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RAE2020 Bibliometric Analyses Performed by Oulu University Library



UNIVERSITY OF OULU

RAE2020 Bibliometric analyses performed by Oulu University Library

RAE2020

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1 Summary


1.1 Introduction

Bibliometrics is an important quantitative method of evaluating scientific publication output. In the RAE2020 assessment, the role of bibliometrics was mainly to support the research units under assessment in their self-assessment work. Bibliometric analyses were also part of the evaluation material of the international panellists who carried out the evaluation. These unit-level analyses were carried out in collaboration with our partner Centre for Science and Technology Studies (hereafter CWTS), Leiden University, the Netherlands. Oulu University Library and CWTS have produced their own analyses for each research unit, but they are only for the use of the units themselves and as assessment material for the evaluation panel members.

In addition to unit-level analyses, both the library and CWTS also conducted their own separate analyses for the entire university and all eight faculties. The results of the analyses produced by the library are presented in this report and the report on the analyses produced by CWTS is available at <http://urn.fi/urn:nbn:fi-fe2021101551288>.

The analyses performed by CWTS are based on the Web of Science database (hereafter WoS) and standard methods using indicators that have been widely tested and approved. There are, however, large differences between scientific fields and disciplines regarding publication and citation habits. CWTS has developed impact measures to correct for field differences. Still, it should be noted that in some fields the current CWTS bibliometric toolbox does not work properly because WoS does not cover all disciplines equally well. For this reason, the library has carried out its own bibliometric analyses in ways that take into account the entire publication output of the university and each faculty. It is very important to understand that the results of the analyses are not comparable between different scientific fields, and therefore the results should be interpreted with special care.

The analyses performed by both the library and CWTS used the same publication data. Since the data collection started already in the spring of 2019 and the data had to take into account the citation window needed for the CWTS analyses, the time window under consideration are the publication years 2013-2017.



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1.2 Data

The data used in the bibliometric analysis for the RAE2020 assessment was extracted from the publications recorded in the research information system Oulun yliopisto tutkii of the University of Oulu. The database consists of publications that are either affiliated with the University of Oulu or whose author is employed by the University of Oulu. Researchers of the University of Oulu are asked to record their publications yearly to the database for the publication data collection of the Ministry of Education and Culture. Oulu University Library is responsible for the verification of the records. For the RAE2020 assessment, research units at the University of Oulu were asked to verify that all publications linked to them during 2013-2017 had been properly registered. The data in the database are updated to some extent after the Ministry's publication data collections, which is why the results of this analysis are not comparable with the figures of the national statistical service Vipunen (<https://vipunen.fi/en-gb/>).

The faculty-level analyses are based on the current unit structure, i.e., the analyses of each faculty include publications produced by their current research units and their predecessors during 2013-2017. There have been changes in several research units: some of the units have merged into larger units, have been subordinate to another faculty, or may even have formed their own faculty during the period under review.

1.3 Methods

The bibliometric analyses of the university and each faculty provided by the Oulu University Library cover the entire publishing output of each analysed unit. This means that the analyses also cover publications that are not included in the WoS-based analyses provided by CWTS. In contrast to the analysis of the CWTS, the analyses in this report also include all non-peer-reviewed publications. In addition, peer-reviewed publications are included in the analyses in their entirety, including also those publications that are not included in the WoS database.

With all the analyses used in this report we have sought to examine the trends in the publication production and behaviour. In this respect, a 5-year time window does not allow the identification of long-term trends and therefore the results should be interpreted with caution.

1.3.1 Production of publications

The analyses are based on the publications linked to the analysed units in the Oulun yliopisto tutkii research information system covering the years 2013-2017. The links are based on the affiliations of the authors at the time of publication, meaning that the analyses for each unit only include publications by authors who were either employed at or otherwise linked to the unit at the time.

The publications have been classified into publication types according to the publication type classification of the Ministry of Education and Culture (hereafter MinEdu). The classification into peer-reviewed scientific publications and other publications, as well as the publication types not included in the analyses are shown in Table 1. Since the MinEdu publication type classification does not include conference abstracts, they have been left out of the analyses.

Table 1. MinEdu publication types and their classification in the analyses.

Publication type of the MinEdu classification	Classification in the analyses
A Peer-reviewed scientific articles	
A1 Journal article (refereed), original research	Peer-reviewed scientific publication
A2 Review article, Literature review, Systematic review	Peer-reviewed scientific publication
A3 Book section, Chapters in research books	Peer-reviewed scientific publication
A4 Conference proceedings	Peer-reviewed scientific publication
B Non-refereed scientific articles	
B1 Non-refereed journal articles	Other publication
B2 Book section	Other publication
B3 Non-refereed conference proceedings	Other publication
C Scientific books (monographs)	
C1 Book	Peer-reviewed scientific publication
C2 Edited book, conference proceedings or special issue of a journal	Peer-reviewed scientific publication
D Publications intended for professional communities	
D1 Article in a trade journal	Other publication
D2 Article in a professional book (incl. an introduction by the editor)	Other publication
D3 Professional conference proceedings	Other publication
D4 Published development or research report or study	Other publication
D5 Textbook, professional manual or guide	Other publication
D6 Edited professional book	Other publication
E Publications intended for the general public	
E1 Popularised article, newspaper article	Other publication
E2 Popularised monograph	Other publication
E3 Edited popular book	Other publication
F Public artistic and design activities	
<i>F1 Published independent work of art</i>	<i>Not included in the analyses</i>
<i>F2 Public partial realisation of a work of art</i>	<i>Not included in the analyses</i>
<i>F3 Artistic part of a non-artistic publication</i>	<i>Not included in the analyses</i>
G Theses	
G1 Polytechnic thesis, Bachelor's thesis	<i>Not included in the analyses</i>
G2 Master's thesis, polytechnic Master's thesis	<i>Not included in the analyses</i>
G3 Licentiate thesis	<i>Not included in the analyses</i>
G4 Doctoral dissertation (monograph)	<i>Not included in the analyses</i>
G5 Doctoral dissertation (article)	<i>Not included in the analyses</i>
H Patents and innovation announcements	
H1 Granted patent	Other publication
H2 Invention announcement	Other publication
I Audiovisual material, ICT software	
I1 Audiovisual material	Other publication
I2 ICT software	Other publication

1.3.2 Quality of publication channels

The analysis is based on a Finnish rating and classification system Publication Forum (hereafter JUFO), which allows all peer-reviewed scientific publications (MinEdu publication types A + C) to be taken into account in the analysis.

JUFO is a Finnish rating and classification system that supports the quality assessment of scientific publication output. The classification takes into account the different publishing cultures in different scientific disciplines by including journals, book series, conferences, and publishers. Since 2015, the classification has been used as a quality indicator of the research output produced by universities within the university funding model established by the MinEdu.

In the three-level classification all the major foreign and domestic publication channels in all disciplines are classified as follows:

1 = basic

2 = leading

3 = top

In addition, publication channels that do not fulfil level 1 criteria are rated as level 0. Further details on the Publication Forum classification can be found at: <https://julkaisufoorumi.fi/en/publication-forum>

It should be noted that the Publication Forum (JUFO) classification is only suitable for reviewing the profiles and internal development of units' publication activities, *not for comparison between scientific disciplines*.



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The analyses are always based on the Publication Forum rating of publications at the time of publication. An exception to this are conference publications, whose evaluation method was changed in 2016. In this analysis all conference publications from all the years are rated using the current evaluation method for conference publications. More information can be found here about [decision on level of individual publications](#).

Another change in the rating method during the period under analysis concerns the level 2 and 3 quotas for series and journals. Starting from the year 2015 the quota calculation criterion has been the publication volume of the series or journals, no longer the number of titles. Due to the change, the number of publication series in the higher-level categories had to be reduced in almost all fields. The largest decline was in the natural and medical fields, where levels 2 and 3 contained 50 percent of all publications before the change, but about 30 percent after the change. For level 3, the proportion of publications per panel ranged from about 1 to 3 percent after the change compared to about 5 percent before the change. Further information on this topic can be found in [issue 1/2015 of the magazine Tieteessä tapahtuu](#) (Finnish only) and in [the classification criteria of the Publication Forum](#).

As the JUFO rating is an important instrument in the national funding model of universities and levels 2 and 3 are clearly valued more than level 1, their joint share has been examined with particular care in this review.

1.3.3 Types of collaboration in the publications

The collaboration analysis describes a unit's collaboration activity based on the affiliation information found in peer-reviewed publications. In addition to the analysis of international and national collaboration, this analysis also studies collaboration between different faculties in the university.

The analysis shows the different types of collaboration of a unit per year. If a publication is a product of both international and national collaboration, as well as collaboration between faculties, it is listed under all these collaboration categories. The category 'Single faculty' includes both publications written by a single author and publications that involve collaboration only within the faculty. The total number of peer-reviewed scientific publications is indicated with the green bar and on the bottom row of the table.

In the graphs of the collaboration analyses, it is difficult to recognize the share of different types of collaboration in the total annual production. Therefore, an attempt has been made to highlight the trend of the share in the text.

1.3.4 Language of the publications

During recent years, there has been concern about the dominance of the English language in scholarly communication. In addition, scientific publications published in a language other than English and research results that have a direct impact on society are often overlooked in publication-based analyses. This is usually because non-English language publications are poorly represented in international databases. To account for multilingualism, this report also includes an analysis of the languages used in the publications.

The language analysis describes the yearly distribution of languages used in a unit's publications. Figures in language analyses show the distribution of languages for peer-reviewed scientific publications and all other publications, respectively. The percentage distribution of languages is shown in the figures and the numbers of publications are listed in the tables at the bottom of the figure.

2 Results

2.1 University-level analysis

The University of Oulu is an international science university and one of the largest and the most multidisciplinary universities in Finland. The university consists of eight faculties and at the end of 2020 there were about 13,500 students and 3,300 employees.

The analyses of the whole university are based on all publications reported in the Oulun yliopiston tutkii database during the years 2013-2017.

Production of publications

The method for studying publication trends is described in [chapter 1.3.1](#).

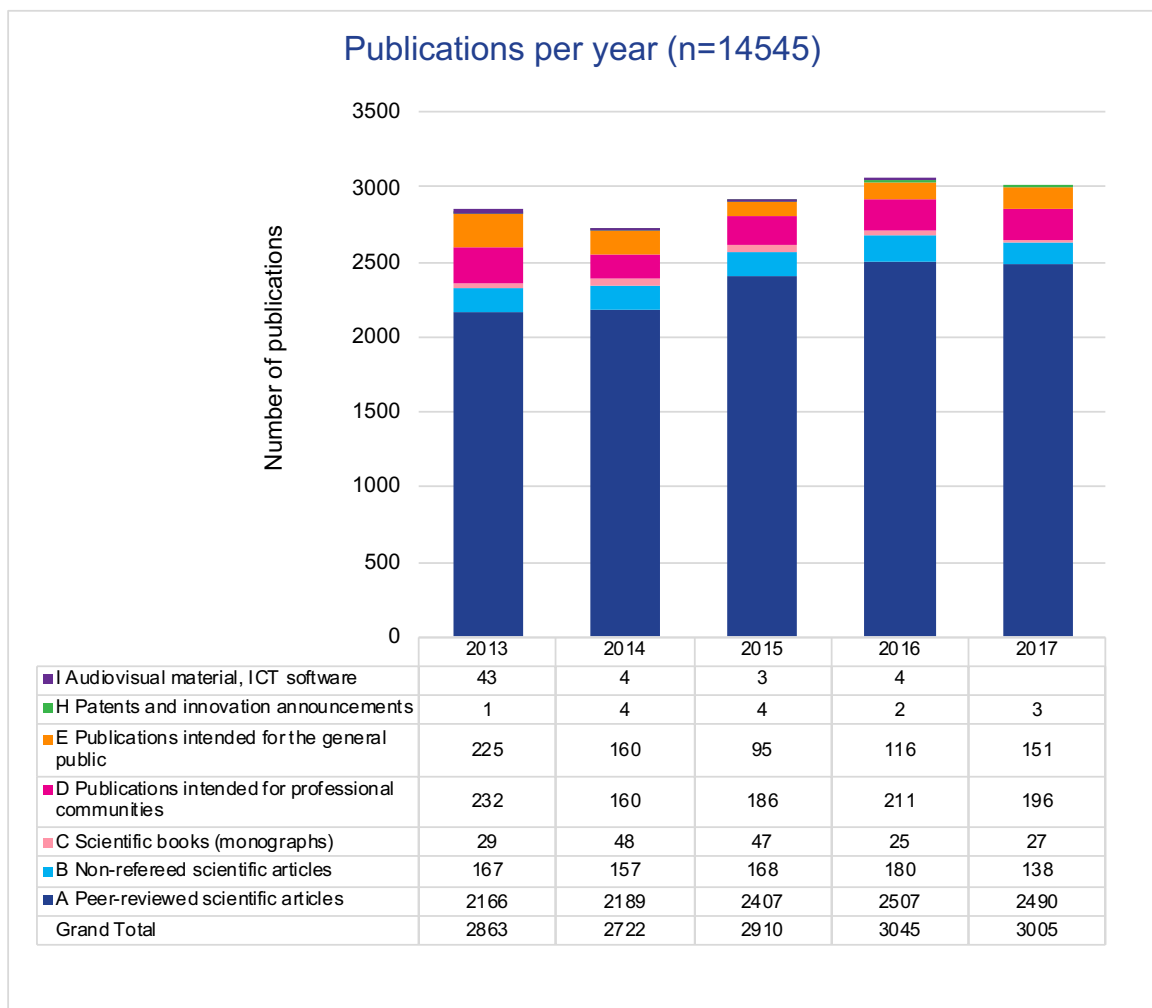


Figure 1. All publications of the university from the years 2013-2017 in MinEdu publication categories A-I (excluding categories: F Public artistic and design activities, and G Theses).

A total of 14,545 publications were published at University of Oulu during the 2013-2017. The number of publications increased by 5 percent in the period and in particular the number of peer-reviewed scientific articles was higher in the last three years than in the first years.

There were also more publications aimed at the general public and professional communities in 2013 than in other years. However, based on the publication data, there is no particular reason for this. The high number of publications of publication type I (audiovisual material, ICT software) in 2013 is due to several extensive radio series published that year.

