figure 2.2. Contribution of the bibliometric analysis to the evaluation design



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3 Introduction to the bibliometric analysis

The aim of the bibliometric analysis of the NABIIT programme is to produce a systematic and robust insight into research production from NABIIT-funded projects, including into their scientific productivity, prestige and impact, their degree of interdisciplinarity, and national and international co-publication.

The key limitation in this study is that about half the projects under NABIIT have yet to be completed. Moreover, publications from a project may emerge several years after the completion of a project, because time is needed to complete the research, to write, submit and revise the publications, and to allow for the peer review process.

As such, the bibliometric analysis will only cover publications from NABIIT-supported projects that are published or accepted for publication at the time of evaluation.

Moreover, the analysis distinguishes between publications from projects that have been completed and projects that are still ongoing, as the former are more likely to have generated the bulk of their publications.

This chapter provides a brief overview of the data and approach taken in the analysis. For a more in-depth discussion of the methodology, please see chapter 6 of this report.

3.1 Data

The bibliometric analysis is based on publication lists provided by the grant holder from each of the 36 projects supported by NABIIT.

Each grant holder was asked to provide an exhaustive list of publications by all project partners that have appeared in peer reviewed scientific journals as a direct result of activities supported by the NABIIT grant. In addition to this, grant holders had the option of providing a list of up to 10 non-journal publications (e.g. Ph.D. theses, books or edited volumes) and up to 10 key conference publications (i.e. publications in conference proceedings or papers accepted for publication at conferences through peer review).

The lists of non-peer reviewed publications thus provided grant holders with the opportunity to identify the most important or prestigious non-journal publications from the project as well as the key conferences contributions from their group.

The grant holders for the 36 projects provided a total of 818 records including scientific journals, books, book chapters, Ph.D. theses, conference presentations etc. (cf. table 3.1 below). The bibliometric analysis focuses on journal publications.

In order to conduct the bibliometric analysis, detailed records of scientific journal publications were located in Thomson Reuters' bibliometric database Web of Science. Table 3.2 shows the result of this exercise: 85 percent of the journal publications provided by the grant holders could be retrieved from Web of Science.

Table 3.2: Publications located in Web of Science

	Publications
No. of publications provided by grant holders	455
No. of publications located in Web of Science	389
Difference	66 (15%)

DAMVAD 2012 based on data from Web of Science

There were three main reasons for why the remaining 66 publications identified by grant holders could not be located in the Web of Science database (cf. Table 3.3): i) the publication provided was still in press, ii) the journal was not included in Web of Science, and iii) the publication could not be located in Web of Science due to e.g. misspelling of title or other mistakes in the reference provided.

Table 3.3: Why 66 publications could not be located in Web of Science

Reason	No. of publications	% of total
Publication is in press	27	41 %
The journal is not indexed in Web of Science	16	24 %
The publication could not be located in Web of Science	23	35 %
Total	66	100 %

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Table 3.1: Number of publications reported by grant holders

Publication type	No. of publications provided	Minimum	Maximum	Average
Journal publication	455	1	43	12.58
In preparation / working paper	21	1	6	2.33
Conference paper	153	2	44	10.79
Conference Proceeding	80	1	17	4.56
Other*	109	1	12	4.74
Sum	818	5	64	22.67

DAMVAD 2012. "Other" includes books, book chapters, Ph.D. theses, presentations etc.

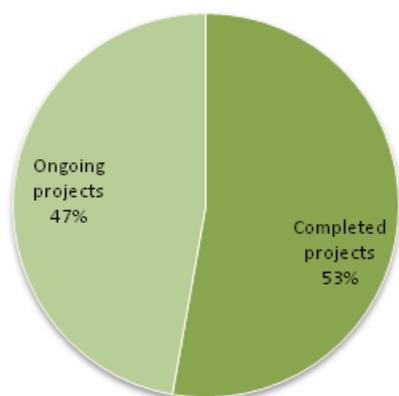
3.2 Projects' degree of completion

A total of 36 projects¹ have been supported by NABIIT during the programme period 2005 to 2008. Of these projects, 17 are ongoing and 19 have been completed at the time of evaluation.²

This bibliometric analysis is based on the publications that have come out of these projects at the time of evaluation, in spring 2012. The results of this analysis should therefore only be seen as indicative; a full analysis of the publications generated by NABIIT projects will not be possible to undertake until some years after the completion of the last NABIIT funded project.

The bibliometric analysis presented in chapter 4 distinguishes between completed and ongoing projects, as completed projects are – all other things equal – more likely to have generated the bulk of their publications.

Figure 3.1: Completed and ongoing projects



DAMVAD 2012 based on data from the Council for Strategic Research

¹ Including 32 strategic research projects, two strategic research alliances and two strategic research centres.

² A project is completed when the final report has been submitted to and approved by the programme commission.

4 Bibliometric analysis

4.1 Scientific productivity

Scientific productivity is given by the number of publications in each project.

The number of publications provided by grant holders from completed and ongoing projects can be seen in tables 4.1 and 4.2, respectively. Not surprisingly, ongoing projects have on average produced close to twice as many articles in scientific journals as completed projects (15.2 compared to 9.8).

The tables also indicate that there is a large degree of variation in productivity between different projects. For instance, the smallest number of journal articles to have come out of a completed project is 4, while the highest number of publications (so far) from a NABIIT funded project is 43 (cf. Table 4.1).

Table 4.1: Number of publications reported for completed projects

Publication type	No. of publications provided	Minimum	Maximum	Average
Journal publication	288	4	43	15.2
In preparation / working paper	10	1	3	1.7
Conference paper	94	2	44	18.8
Conference Proceeding	42	1	17	4.7
Other*	75	1	12	5.8
Total	509	20	61	35.7

Table 4.2: Number of publications reported for ongoing projects

Publication type	No. of publications provided	Minimum	Maximum	Average
Journal publication	167	1	38	9.8
In preparation / working paper	11	2	6	3.7
Conference paper	57	4	16	6.3
Conference Proceeding	40	1	10	4.4
Other*	34	1	9	3.4
Total	309	7	43	18.2

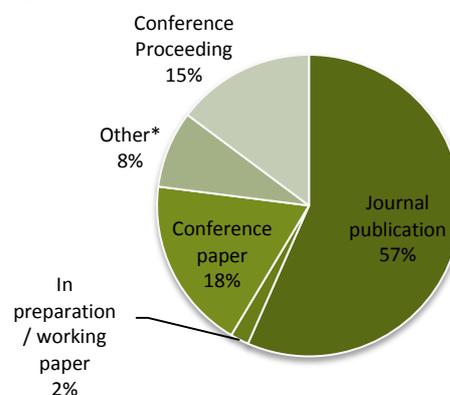
*DAMVAD 2012 *) Books, Book chapters, presentations, Ph.D. thesis, oral presentations, etc.*

Figures 4.1 and 4.2 indicate that journal articles represent more than half the total scientific outcome from NABIIT funded projects, or 57% for completed projects and 54% for ongoing projects.

The differences in publication outputs from completed and ongoing projects are likely to become smaller as more NABIIT projects are completed, and thus produce more publications.

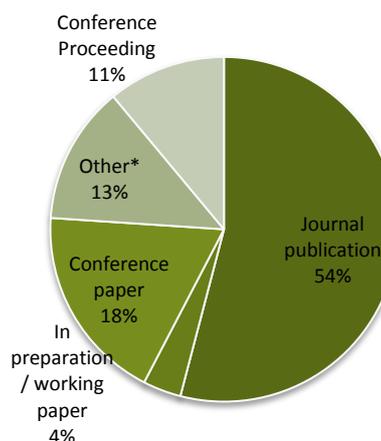
Table 4.3 shows that 87% and 83% of the journal publications reported by grant holders from completed and ongoing projects, respectively, were located in the Web of Science database.

Figure 4.1: Publications from completed projects, by type



DAMVAD 2012. "Other" includes books, book chapters, oral presentations, Ph.D. theses etc.

Figure 4.2: Publications from ongoing projects, by type



DAMVAD 2012. "Other" includes books, book chapters, oral presentations, Ph.D. theses etc.