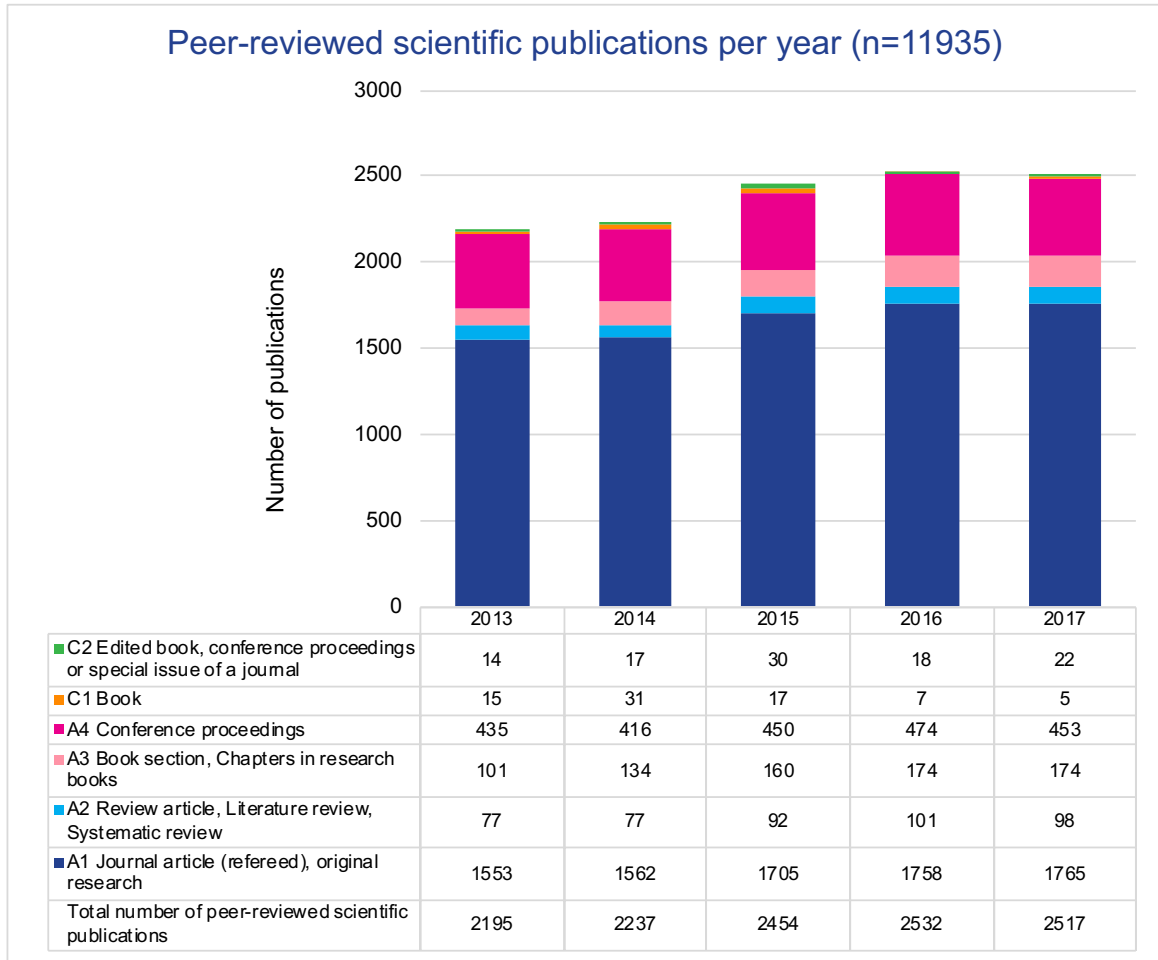


Figure 2. The number of peer-reviewed scientific publications per year and publication type (publication types A1-A4 and C1-C2).

A total of 11,935 peer-reviewed publications were published at the University of Oulu during 2013-2017, which is about 82 percent of all publications over the period.

As mentioned earlier, the number of peer-reviewed scientific articles (MinEdu publication type A) increased during the period, being as much as 15 percent higher at the end of the period. The growth can be seen in the number of original research articles and review articles in journals, but also in the number of book sections.

The number of monographs, on the other hand, clearly decreased during the period: at its highest in 2014, 31 monographs were published, but in 2016 and 2017, only 7 and 5 were published. A similar decline can also be seen at the national level on the basis of the Vipunen statistical service (<https://vipunen.fi/en-gb/university/Pages/Julkaisut.aspx>), as the total number of C1 publications in Finnish universities in 2017 was almost 30 percent lower than in 2013.

Quality of publication channels

The method for studying the quality of publication channels is described in [chapter 1.3.2](#).

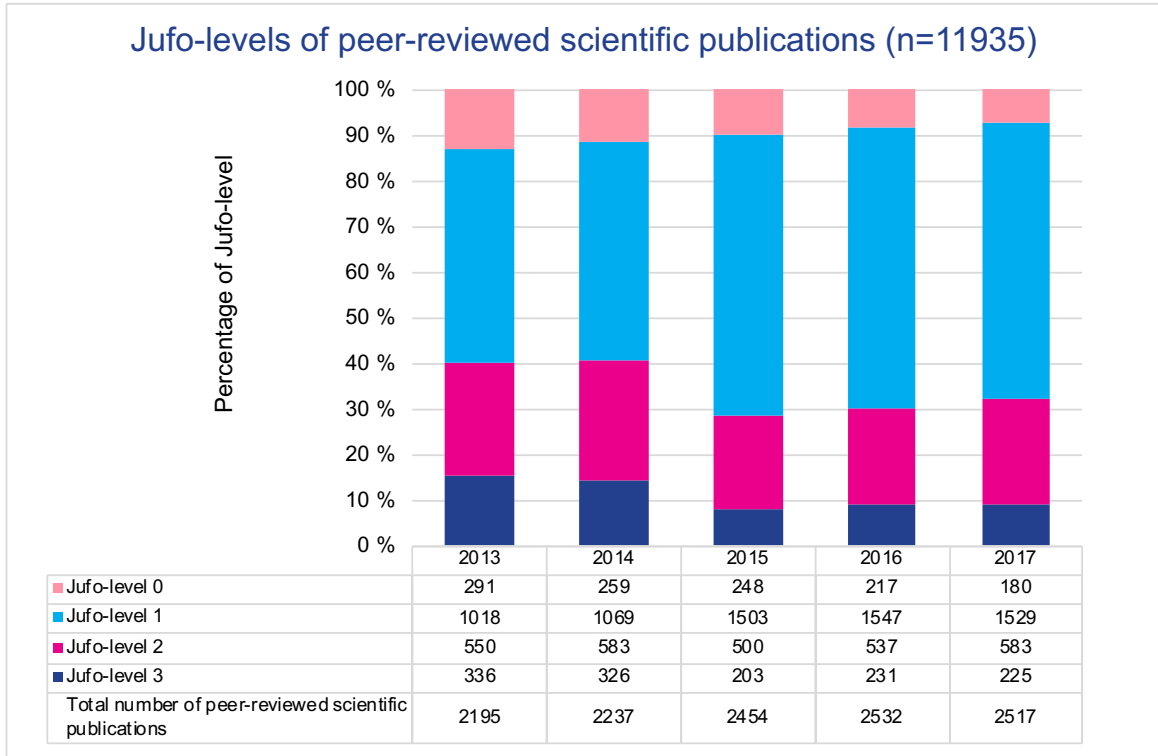


Figure 3. The percentage distribution of peer-reviewed scientific publications in levels of the Publication Forum (publication types A1-A4 and C1-C2).

When examining the quality of publication channels, there is a significant decrease in the number and share of JUFO level 0 publication channels, with the annual share falling from more than 12 percent to about 7 percent during the period under review.

Looking at the share of the highest levels of JUFO level 2 and JUFO level 3, a clear decline can be observed in 2015. This is at least partly due to the change in the calculation method of the Publication Forum in 2015, which is explained in [chapter 1.3.2](#). In 2017, the number of JUFO level 2 publication channels rose to the same level as in the early years. However, the share of JUFO level 3 publications remained slightly below 10 percent over the last three years.

Types of collaboration in the publications

The method for studying collaboration and the instructions for interpreting the figures are described in [chapter 1.3.3](#).

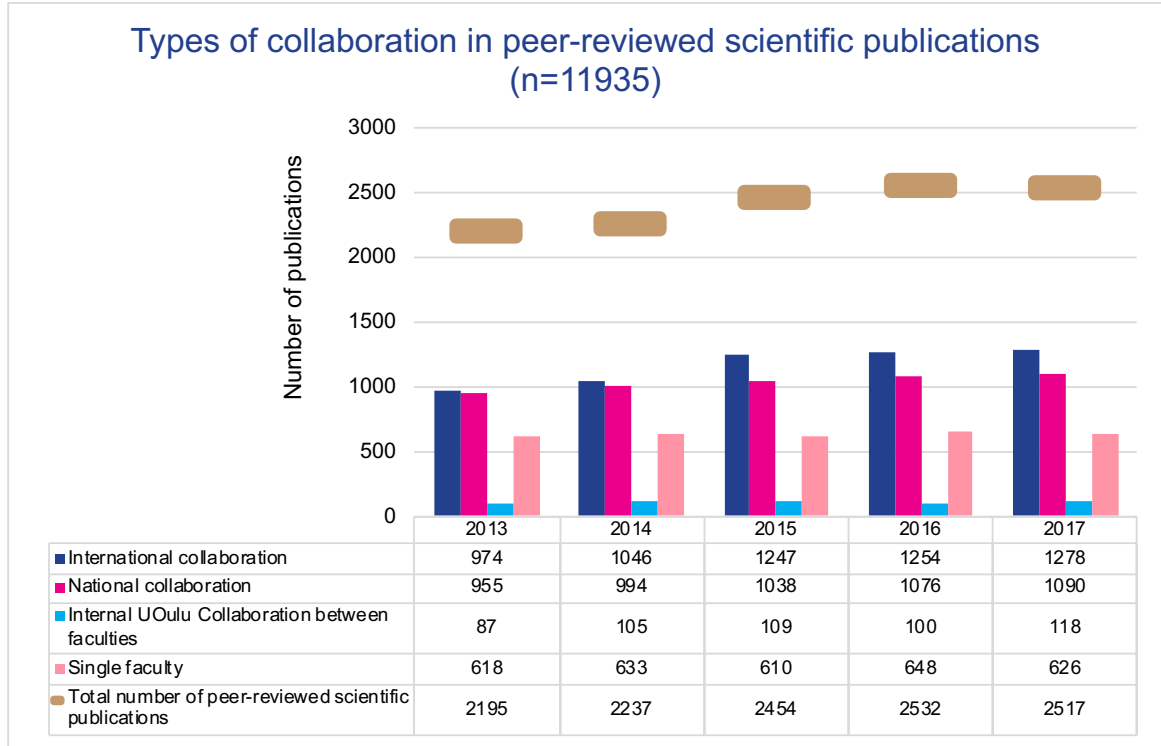


Figure 4. Distribution of peer-reviewed scientific publications into different collaboration types.

On average, there was international collaboration in 49 percent of the publications, while national collaboration accounted for an average of 43 percent. The smallest proportions were for the Single Faculty type of collaboration, averaging 26 percent of the publications, and the Internal UOulu collaboration between faculties averaging 4 percent of the publications.

Publications involving international collaboration rose most clearly in from a share of 44 percent in 2013 to a share of 51 percent in 2017. Otherwise, there were no clear trends in the share of different forms of collaboration, as the shares varied from year to year or the differences between the years were small.

Language of the publications

The method for studying the language of the publications is described in [chapter 1.3.4](#). The university-level analysis focuses on the distribution of different languages of publications, while the faculty-level analyses also look at languages of the publications seeking a temporal trend.

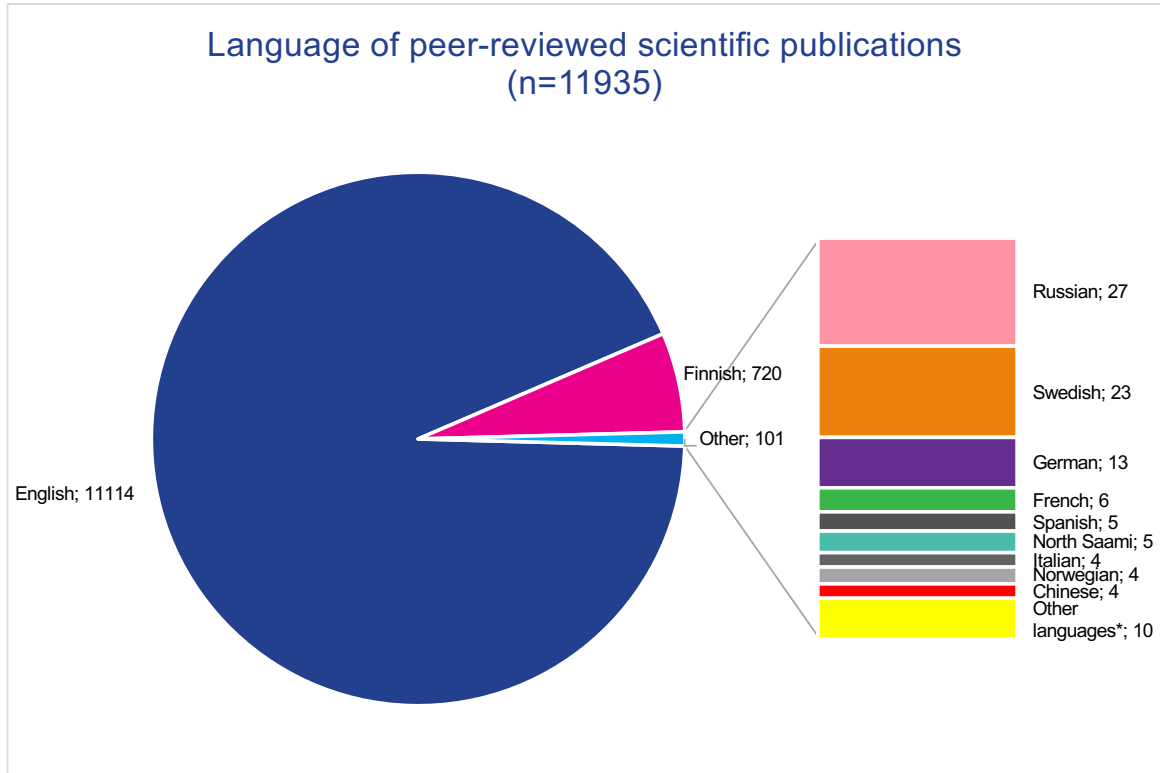


Figure 5. Percentage distribution of the languages of peer-reviewed scientific publications. * Other languages: Estonian 3 publications, Japanese 2 publications, Slovak, Portuguese, Polish, Romanian, and Karelian one publication each.