Table 4.3: Publications located in Web of Science

	Completed projects	Ongoing projects
Number of publications provided by the project managers	288	167
Number of publications located in Web of Science	251	138
Difference	37 (13%)	29 (17%)

DAMVAD 2012 based on data from Web of Science

4.2 Scientific quality

Due to the fact that most NABIIT publications have been generated in recent years, taken together with the fact that about half of the NABIIT projects have yet to be completed, it is not possible to perform a robust or meaningful citation analysis on NABIIT publications at this time.

Instead, the authority lists developed for use in the Danish bibliometric research performance indicator are used as an indicator of the quality of the research published in NABIIT funded projects. These lists identify key scientific journals and categorise them as “level 1” or “level 2” journals. Level 2 publications are recognised as the top 20 percent of journals in their field (see chapter 6, Methodology, for more detailed information),

Overall, 47 percent of the publications (or 184 out of 389 articles) appeared in top journals, the so-called “level 2”-journals.

Tables 4.4 and 4.5 shows that the proportion of level 2 publications is considerably higher than the 20% goal used in the development of the authority lists, namely 52% for completed projects and 38% for ongoing projects. These results suggest that the quality of research produced in NABIIT funded projects is significantly higher than the average research quality in the Danish scientific fields concerned.

The relatively high proportion of NA (i.e. “not available” or “not identified”) publications from projects that have not yet been completed (14 percent, cf. table 4.5) may indicate that some of the ongoing projects are active within research areas that have yet to mature. Emerging scientific areas often suffer from the fact that appropriate scientific journals either do not exist or are not sufficiently recognised in the academic community to be included in bibliometric databases and on authority lists.

Scientific journals are typically highly specialised and emerge from established or at least growing research fields based on a more or less well-defined research community, i.e. academic scientists who work on similar or related topics, typically using similar or related research methods. This community contributes both with research publications and with reviewers and editors for the peer review system for assessment of new article submissions. For scientific journals to appear in bibliometric databases they have to have proven that they are stable periodically with a well-established track record of published issues for a number of years. For a journal to become a recognised scientific journal, the research community around it and using it must be rather well defined and established. New or emerging scientific areas – e.g. new interdisciplinary research areas – are not based on a fully formed research community and, as such, often lack good journal outlets. When publications from such new research areas are submitted to existing journals, they may meet difficulties with the review process; because there is no research community from which to draw ideal reviewers who can perform a thorough assessment of the scientific importance and quality of the research.

Table 4.4: Publications in level 1 and 2 journals for completed projects

Level	No. of journals	% of journals	No. of publications	% of publications
Level 2	78	46%	131	52%
Level 1	81	48%	107	43%
NA	11	6%	13	5%
Total	170	100%	251	100%

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Table 4.5: Publications in level 1 and 2 journals for ongoing projects

Level	No. of journals	% of journals	No. of publications	% of publications
Level 2	36	34%	53	38%
Level 1	54	51%	62	45%
NA	16	15%	23	17%
Total	106	100%	138	100%

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4.3 Scientific impact

Scientific impact is indicated by the number or pro-

portion of publications that NABIIT funded projects has published in journals with a high Journal Impact Factor (JIF) score. JIF scores are assigned to all journals indexed in the Web of Science database (see chapter 5, Methodology, and Appendix 1 of this report for more detailed information on JIF scores).

Overall, 28 percent of the publications from NABIIT funded projects (or 109 articles) appeared in journals that have a JIF score of 5 or higher. 13 percent (49 articles) appeared in journals with a JIF score of 7.5 or higher.

As indicated by tables 4.6 and 4.7, 13 percent and 13 percent of publications from completed and ongoing projects, respectively, have appeared in journals with JIF scores of 7.5 or higher.

Moreover, the evaluation panel for the evaluation of NABIIT has categorised JIF scores according to whether they indicate “good”, “excellent” or “world class” journals in their field. See appendix 1 for the full list of journal and associated JIF scores.

Table 4.6: JIF scores for publications from completed projects

Impact factor	Assessment	No. of journals	No. of publications	% of journals	% of publications
0 > JIF > 4	Fair	101	150	59%	60%
4 > JIF > 5	Good	21	30	12%	12%
5 > JIF > 7.5	Very good	28	40	16%	16%
7.5 > JIF > 10	Excellent	10	19	6%	8%
JIF over 10	World class	10	12	6%	5%
Total		170	251	100%	100%

Table 4.7: JIF scores for publications from ongoing projects

Impact factor	Assessment	No. of journals	No. of publications	% of journals	% of publications
0 > JIF > 4	Fair	62	70	58%	51%
4 > JIF > 5	Good	17	30	16%	22%
5 > JIF > 7.5	Very good	13	20	12%	14%
7.5 > JIF > 10	Excellent	7	10	7%	7%
JIF over 10	World class	7	8	7%	6%
Total		106	138	100%	100%

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4.4 Interdisciplinarity

Promoting interdisciplinary research is one of the overall goals of the Council for Strategic Research, which aims to promote cross-cutting, problem-oriented research.

A very rough estimation of the level of interdisciplinarity of a scientific publication can be made based on the number of Web of Science subject categories assigned to the journal in which it has appeared.³ These subject categories reflect different fields of research and are assigned to journals based on the general content of the scientific articles that each journal publishes.

Tables 4.8 and 4.9 show that publications from completed and ongoing NABIIT funded projects appear in journals with, on average, 1.93 and 2.11 subject categories, respectively.

The average number of subject categories is slightly higher for publications from ongoing projects than for articles from completed projects. This may indicate that more recent NABIIT projects address more scientific fields.

Table 4.8: Number of subject categories assigned to the journals in which publications from completed projects have appeared

No. of subject categories	No. of publications	% of total
1	127	51%
2	47	19%
3	54	22%
4	14	6%
5	9	4%
Total	251	100%
Average* = 1.93		

DAMVAD 2012. *) Average number of subject categories per publication

Table 4.9: Number of subject categories assigned to the journals in which publications from completed projects have appeared

No. of subject categories	No. of publications	% of total
1	52	38%
2	46	33%
3	18	13%
4	17	12%
5	5	4%
Total	138	100%
Average* = 2.11		

DAMVAD 2012. *) Average number of subject categories per publication

³ Several, more sophisticated measures of the level of interdisciplinarity in a set of scientific publications are available; however, their use lies outside the scope of this evaluation as they require considerable additional data collection and analysis.

4.5 National co-publication

Publications from NABIIT funded projects have been analysed according to the number of publications that have been authored by scientists affiliated to the organisation participating in the projects. Furthermore, we measure the number of publications that is co-authored by the scientists from these organisation and other national partners, e.g. firms, other universities or government research institutions (GRI).

As tables 4.10 and 4.11 indicate, collaboration patterns are relatively similar for publications from completed and ongoing projects, though publications from completed projects tend to have more collaborations with industry partners and scientists located at other universities than publications from ongoing projects.

Table 4.11: National co-publications from completed projects

No. of publications authored in collaboration with...		
Own organization*	88	65%
GRI**	1	1%
Firms	20	15%
Other universities	26	19%
Total	135	100%

*DAMVAD 2012. *) Own organization indicates that scientists affiliated with the grant holding organisation has co-authored the publication. **) GRI include institutions like Danish Technological Institute or the National Institute for Health Data and Disease Control.*

Table 4.11: National co-publications from ongoing projects

No. of publications authored in collaboration with...		
Own organization*	46	75%
GRI**	2	3%
Private Non-profit organization	1	2%
Firms	2	3%
Other universities	10	17%
Total	61	100%

*DAMVAD 2012. *) Own organization indicates that scientists affiliated with the grant holding organisation has co-authored the publication. **) GRI include institutions like the National Institute for Health Data and Disease Control.*

4.6 Internationalisation

The level of internationalisation of the research conducted in NABIIT funded projects is explored by looking at co-authors' institutional affiliations. Articles that were published in collaboration with international research institutions or companies were identified; the degree of internationalisation was measured as the percentage of publications that have been co-authored with international research organisations or companies.