In the peer-reviewed scientific publications of the University of Oulu, the emphasis is on English-language publications, which account for a total of 93 percent of all peer-reviewed publications. Publications in Finnish account for 6 percent, while other languages account for less than 1 percent.

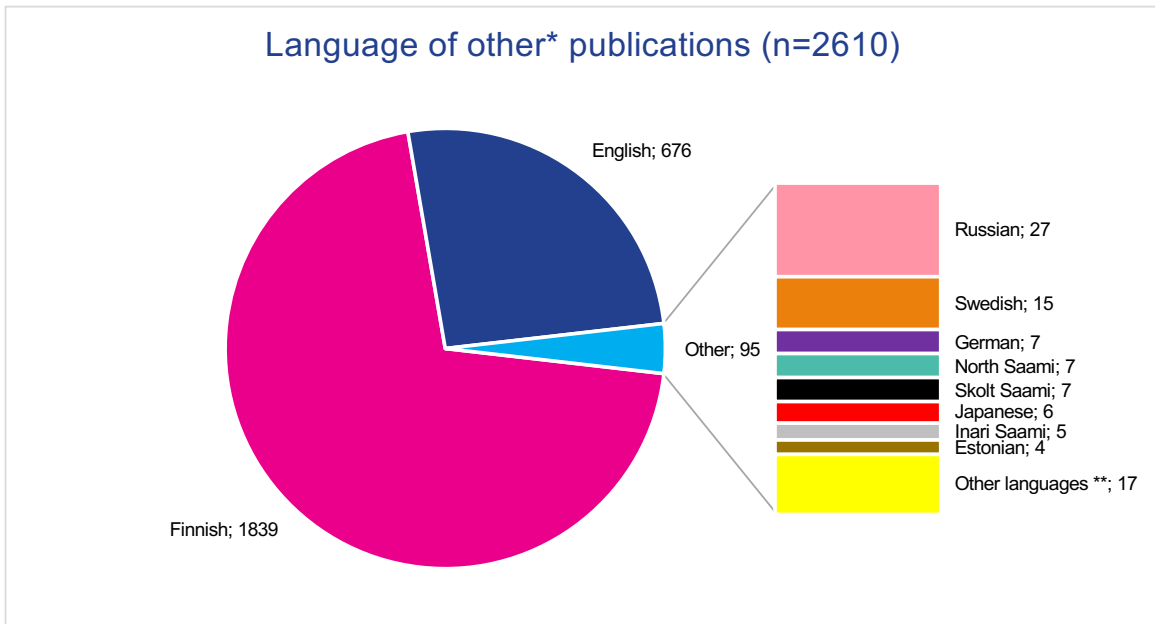


Figure 6. Percentage distribution of the languages of other publications. * Other publications include types: B Non-refereed scientific articles, D Publications intended for professional communities, E Publications intended for the general public and I Audiovisual material, ICT software. ** Other languages: Chinese, Hungarian, Spanish, and Italian (two publications each). Lithuanian, French, Ukrainian, Portuguese, Norwegian, Polish, Veps, Karelian, and Danish (one publication each).

In other than peer-reviewed publications, Finnish was the dominant language with a share of 71 percent, while English accounted for 26 percent. As a third language, Russian exceeded 1 percent, while other languages accounted for less.



2.2 Faculty-level analyses

2.2.1 Faculty of Biochemistry and Molecular Medicine (FBMM)

The Faculty of Biochemistry and Molecular Medicine (hereafter FBMM) performs internationally significant research and delivers high-level undergraduate and post-graduate education in the fields of biochemistry and molecular medicine, and provides infrastructure and other expertise to local, national, and international scientific communities and to entrepreneurs in Finland and abroad. The faculty's research focus areas are: 1) cell-extracellular matrix interactions, fibrosis, and hypoxia, 2) protein and structural biology and drug development, and 3) cellular regulatory and metabolic networks and associated diseases. At the end of 2020, the faculty had about 130 employees.

The analysis is based on the publications of the three current research units of the faculty and their predecessors in the years 2013-2017. These three research units are a) Disease Networks, b) ECM and Hypoxia and c) Protein and Structural Biology.

Production of publications

The method for studying publication trends is described in [chapter 1.3.1](#).

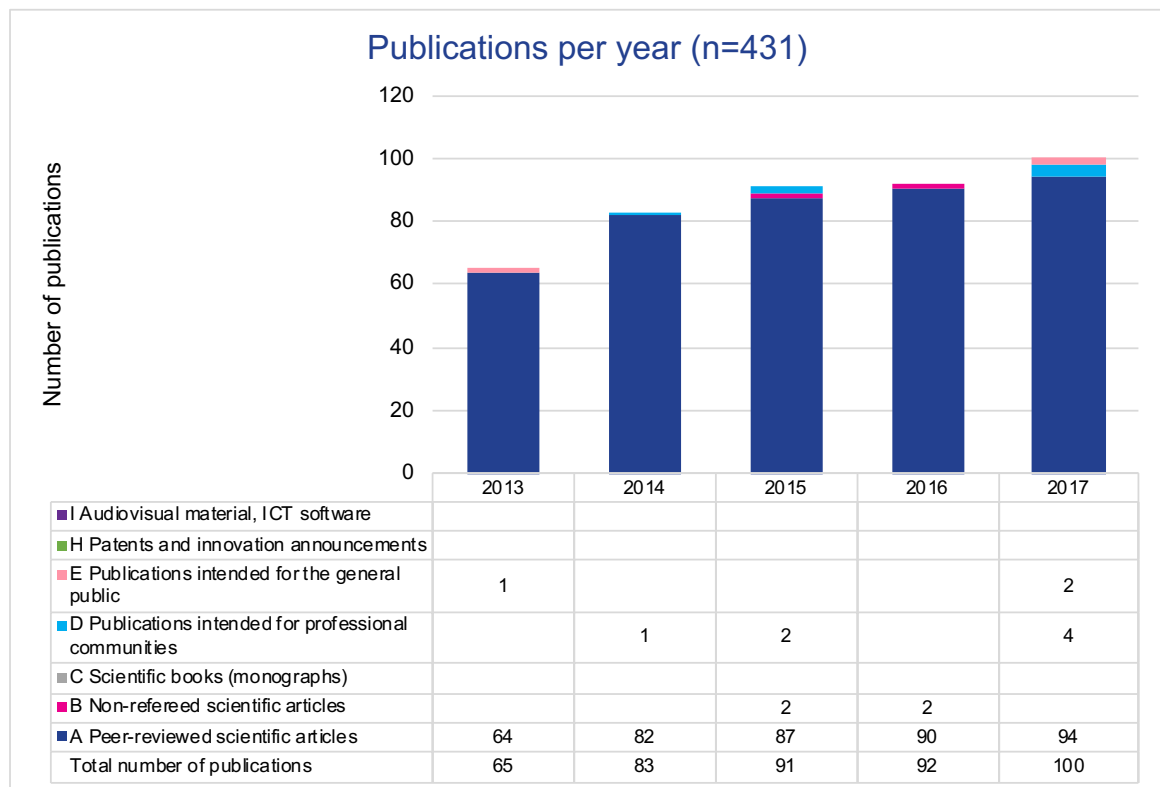


Figure 7. All publications of the FBMM from the years 2013-2017 in MinEdu publication categories A-I (excluding categories: F Public artistic and design activities, and G Theses).

The FBMM publishing activities have focused almost entirely on peer-reviewed scientific articles during the period, as only about 3 percent of the publications during the entire period are of any other type of publication.

The annual number of publications increased by 54 percent over the period and was particularly strong in 2014, when the number of publications increased by almost 28 percent from the previous year.

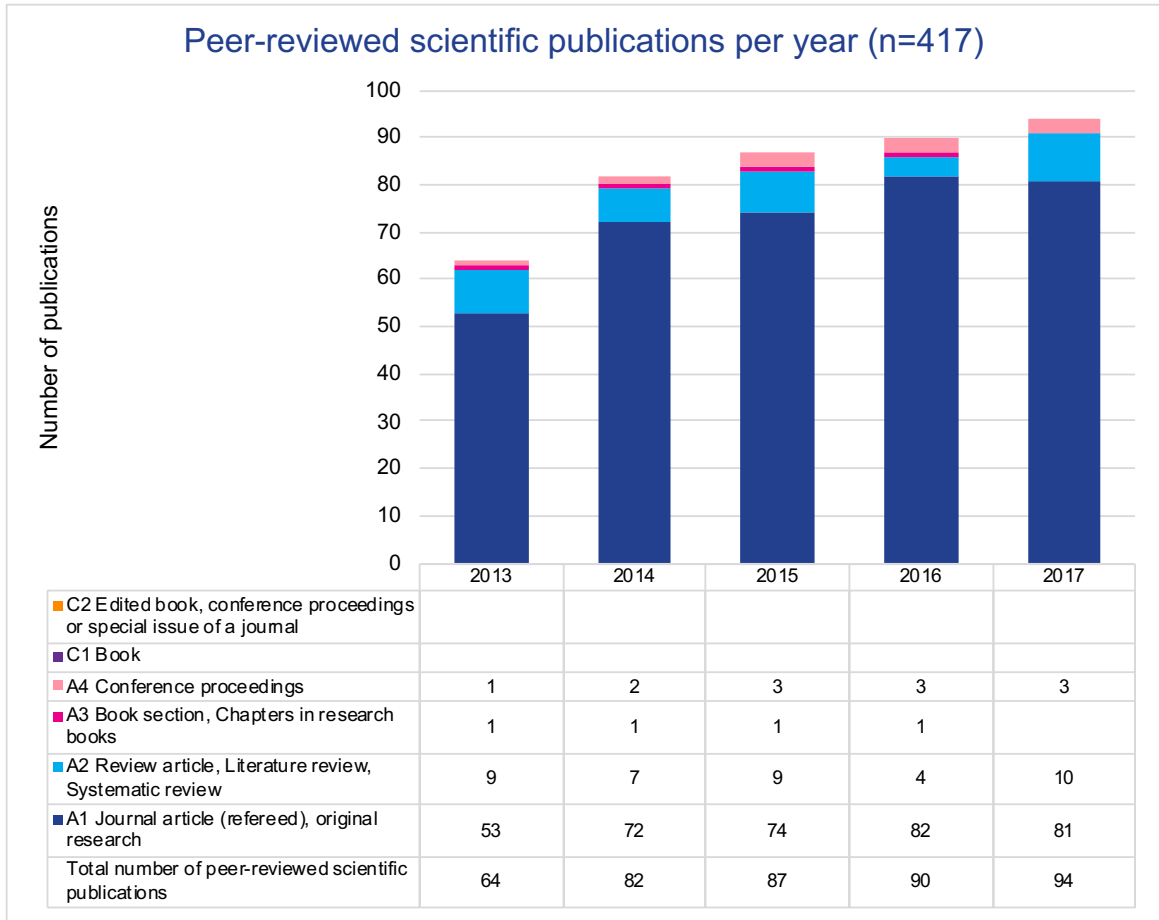


Figure 8. The number of peer-reviewed scientific publications by FBMM per year and the publication type (publication types A1-A4 and C1-C2).

The number of peer-reviewed scientific publications by FBMM focuses on the original research articles in journals, but the proportion of review articles is also significant, accounting for about 9 percent of all peer-reviewed scientific publications during the period.

Additionally, for peer-reviewed publications, the largest increase in the number of publications took place in 2014, when there were more than 28 percent more peer-reviewed publications than in the previous year.

Quality of publication channels

The method for studying the quality of the publication channels is described in [chapter 1.3.2](#).

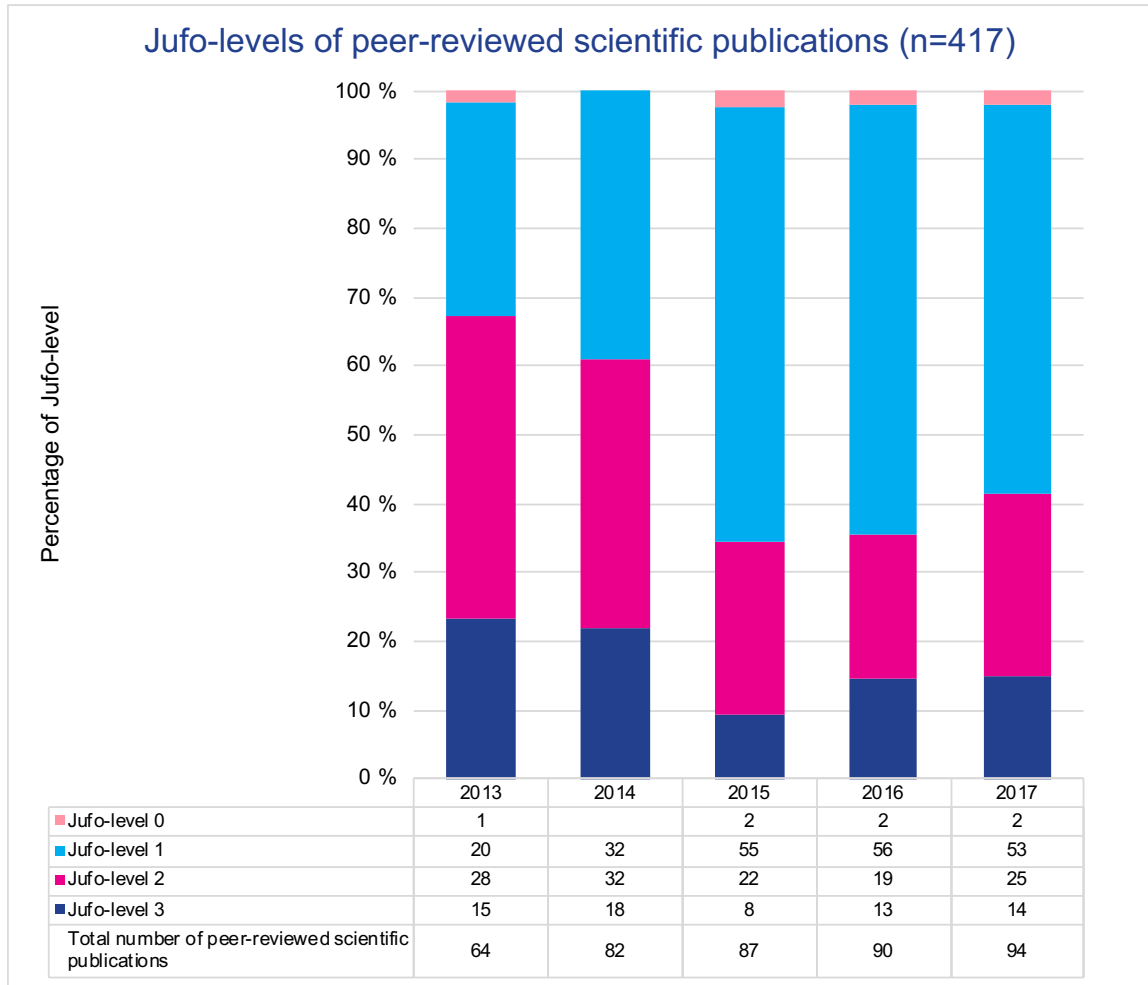


Figure 9. The percentage distribution of peer-reviewed scientific publications by FBMM in terms of the Publication Forum (JUFO) levels (publication types A1-A4 and C1-C2).