Overall, 43 percent of publications (or 168 articles) were co-authored by one or more international collaborators.

Tables 4.12 and 4.13 show that 37 percent of publications from completed projects and 54 percent of articles from ongoing projects were co-authored with at least one international collaborator.

Table 4.12: International collaboration on publication from completed projects

Degree of internationalisation	No. of publications	% of publications
No. of publications authored by Danish organisations	137	54%
No. of publications authored by international organisations	92	37%
NA	23	9%
Total	252	100%

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Table 4.13: International collaboration on publication from ongoing projects

Degree of internationalisation	No. of publications	% of publications
No. of publications authored by Danish organisations	59	43%
No. of publications authored by international organisations	74	54%
NA	4	3%
Total	137	100%

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The data presented in tables 4.14 and 4.15 identify the ten most frequent international partners for completed and ongoing projects, respectively, based on the affiliation of the international scientists that have co-authored publications.

For example, the 17 partners with origin in Germany in table 4.14 indicate that, among all the publications that have been published from the completed projects, there are 17 international co-authors with affiliation to a German scientific institutions or firms.

The tables indicate that NABIIT funded projects collaborate with a great variety of countries around the world, ranging from the U.S. and the European countries to China and Israel.

Table 4.14: The ten partner countries with most co-authors on publications from completed projects

Country	No. of co-authors	% of total
USA	51	23%
Netherlands	34	15%
France	19	8%
Germany	17	8%
Sweden	13	6%
China	11	5%
England	10	4%
Italy	9	4%
Japan	8	4%
Spain	8	4%
Other	44	20%
Total	224	100%

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Table 4.15: The ten partner countries with most co-authors on publications from ongoing projects

Country	No. of co-authors	% of total
Poland	29	22%
England	24	19%
Germany	14	11%
Israel	8	6%
Finland	7	5%
France	5	4%
Sweden	5	4%
Hungary	4	3%
Italy	4	3%
Singapore	3	2%
Other	26	20%
Total	129	100%

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5 Methodology

5.1 Purpose

The aim of the bibliometric analysis is to use publication data to shed light on key themes in the evaluation, notably

- The scientific quality, scientific impact and interdisciplinarity of research publication from NABIIT-funded projects, and
- Research collaboration (i.e. international and collaboration with industry) as indicated by co-publication of scientific articles.

5.2 Data

The bibliometric analysis was based on the materials listed below.

Publication lists provided by grant holders from each of the 36 grants. Publication lists were collected from grant holders and not from each of the project partners. This approach was taken to limit the imposition on project partners. Moreover, the grant holder will in many cases already have all or at least much of the requested information.

In analyses like this, there is a risk that participants may include publications that are not actually or only partially derived from the project subsidised by NABIIT, in order to boost the results of the project. The consensus in the bibliometric research community is, however, that this is a negligible and acceptable risk. To nonetheless mitigate the risk of this occurring, grant holders were asked to only indicate publications that are the *direct* result of activities supported by the NABIIT grant.

Limited additional information on other forms of publications, notably publications in books and edited volumes and publications in conference proceedings, could also be provided, as such publica-

tions carry more weight in certain research fields and traditions than others. Information on these publications will therefore both provide valuable information about non-journal scientific publications and help ensure that we have a balanced overview of the projects' overall set of scientific publications.

Bibliometric data like publication source, author affiliation, citations and Journal Impact Factor (JIF) scores were obtained through individual searches for each publication in the leading international bibliometric database Web of Science from Thomson Reuters.

Web of Science contains indexed information about scientific publications in key international peer reviewed journals. The database also provides information about the number of times a publication has been cited, the sources of those citations, the scientific impact of the individual article or the journal it appeared in, subject areas covered by the journal, etc.

Authority lists. Assessments of the scientific quality of publications were based on the Danish authority list developed

These authority lists categorise peer reviewed journals according to whether they are internationally recognised, quality journals within their field (level 1) or whether they are the absolute best journals in their field (level 2; this level accounts for the top 20 percent of journals included in the list). These authority lists have been developed by expert groups on behalf of the Danish Agency for Science Technology and Innovation for the use in the national bibliometric performance indicator. This indicator is used to allocate base funding to Danish universities based on their publication performance.

5.3 Method

The bibliometric analysis was based on a systematic examination and synthesis of the materials listed in section 6.2. Moreover, the analysis was guided by the evaluation themes and questions guiding the evaluation of the NABIIT programme, as described in the report *Evaluation of NABIIT: Evaluation Methodology*.

The first NABIIT funded projects have only been completed within the past two years. The bulk of publications from the projects are therefore likely to have appeared within the past three years. The evaluation therefore does not include an analysis of citations to these publications. The reason for this is that citation analysis typically operates with a three-year citation lag to control for differences in the age of publications, since this age will impact the number of citations that a publication has received. It is not possible to operate with a three-year citation window when most or at least a substantial number of the publications to have emerged from NABIIT-funded projects are less than three years old.

Publications are analysed separately for completed and ongoing projects along the dimensions described below.

(1) *Scientific productivity* is indicated by the number of publications in each project or, more precisely, the number of publications that are in Web of Science indexed journals.

(2) *Scientific quality* is indicated by the prestige of the journals in which publications appeared. As previously mentioned, it is not possible to perform a robust citation analysis on NABIIT publications yet. Instead, the Danish authority lists are used

to identify the number or proportion of publications that have appeared in journals that are recognised as top journals in their field (i.e. the so-called “level 2”-journals).

(3) *Scientific impact* refers to the impact that an article has on the scientific community. Again, because a reliable analysis of citations cannot be performed, the impact of the journals in which publications from NABIIT projects appear is used as an indicator for the impact, or at least the likely impact, of the publications.

More precisely, impact is estimated based on the *Journal Impact Factor* (JIF) scores assigned to Web of Science indexed journals. These scores are a measure of the journals’ impact on the international scientific community and the research front in their field, based on citations to the articles they publish. JIF scores are determined based on expert panels’ assessments of Web of Science indexed journals.

(4) *Interdisciplinarity* is one of the overall objectives of the Council for Strategic Research, which aims to promote cross-cutting, problem-oriented research. The bibliometric analysis therefore estimates the degree of interdisciplinarity of a publication based on number of subject categories covered by the journal in which it appeared.

Web of Science journals are classified according to approximately 225 scientific subject categories (or research fields) based on the contents of the articles they publish; some journals are assigned to just one subject category, while others are assigned to multiple categories.

The number of subject categories that have been assigned to a journal can therefore provide a very rough approximation of the degree of interdiscipli-

narity of the journal and hence, by extension, of the articles published in that journal.

(5) *National co-publication*. By examining the organisational affiliations of authors, collaboration with other Danish research organisations or companies is examined.

(6) *Internationalisation* of research is explored by looking at authors' institutional affiliations to identify articles that have been published in collaboration with international research institutions or companies.

Appendix 1: Journal Impact Factors

This appendix lists all the Journal Impact Factor (JIF) score for all journals that NABIIT publications have appeared in and which are indexed in Thomson Reuters Web of Science.

The JIF scores listed are from the 2011 version of the Thomson Reuters Journal Citation Report.

Journal name	Journal Impact Factor	No of Publication
ACS Nano	9,865	6
Acta Oncologica	3,137	6
Acta Oto-Laryngologica	1,200	1
Acta Physica Polonica A	0,467	1
Advanced Drug Delivery Reviews	11,502	2
Advanced Materials	10,880	2
Advances in Applied Mathematics	0,800	2
Advances in Applied Probability	0,720	2
Algorithms for Molecular Biology	2,800	2
Analyst	3,913	1
Analytical and Bioanalytical Chemistry	3,778	1
Analytical Chemistry	5,874	3
Anatomical Record	1,743	2
Angewandte Chemie-International Edition	12,730	4
Annual review of pharmacology and toxicology	19,238	1
Antimicrobial Agents and Chemotherapy	4,672	2
APMIS	1,944	1
Applied and environmental microbiology	3,778	1
Applied Physics Letters	3,841	5
Applied Physics A: Materials Science & Processing	1,63	1
Applied Surface Science	1,795	2
Aquatic Toxicology	3,333	2
Archiv für Geflügelkunde	0,373	1
Archives of Animal Nutrition	1,165	1
Archives of Toxicology	4,041	1
BBA-Proteins Proteomics	3,635	1