As in the analysis describing the entire university, the share of Publication Forum (JUFO) levels 2 and 3 in the publications produced by FBMM clearly decreased in 2015. This decrease is likely to be explained, at least in part, by the Publication Forum changing the calculation of the level categories to a volume based approach. The change in the calculation method is described in more detail in [chapter 1.3.2](#). This is partly demonstrated by the fact that the JUFO level of the two most used journal channels of the faculty was dropped from level 2 to level 1 in 2015. These journals are PLoS One and the Journal of Biological Chemistry.

Another clear observation is the low number of publications published on level 0 publication channels during the period, with these accounting for less than 2% of all peer-reviewed publications.

Types of collaboration in the publications

The method for studying collaboration and instructions for interpreting the figures are described in [chapter 1.3.3](#).

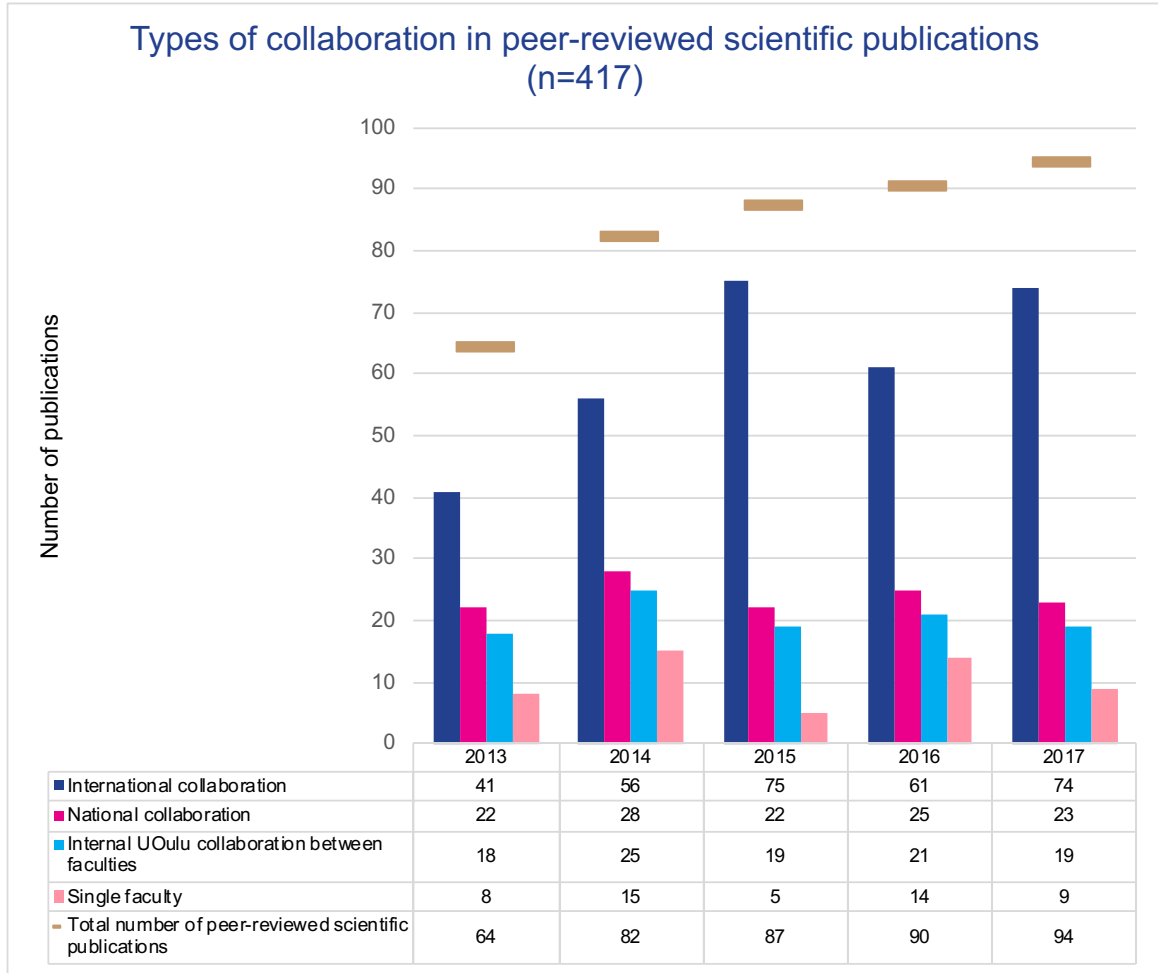


Figure 10. Distribution of peer-reviewed scientific publications by FBMM into different collaboration types.

International collaboration is the most common form of collaboration in the FBMM, as about 74 percent of all peer-reviewed publications were produced as a form of international collaboration.

Compared to many other faculties at the University of Oulu, collaboration with other faculties is also exceptionally high in the FBMM, as about 24% of the publications were produced in collaboration with other UOulu faculties. This is largely explained by joint publications with research groups of the Faculty of Medicine, but also by collaboration with the research units of the Faculty of Information Technology and Electrical Engineering.

Due to the relatively small number of publications per year, the proportions of the different forms of collaboration vary greatly from year to year. However, the figures show an increase in the share of international collaboration as well as a slight decrease in both national collaboration and internal collaboration between faculties.

Language of the publications

The method for studying the language of the publications is described in [chapter 1.3.4](#).

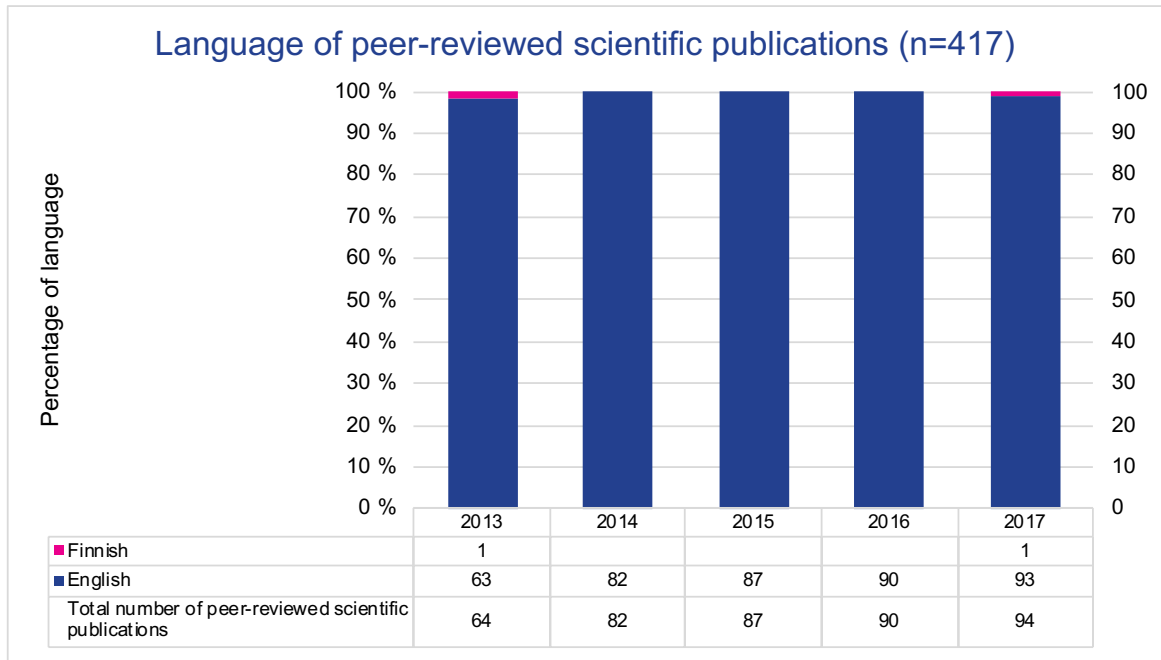


Figure 11. The percentage distribution of the languages of peer-reviewed scientific publications of the FBMM.

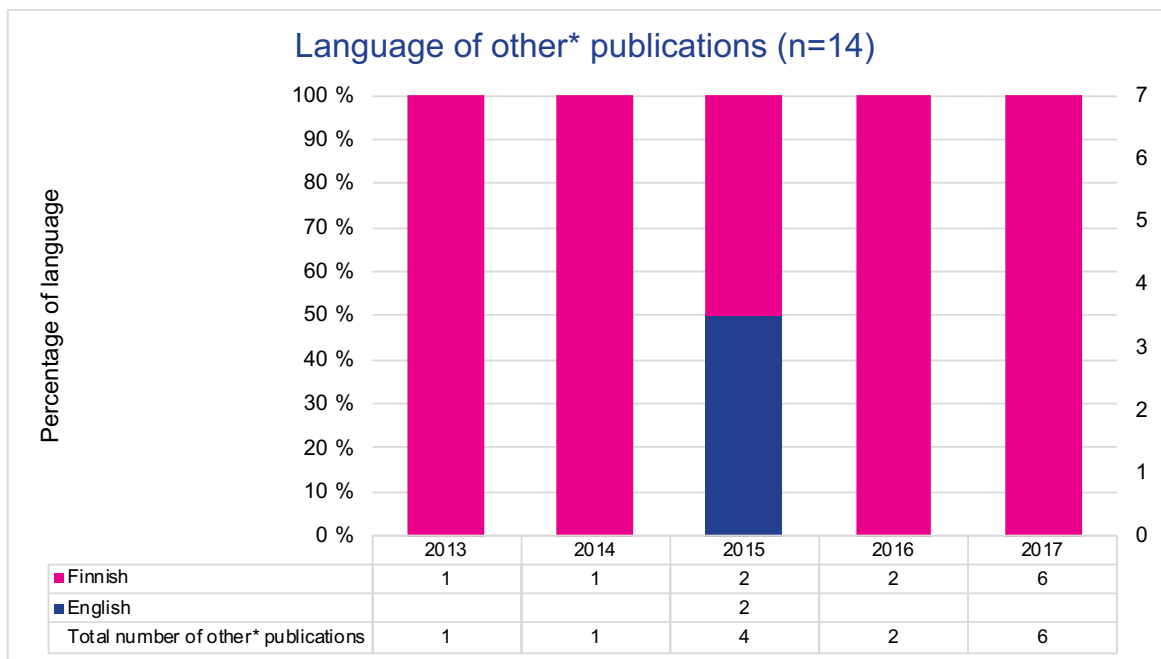


Figure 12. The percentage distribution of the languages of other publications of the FBMM. * Other publications include types: B Non-refereed scientific articles, D Publications intended for professional communities, E Publications intended for the general public and I Audiovisual material, ICT software.

Peer-reviewed scientific publications were almost without exception published in English by the FBMM. The number of other types of publication is small and they were usually published in Finnish.

2.2.2 Faculty of Education

Multidisciplinary research at the Faculty of Education (hereafter FEdu) concerns learning and learning processes, the use of advanced technology in education, teachers, teaching and educational communities, as well as the values, ideologies, and societal contexts of education. The FEdu develops teacher training, multidisciplinary master's programmes and continuous learning based on high-level research. At the end of the year 2020 the faculty had about 160 employees.

The analysis is based on the publications of the three current research units of the faculty and their predecessors from 2013-2017. These three research units are a) Learning and Learning Process, b) Teachers, Teaching and Educational Communities and c) Values, Ideologies and Social Contexts of Education.

Production of publications

The method for studying publication trends is described in [chapter 1.3.1](#).

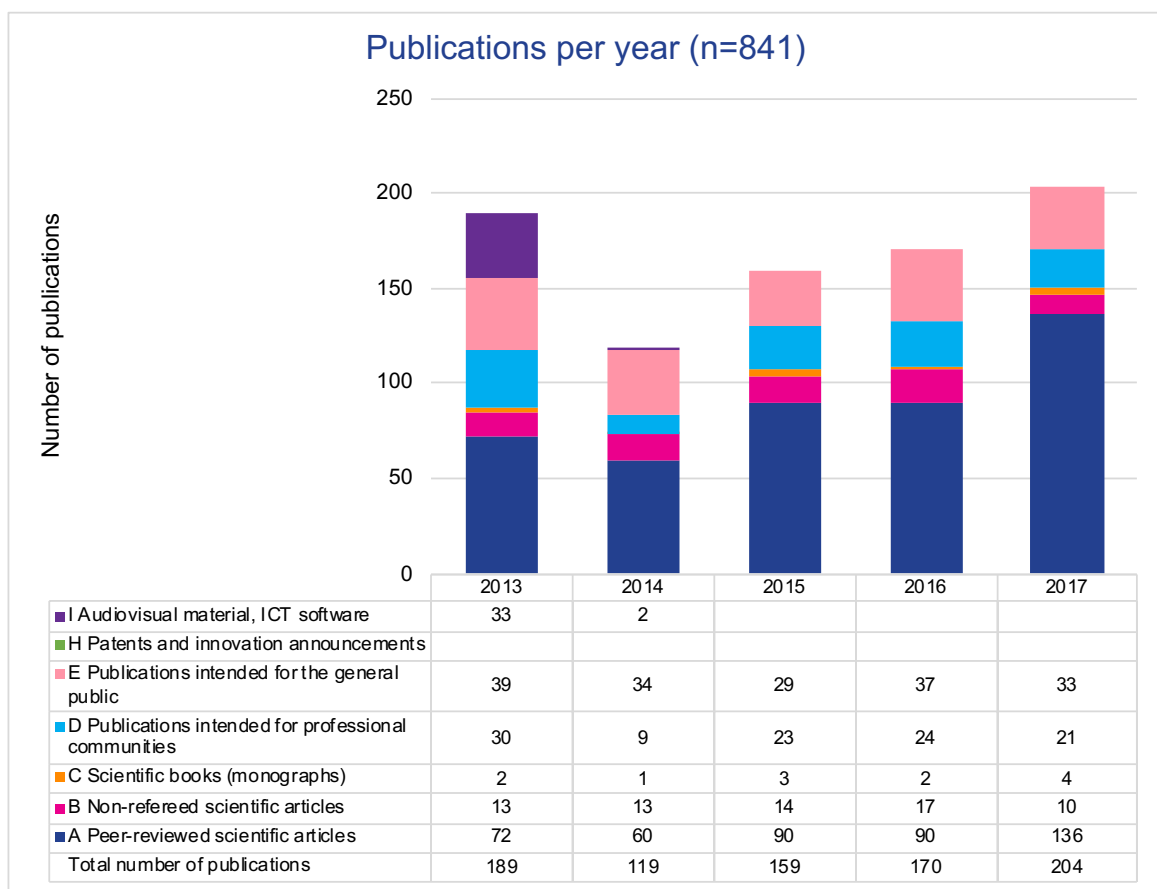


Figure 13. All publications of the FEdu from the years 2013-2017 in MinEdu publication categories A-I (excluding categories: F Public artistic and design activities, and G Theses).

In the case of the FEdu, the publications were clearly divided into almost all the different MinEdu publication categories and as many as 37 percent of all publications were aimed at professional communities or the general public (MinEdu categories D, E and I). This is typical of the fields of social sciences and humanities (SSH) and demonstrates the direct impact of research and education on society.

In terms of the trend in publication volumes, the total number of publications decreased by 37 percent after the first year of review. Since then, the publication volumes rose steadily each year. The increase in the number of publications was mainly based on the increase in the number of peer-reviewed scientific articles, which were approximately 89 percent higher in 2017 than in 2013.

As an individual observation, the analysis shows an exceptionally large number of publications of publication type I (Audiovisual material, ICT software) in 2013. Based on the data, this finding is explained by the publishing of several large radio series in that year.

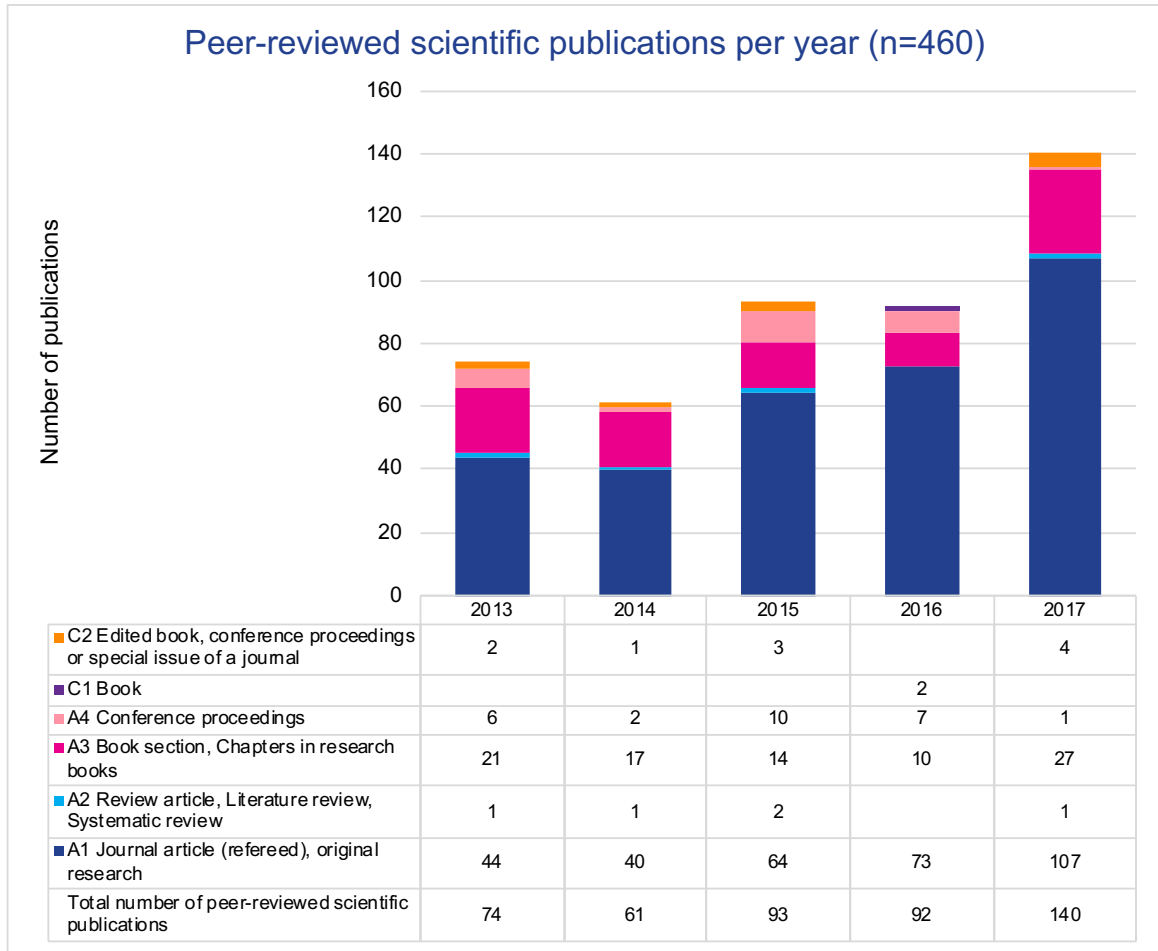


Figure 14. The number of peer-reviewed scientific publications by the FEdu per year and the publication type (publication types A1-A4 and C1-C2).

As noted in Figure 13, the number of peer-reviewed publications clearly increased during the period considered. This increase is mainly explained by the increase in the number of journal articles (publication type A1), which in 2017 was about 168 percent higher than in 2014. The increase was particularly high for the last year of the review period.

In addition to journal articles, the role of book chapters (type A3) is also significant in the faculty: for the entire period under review, 19 percent of the peer-reviewed publications were book chapters.

Quality of publication channels

The method for studying the quality of publication channels is described in [chapter 1.3.2](#).

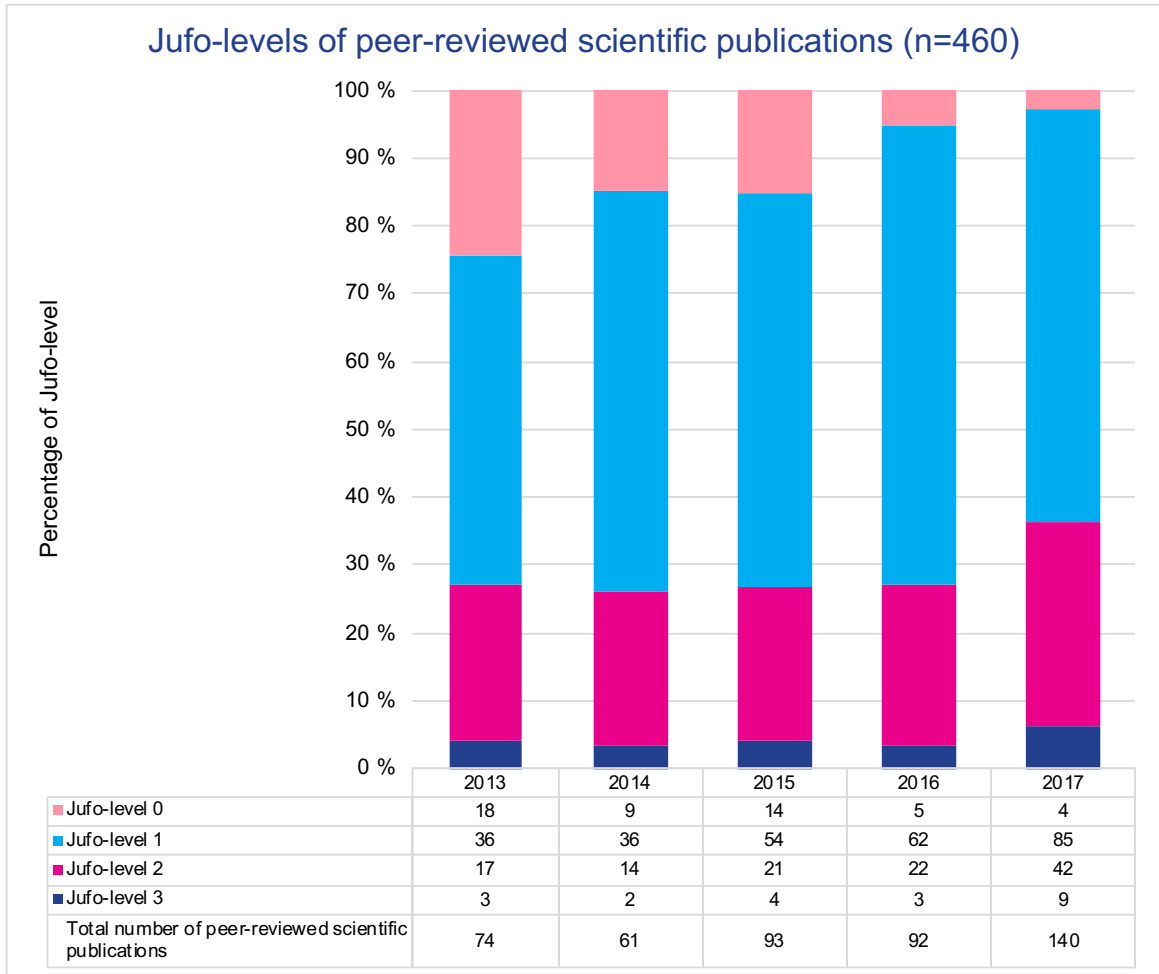


Figure 15. The percentage distribution of peer-reviewed scientific publications of the FEdu in terms of Publication Forum (JUFO) levels (publication types A1-A4 and C1-C2).

When examining the JUFO levels of the publications by the FEdu, special attention should be paid to the 2017 JUFO levels. At that time, the number of publications was clearly higher than in previous years, but in addition to this, the difference is particularly evident in the increase in the share of the higher JUFO levels 2 and 3.

On the other hand, it should be noted that the share of JUFO level 0 publications decreased throughout the period: especially during 2016 and 2017. The share of publications at level 0 peaked at 24 percent in 2013, but in 2017 the share was only about 3 percent.

Types of collaboration in the publications

The method for studying collaboration and instructions for interpreting the figures are described in [chapter 1.3.3](#).

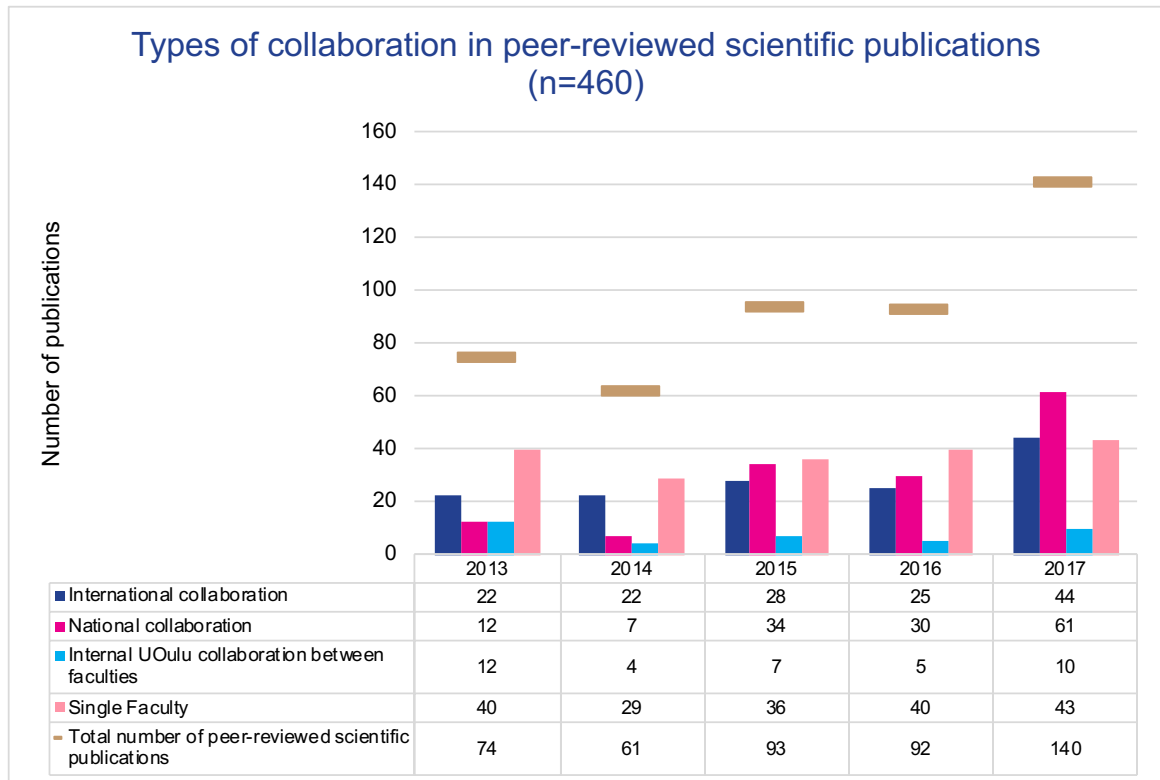


Figure 16. Distribution of peer-reviewed scientific publications of FEdu into different collaboration types.

In terms of different types of collaboration, a single faculty was the most significant type throughout the period, accounting for 41% of all peer-reviewed publications.

However, the volume and share of national cooperation clearly increased in the period, with its share at its lowest in 2014 at around 11 percent, but in 2017 already at 44 percent. The largest increase in the share took place in 2015, after which it remained at a clearly higher level than in the first two years in the period.

There was no major trend in the share of international collaboration, ranging from 27% to 36% per year. In collaboration between faculties, the share decreased after 2013, when the share was 16 percent. Since 2014, the share has remained between 5-8 percent.

The significant increase in the number of publications in 2017 can also be observed due to the increase in the number of collaborative publications: at that time, the number of publications involving all other types of collaboration increased from the previous year, but the single faculty publications remained roughly at the previous year's level.

Language of the publications

The method for studying the language of the publications is described in [chapter 1.3.4](#).