Journal name	Journal Impact Factor	No of Publication
Beilstein Journal of Nanotechnology	0,789	1
Bernoulli	1,000	1
Biochemical and Biophysical Research Communications	2,595	2
Biochemistry	3,226	1
Biochim. Biophys. Acta Mol. Cell Biol. Lipids	5,269	1
Biochimica et Biophysica Acta	4,843	2
Bioconj. Chem.	4,930	1
Bioinformatics	4,877	2
Biointerphases	3,118	1
Biomaterials	7,404	2
Biometrics	1,764	1
Biometrika	1,833	2
Bioorganic & Medicinal Chemistry Letters	2,661	1
Biophysical Journal	4,218	7
Biostatistics	2,769	1
BMC Bioinformatics	3,029	4
BMC Nephrology	2,136	1
BMC Structural Biology	2,258	1
Bulletin of the Veterinary Institute in Pulawy	0,321	1
Carbohydrate Research	1,898	1
Catalysis Letters	1,907	1
Catalysis Today	2,993	1
Chemical Physics Letters	2,282	1
Chemical Research in Toxicology	4,148	1
Chemistry A European Journal	5,476	3
Clinical Respiratory Journal	0,512	2
Comparative Biochemistry and Physiology	NA	1
Comput. Electron. Agric.	1,846	1
Computers in Biology and Medicine	1,089	1
Current Molecular Medicine	5,212	1
Current Opinion in Biotechnology	8,486	1
Ecotoxicology	3,051	1
Electronics Letters	1,004	1
EMBO Journal	9,205	1

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Energy & Environmental Science	9,488	1	Journal of Applied Physiology	4,235	1
Environ. Sci. Technol.	5,228	1	Journal of Biological Chemistry	4,773	3
Environmental Microbiology	5,537	1	Journal of Biomedical Materials Research Part A	3,044	1
Environmental Science & Technology	4,827	1	Journal of Biomedical Nanotechnology	2,297	2
European Journal of Lipid Science and Technology	1,487	1	Journal of Biomedical Optics	3,188	1
European Journal of Organic Chemistry	3,206	2	Journal of Catalysis	5,415	8
European Radiology	3,594	1	Journal of Chemical Information and Modeling	3,822	2
European Respiratory Journal	5,922	1	Journal of Chemical Physics	2,921	4
Expert Opinion on Drug Delivery	4,482	2	Journal of Chemical Theory and Computation	5,138	4
FEBS Letters	3,538	2	Journal of Controlled Release	7,164	5
Free Radical Research	2,805	1	Journal of Dairy Science	2,497	1
Fuzzy Sets and Systems	1,875	1	Journal of electroanalytical chemistry	2,733	1
Haematol-Hematol. J.	6,424	1	Journal of Immunology	5,745	3
Hippocampus	5,176	1	Journal of Liposome Research	1,823	2
IEEE Journal of Quantum Electronics	2,480	1	Journal of Magnetic Resonance	2,333	1
IEEE Journal of Selected Topics in Quantum Electronics	3,780	2	Journal of Magnetic Resonance Imaging	2,749	2
IEEE Photonics Technology Letters	1,989	3	Journal of Medicinal Chemistry	5,207	2
IEEE Transactions on Medical Imaging	3,639	3	Journal of Microelectromechanical Systems	2,157	1
Image and Vision Computing	1,578	1	Journal of Micromechanics and Microengineering	2,281	4
International Journal of Hyperthermia	2,929	2	Journal of Microscopy	1,872	2
International Journal of Intelligent Systems	1,331	1	Journal of Molecular Modeling	1,871	1
International Journal of Nanomedicine	4,976	4	Journal of Nanoscience and Nanotechnology	1,352	1
International Journal of Radiation Biology	1,861	2	Journal of Neuroscience	7,115	1
J. Lightwave Technol.	2,784	4	Journal of Neuroscience Methods	2,100	1
J. Microsc.-Oxf.	1,631	3	Journal of Optics A: Pure and Applied Optics	1,742	2
J. Phys. D-Appl. Phys.	2,544	1	Journal of Peptide Science	1,954	1
Journal Animal and Feed Sciences	0,659	3	Journal of Physical Chemistry B	3,603	1
Journal of Agricultural Food Chemistry	2,823	1	Journal of Physical Chemistry C	4,524	4
Journal of Agricultural, Biological and Environmental Statistics.	1,210	1	Journal of Physical Chemistry Letters	6,213	4
Journal of Antimicrobial Chemotherapy	4,659	1	Journal of Physics Condensed Matter	2,332	2
Journal of Applied Crystallography	3,794	3	Journal of Raman Spectroscopy	3,137	3

Journal name	Journal Impact Factor	No of Publication	Journal name	Journal Impact Factor	No of Publication
Journal of Statistical Software	2,647	1	New Journal of Physics	3,849	1
Journal of Structural Biology	3,406	1	Optics Communications	1,517	2
Journal of Synchrotron Radiation	2,335	1	Optics Express	3,753	14
Journal of the American Chemical Society	9,023	12	Optics Letters	3,318	3
Journal of the Optical Society of America B	2,030	3	Oral Microbiology and Immunology	2,479	1
Journal of Thoracic Oncology	4,040	1	Organic & Biomolecular Chemistry	3,451	1
Journal of Vacuum Science & Technology B	1,271	1	Pain	5,355	1
Lab on a Chip	6,260	3	Physica Status Solidi (b)	1,349	1
Langmuir	4,269	6	Physica Status Solidi. A	1,472	1
Laser & Photonics Reviews	9,312	1	Physical Review B	3,774	11
Lung Cancer	3,356	1	Physical Review Letters	7,622	7
Macromolecular Rapid Communications	4,371	1	PLoS ONE	4,411	1
Magnetic Resonance in Medicine	3,268	2	Polymer Degradation and Stability	2,594	1
Materials Today	6,265	2	Proceeding of the National Academy of Sciences of the United States of America	9,771	1
Mathematische Nachrichten	0,653	1	Proteins	1,038	2
Medical Image Analysis	4,364	2	Radiology	6,069	1
Medical Physics	3,075	1	Rapid Communications in Mass Spectrometry	2,846	1
Microelectronic Engineering	1,575	5	Reports on Progress in Physics	13,857	2
Microfluidics and Nanofluidics	3,507	2	Review of Scientific Instruments	1,601	2
Mitochondrion	3,238	1	Scandinavian Journal of Statistics	0,835	1
Molecular Immunology	2,916	1	Science	31,377	1
Molecular Membrane Biology	2,570	2	Seminars in Cell and Developmental Biology	6,342	1
Molecular Therapy	7,149	1	SENSORS	1,739	2
MRS Bulletin	4,764	2	Small	7,336	1
Nano Letters	12,219	3	Soft Matters	4,390	5
Nanomedicine: Nanotechnology, Biology and Medicine	6,202	1	Statistical Methods in Medical Research	1,768	1
Nanoscale	4,109	5	Statistics and Computing	1,851	1
Nanoscale Research Letters	2,560	1	Structure	6,337	1
Nanotechnology	3,652	2	Surface and Coatings Technology	1,867	1
Nature Chemical Biology	14,690	1	Surface Science	2,011	2
Nature Communications	7,396	2	Theoretical Computer Science	0,838	1
Nature Nanotechnology	30,324	3	Theory and Practice of Practice Logic Programming	0,667	1
NeuroImage	5,937	1	Thorax	6,525	4
Neuroscience Letters	2,055	1	Topics in Catalysis	2,624	1

Journal name	Journal Impact Factor	No of Publication
Toxicologic Pathology	2,168	2
Toxicology Letters	3,581	1
Tribology Letters	1,574	1
Ultramicroscopy	2,063	3

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