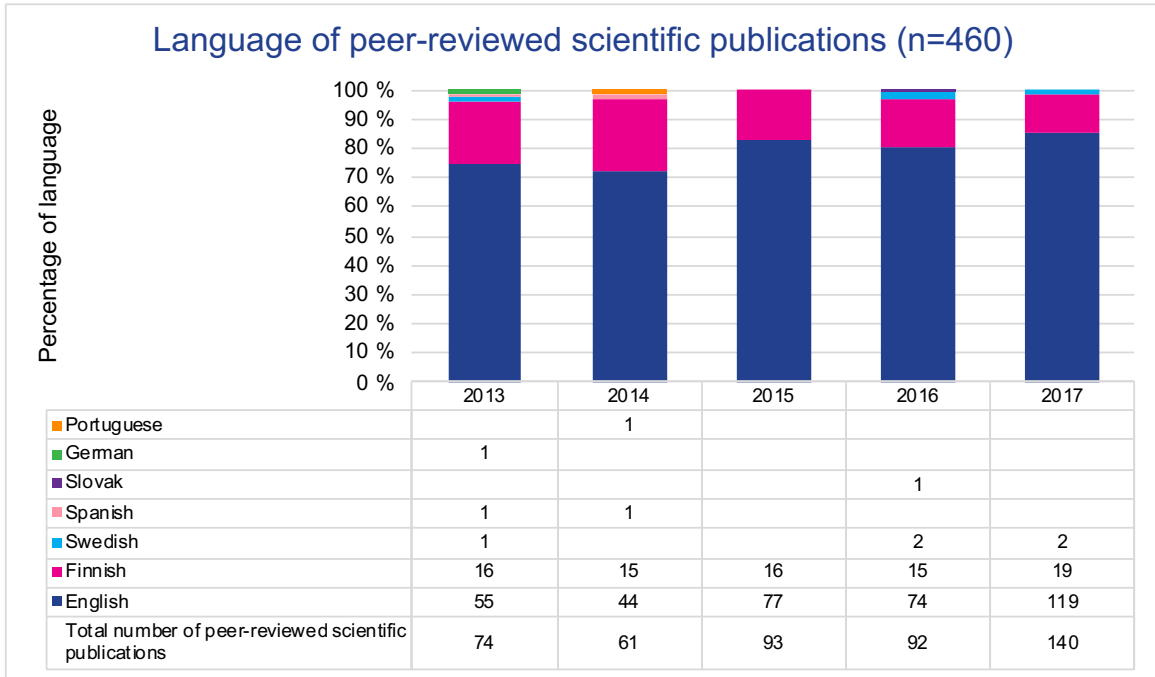


Figure 17. The percentage distribution of the languages of peer-reviewed scientific publications of the FEdu.

In the FEdu, English was the predominant language of publication for peer-reviewed publications, just as in the other faculties. However, the share of other languages was also significant, ranging from around 15-25% per year. Of the other languages, Finnish was the most significant, accounting for 18 per cent of all peer-reviewed scientific publications.

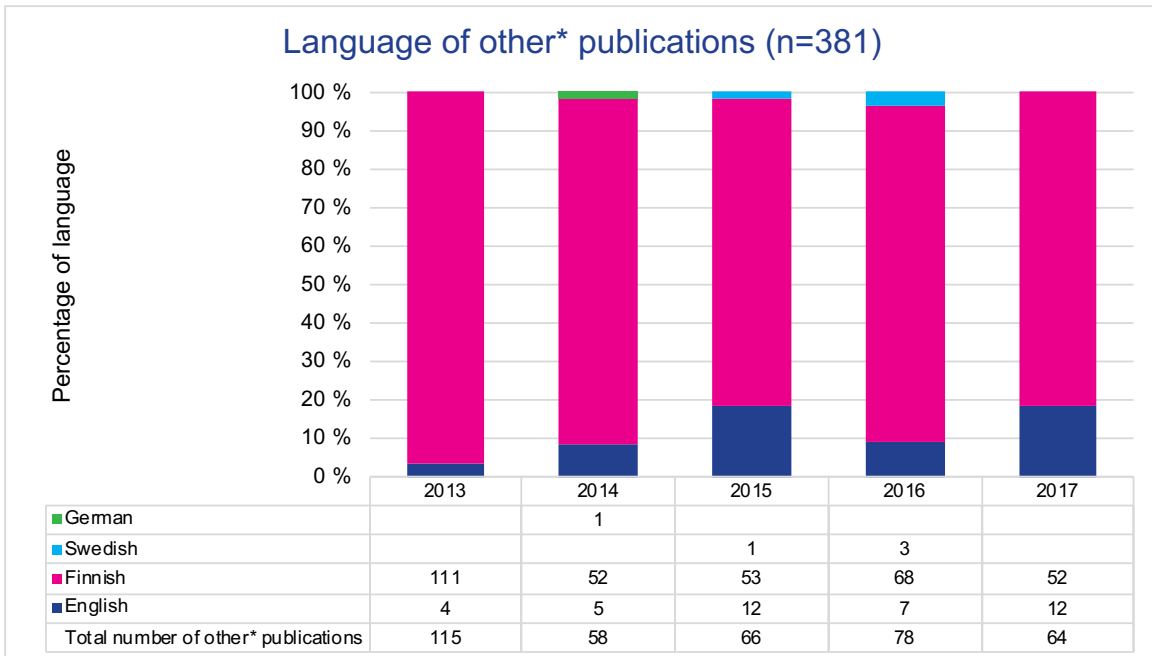


Figure 18. The percentage distribution of the languages of other publications of the FEdu. * Other publications include types: B Non-refereed scientific articles, D Publications intended for professional communities, E Publications intended for the general public and I Audiovisual material, ICT software.

Regarding non-peer-reviewed publications, Finnish was the main language of other publications with a total share of 88 percent. The share of English was also significant, accounting for more than 10 percent of the other publications.

2.2.3 Faculty of Humanities

The Faculty of Humanities (hereafter FHum) represents a wide range of disciplines (e.g., history, archeology, cultural anthropology, languages and literature, information studies, logopedics, Saami studies). The research in this faculty is focused on people, their activities, and interactions – especially in northern Europe. Of all the university’s focus areas, especially the Understanding Humans in Change is connected to research conducted at the faculty. The cross-cutting theme in research is the Arctic. At the end of 2020 the faculty had about 170 employees.

The analysis is based on the publications of the four current research units of the faculty and their predecessors from 2013-2017. These four research units are a) Giellagas Institute, b) History, Culture and Communication Studies c) Languages and Literature, and d) Logopedics.

Production of publications

The method for studying publication trends is described in [chapter 1.3.1](#).

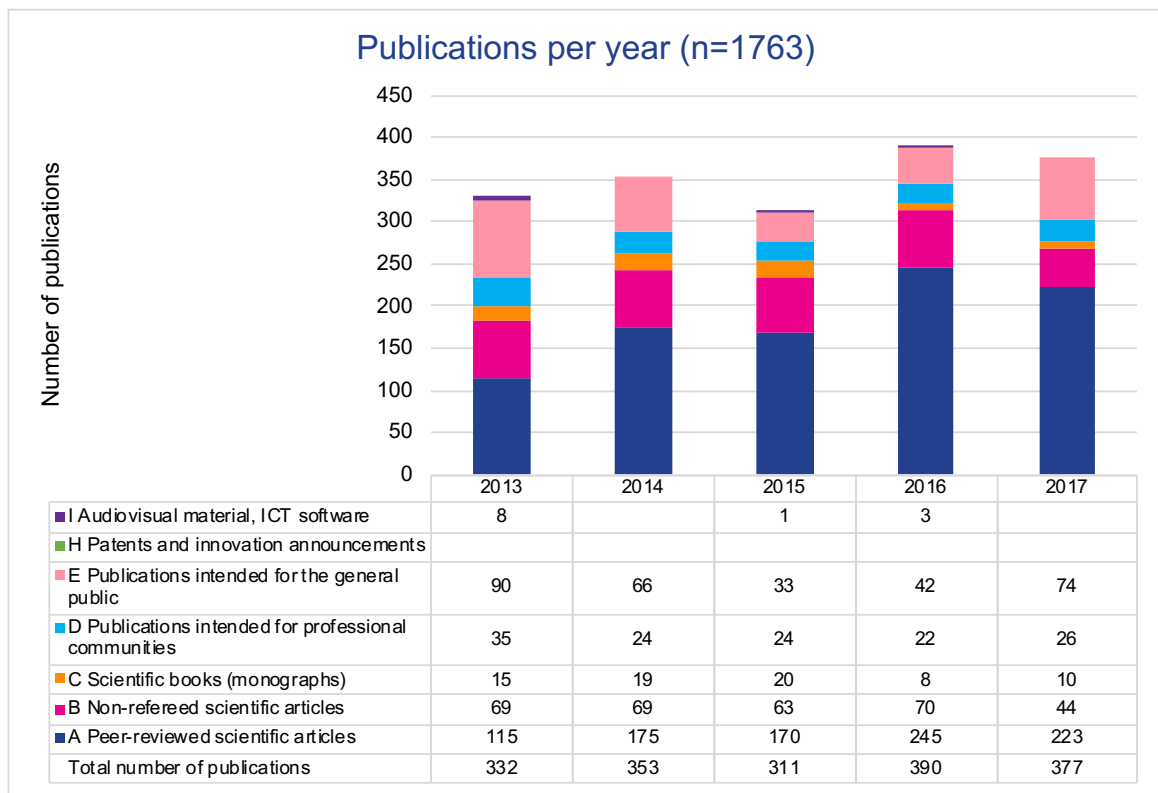


Figure 19. All publications of the FHum from the years 2013-2017 in MinEdu publication categories A-I (excluding categories: F Public artistic and design activities, and G Theses).

The analysis of the FHum shows the diverse use of publication types, which is typical to the fields of social sciences and humanities. Peer-reviewed scientific articles accounted for 53% of the all publications, but there were also a significant number of other types of publications. Of the other types, non-refereed scientific publications accounted for 18% and publications for the general public with 17% of all publications.

The number of publications increased in 2016 and 2017 compared to the first three years of the period. In particular, the number of peer-reviewed scientific articles increased and their share of all publications in 2016-2017 was about 60 percent. In 2013, peer-reviewed publications accounted for only 35 percent of all publications.

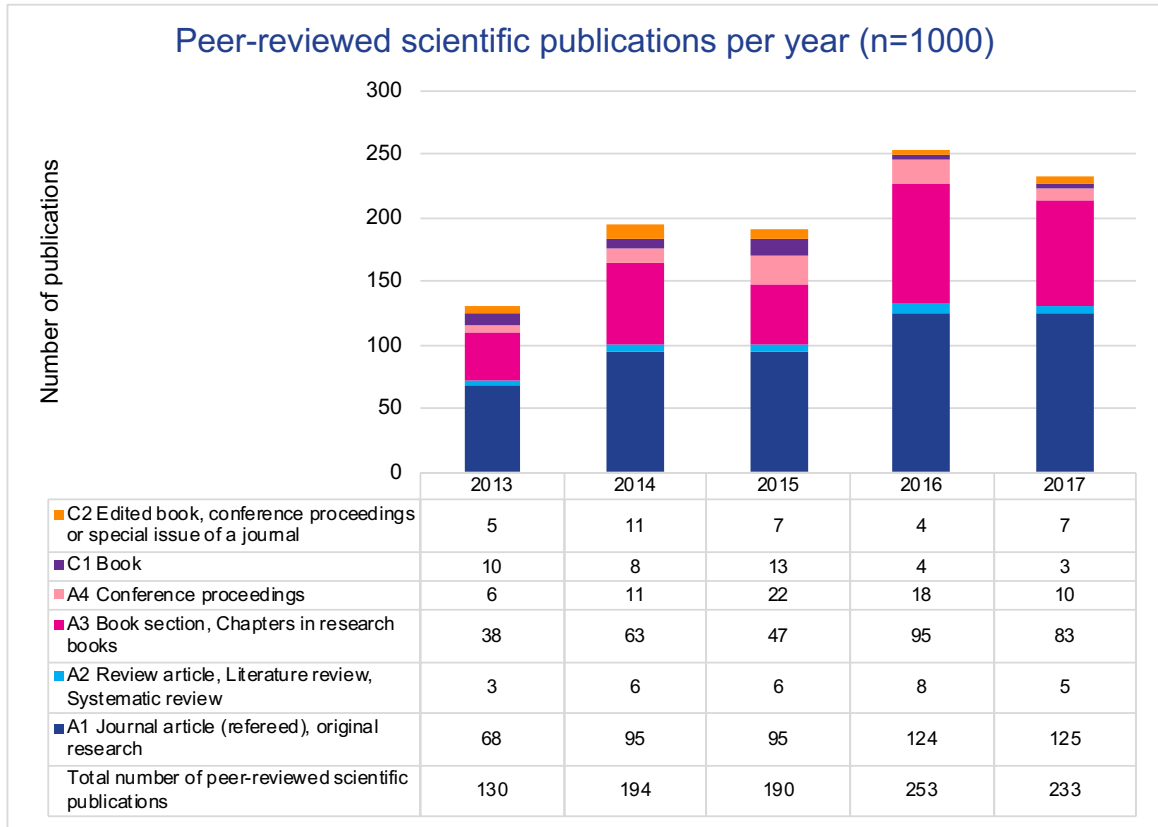


Figure 20. The number of peer-reviewed scientific publications of FHum per year and the publication type (publication types A1-A4 and C1-C2).

The increase in the number of peer-reviewed scientific publications at the FHum was significant throughout the period, although there were slightly fewer publications in 2017 than in the previous peak year of 2016. However, in 2017, FHum researchers published about 79 percent more peer-reviewed publications than in 2013.

There was growth especially in the number of book chapters, which accounted for 37 percent of all peer-reviewed publications in 2016-2017. For the years 2013-2015, the share was 29 percent. However, the share of journal articles for the whole period was the largest, ranging between 49 and 54 percent annually.

Quality of publication channels

The method for studying the quality of publication channels is described in [chapter 1.3.2](#).

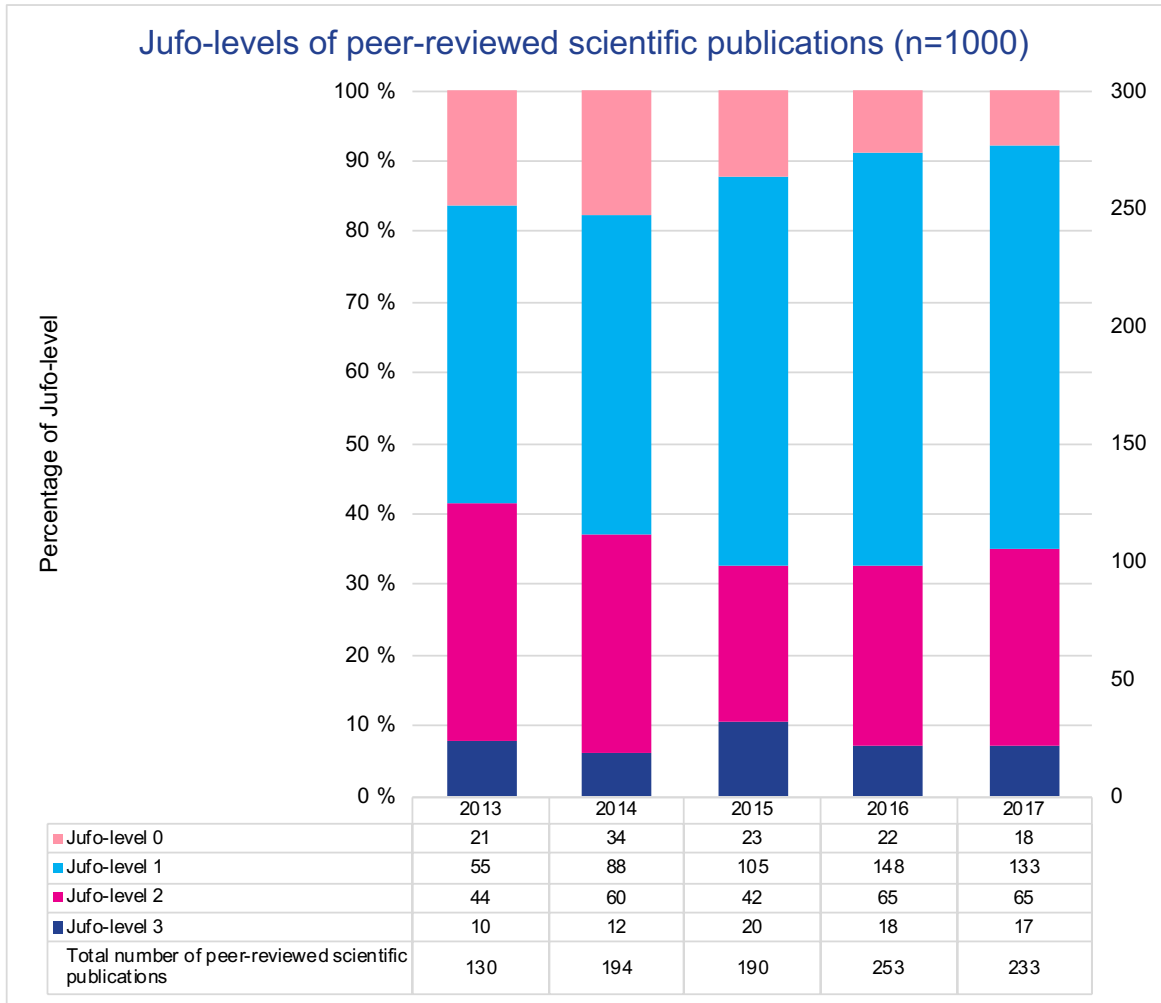


Figure 21. The percentage distribution of peer-reviewed scientific publications at the FHum and their Publication Forum (JUFO) levels (publication types A1-A4 and C1-C2).

For the FHum, two trends can be seen in the JUFO levels of the publication channels. First, the share of JUFO levels 2 and 3 decreased slightly over the period, being around 42 percent in 2013, but between around 32-35 per cent in the years 2015-2017. However, the lowest peak was already in 2015 and the share has risen slowly again since then.

An even clearer trend can be seen in the decline in the number of JUFO level 0 publications, with the share being about 16 percent in 2013, but less than 8 percent in 2017.

Types of collaboration in the publications

The method for studying collaboration and instructions for interpreting the figures are described in [chapter 1.3.3](#).

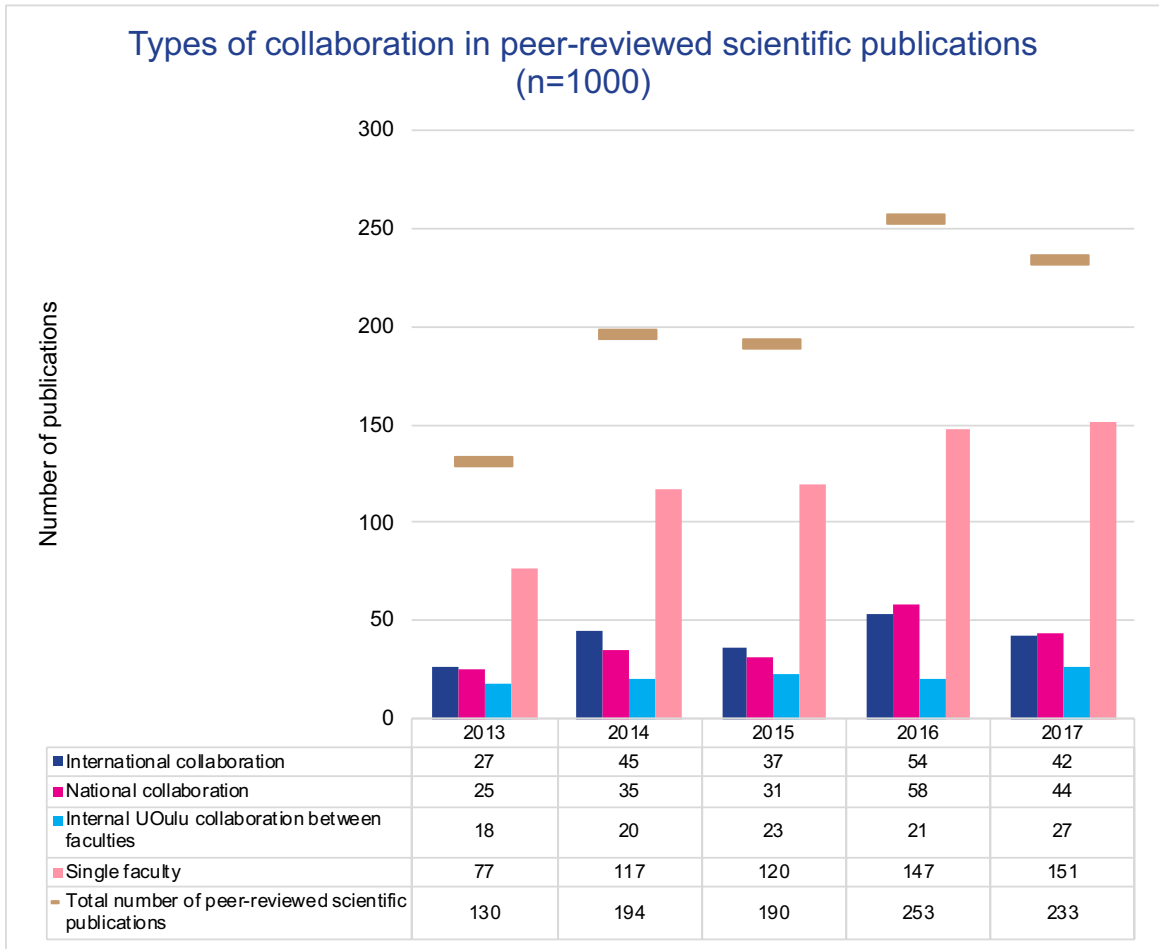


Figure 22. Distribution of peer-reviewed scientific publications of FHUm into different collaboration types.

Publications written alone or in collaboration within the faculty accounted for the most significant 61 percent of all peer-reviewed scientific publications. This is largely due to disciplinary practices and the publishing culture. For other types of collaboration, international collaboration was evident in 21 percent and national collaboration in 18 percent of the peer-reviewed publications. Collaboration with other faculties of the university was present in about 11 percent of the publications.

The increase in the number of publications cannot be fully explained by increased collaboration, as publications involving just a single faculty increased even more than publications involving international and national collaboration.

There was no identifiable trend in the distribution between the different types of collaboration, as the distributions varied between years.

Language of the publications

The method for studying the language of the publications is described in [chapter 1.3.4](#).

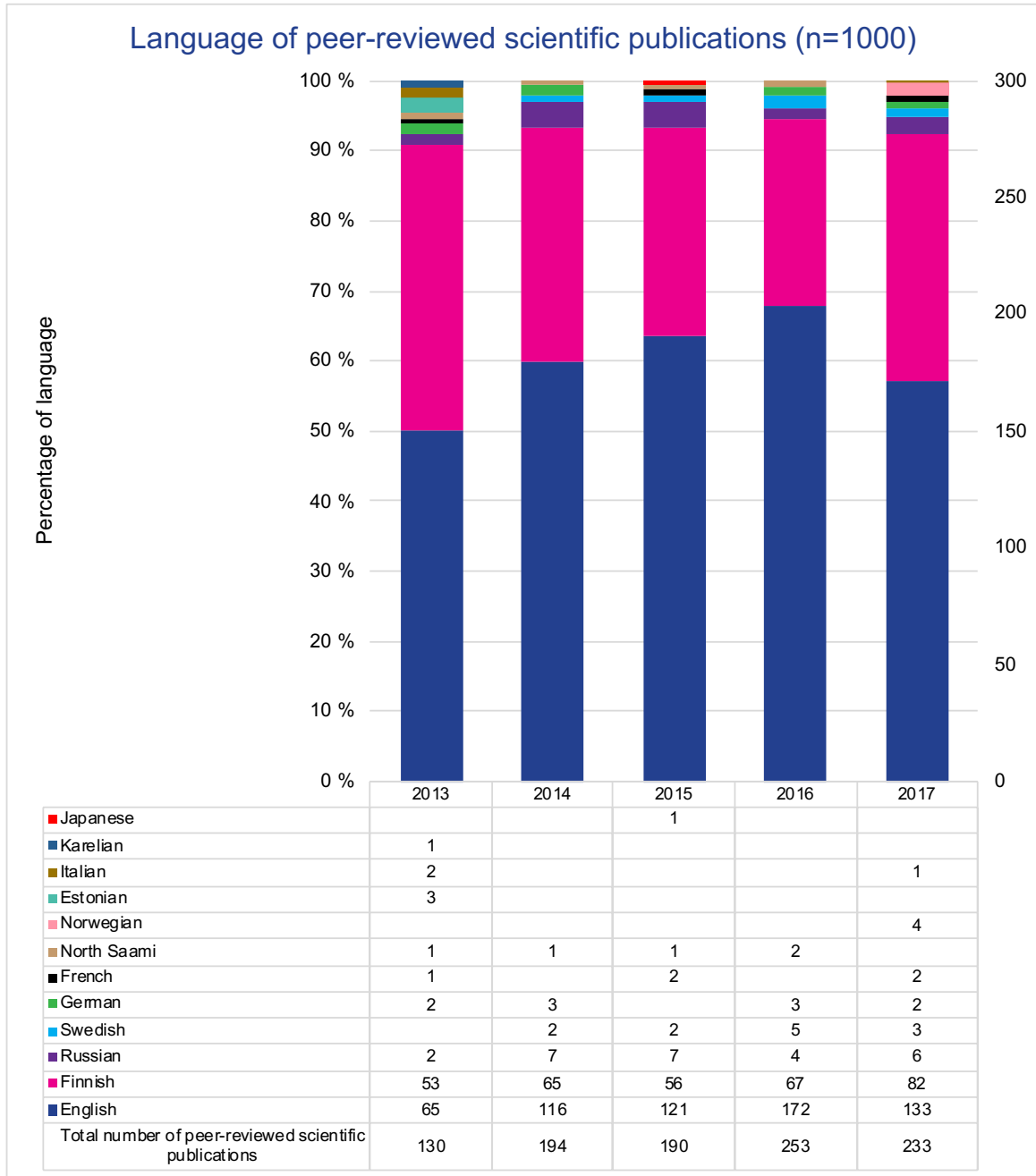


Figure 23. The percentage distribution of the languages of peer-reviewed scientific publications of the FHum.

Regarding the languages of the peer-reviewed publications, the FHum emphasized two languages, with English-language publications accounting for 61 percent and Finnish-language publications accounting for 32 percent of all peer-reviewed publications.

The share of English-language publications trend upward, rising from 50 per cent to 68 per cent between 2013 and 2016. For some reason, the share fell back to less than 60 percent in 2017.

Other languages were also abundant, with Russian being the most common of these, accounting for a total of 3 percent of the peer-reviewed publications for the faculty.

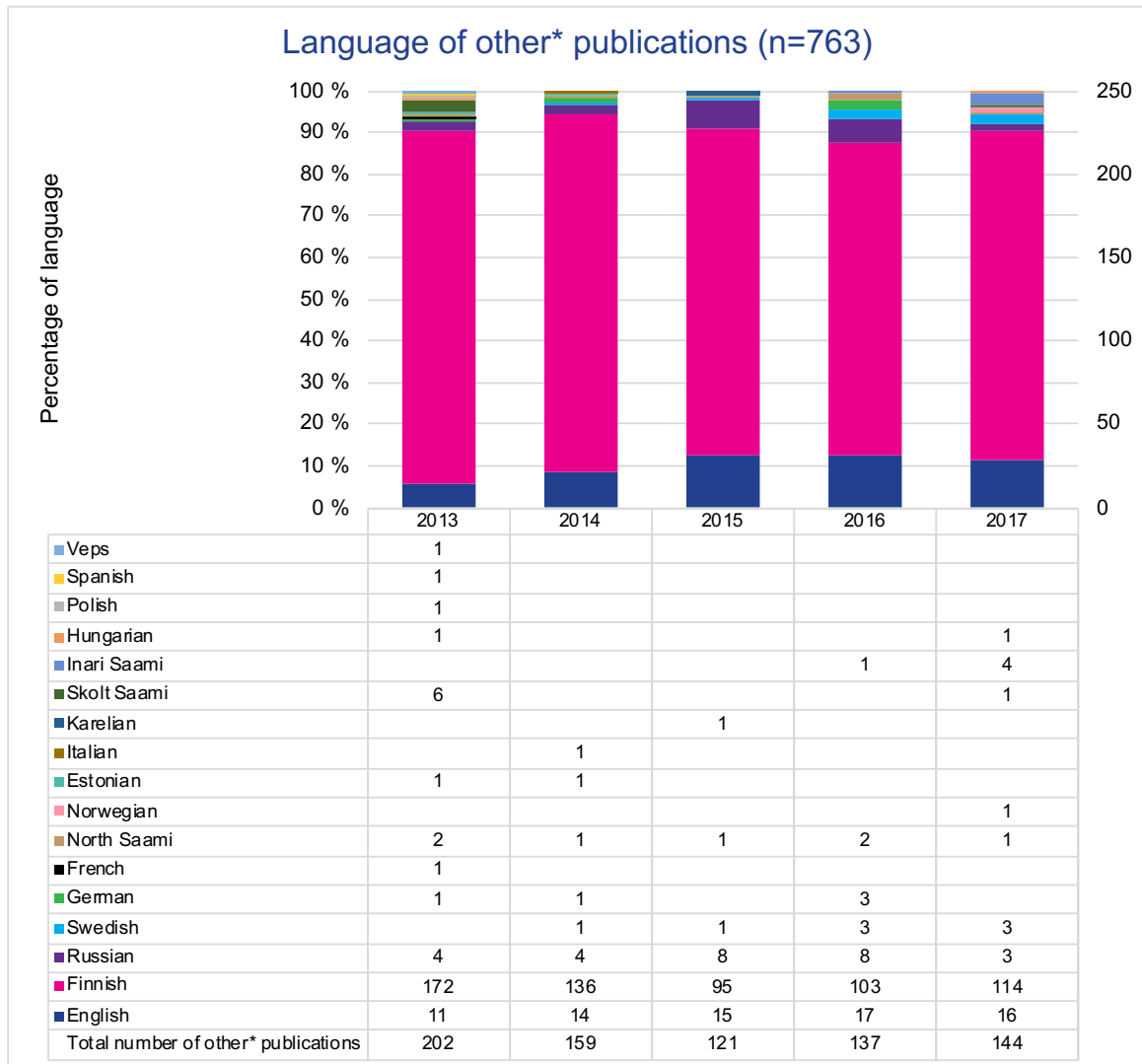


Figure 24. The percentage distribution of the languages of other publications of the FHum. * Other publications include types: B Non-refereed scientific articles, D Publications intended for professional communities, E Publications intended for the general public and I Audiovisual material, ICT software.

With regard to non-peer-reviewed publications, Finnish was the main language of other publications in the FHum with a total share of 81 percent. The share of English was also significant, accounting for 10 percent of other publications.

Of the other languages, Russian also stands out in the analysis of other types of publications with a share of about 4 percent. In addition, the various Sámi languages (Skolt, Inari and North) together account for more than 2 percent of other publications.

2.2.4 Faculty of Information Technology and Electrical Engineering

The Faculty of Information Technology and Electrical Engineering (hereafter ITEE) pioneers ICT technologies that shape the sustainable and secure digital future. The faculty's world-class research targets core ICT areas of measuring, electronics and materials, 5G and 6G wireless communications, artificial intelligence, systems, software and experiences. Multidisciplinary collaborations transfer ITEE expertise to application domains. The education portfolio and learning support provided for ITEE students from everywhere in the world complement the vision. The faculty supports economic growth through contributions to ICT technologies. At the end of the 2020 the faculty had about 550 employees.

The analysis is based on the publications of the twelve current research units of the faculty and their predecessors from 2013-2017. These research units are:

- a) Applied and Computational Mathematics
- b) Biomimetics and Intelligent Systems
- c) Circuits and Systems
- d) Center for Machine Vision and Signal Analysis
- e) CWC - Networks and Systems
- f) CWC - Radio Technologies
- g) Human Computer Interaction and Human-Centered Development
- h) Empirical Software Engineering in Software, Systems and Services
- i) Microelectronics
- j) Oulu Advanced Research on Service and Information Systems
- k) Opto-Electronics and Measurement Techniques
- l) Ubiquitous Computing

Production of publications

The method for studying publication trends is described in [chapter 1.3.1](#).

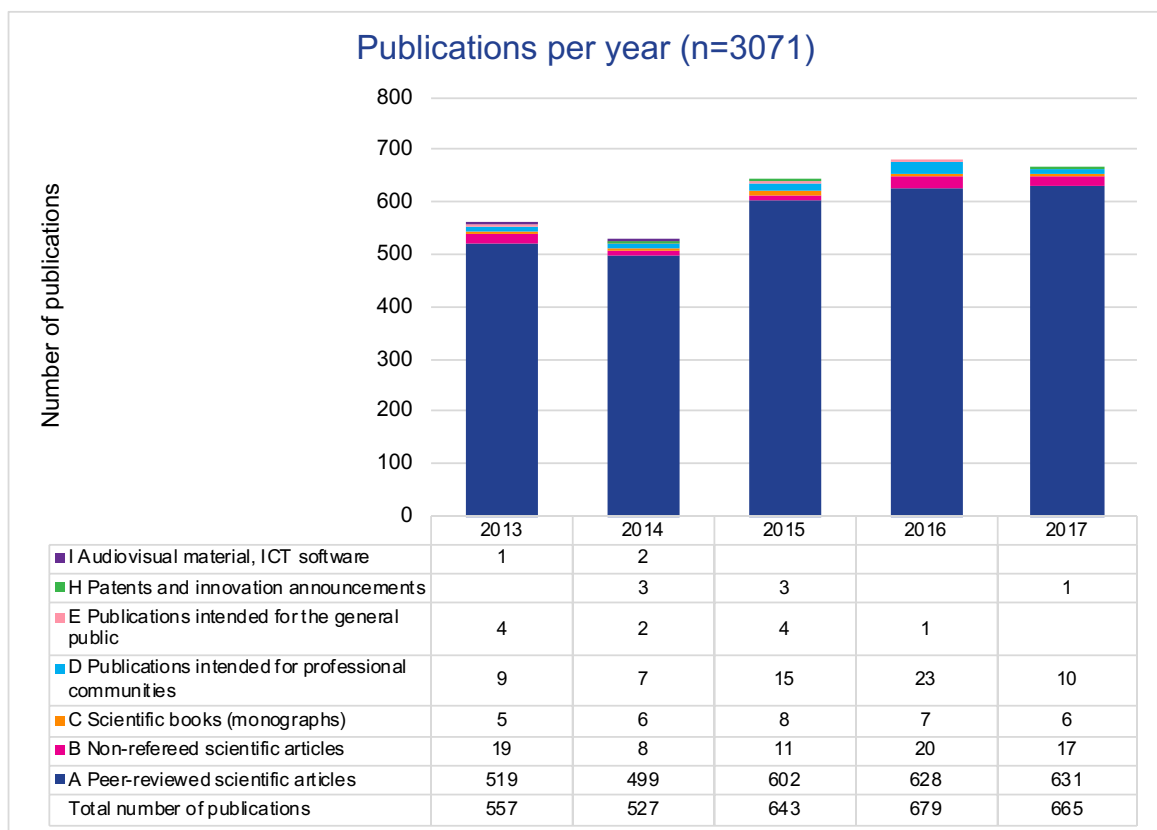


Figure 25. All publications of the ITEE from the years 2013-2017 in MinEdu publication categories A-I (excluding categories: F Public artistic and design activities, and G Theses).

The analysis of publications produced by the ITEE shows the dominance of peer-reviewed scientific articles, with other types of publications accounting for only 6% of all publications. Publications intended for professional communities and non-refereed scientific articles were the next most common publication types, each accounting for about 2 percentiles of all publications.

The trend in the volume of publications was upward during the period, and in the last year of the review ITEE researchers published over 19 percent more publications than five years earlier. The largest increase occurred in 2015, when ITEE researchers published 22 percent more publications than in the previous year.

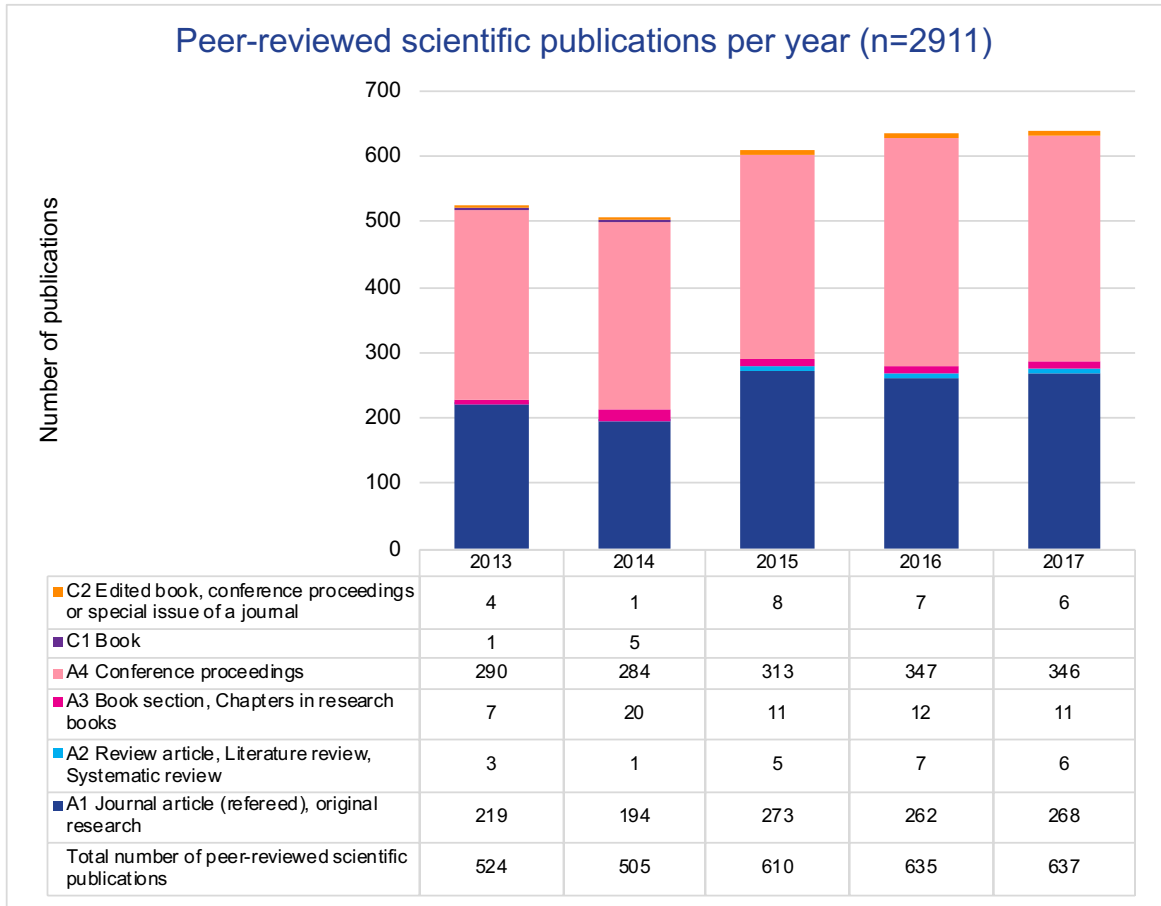


Figure 26. The number of peer-reviewed scientific publications of the ITEE per year and the publication type (publication types A1-A4 and C1-C2).

Of the ITEE’s peer-reviewed publications, 54 percent were conference publications, while journal articles (type A1) accounted for 42 percent of all peer-reviewed publications.

In terms of the volume of publications, the trend was clearly upwards and the largest increase took place in 2015, when the annual publication count was about 21 percent higher than in the previous year. There were no clear changes in the relative share of the different publication types during this five-year period. However, for 2015, there was a peak in the number of journal articles, accounting for 45 percent of all peer-reviewed publications. After that, the share levelled off again to about 42 percent.

Quality of publication channels

The method for studying the quality of the publication channels is described in [chapter 1.3.2](#).

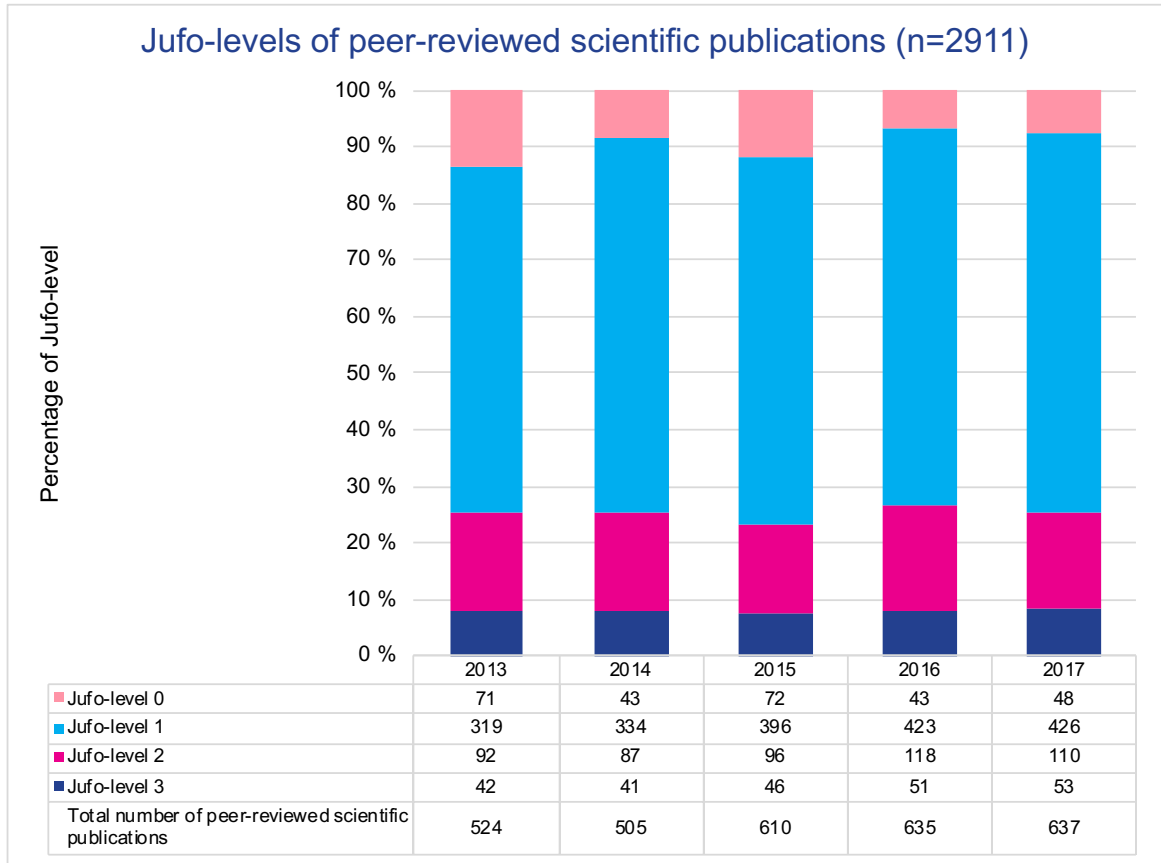


Figure 27. The percentage distribution of peer-reviewed scientific publications of ITEE into Publication Forum (JUFO) levels (publication types A1-A4 and C1-C2).

The shares of the Publication Forum levels were surprisingly even each year, with the shares of the different levels varying only slightly from year to year. However, there was a decrease in the number and share of JUFO level 0 publications in the period under review, with a share of 14 percent in 2013, but only 8 percent of all peer-reviewed publications in 2017.

Approximately 25 percent of the ITEE’s peer-reviewed publications were at JUFO levels 2 and 3. At level 3, there were a total of 233 publications over time, which is 8 percent of all peer-reviewed publications.

Types of collaboration in the publications

The method for studying collaboration and instructions for interpreting the figures are described in [chapter 1.3.3](#).

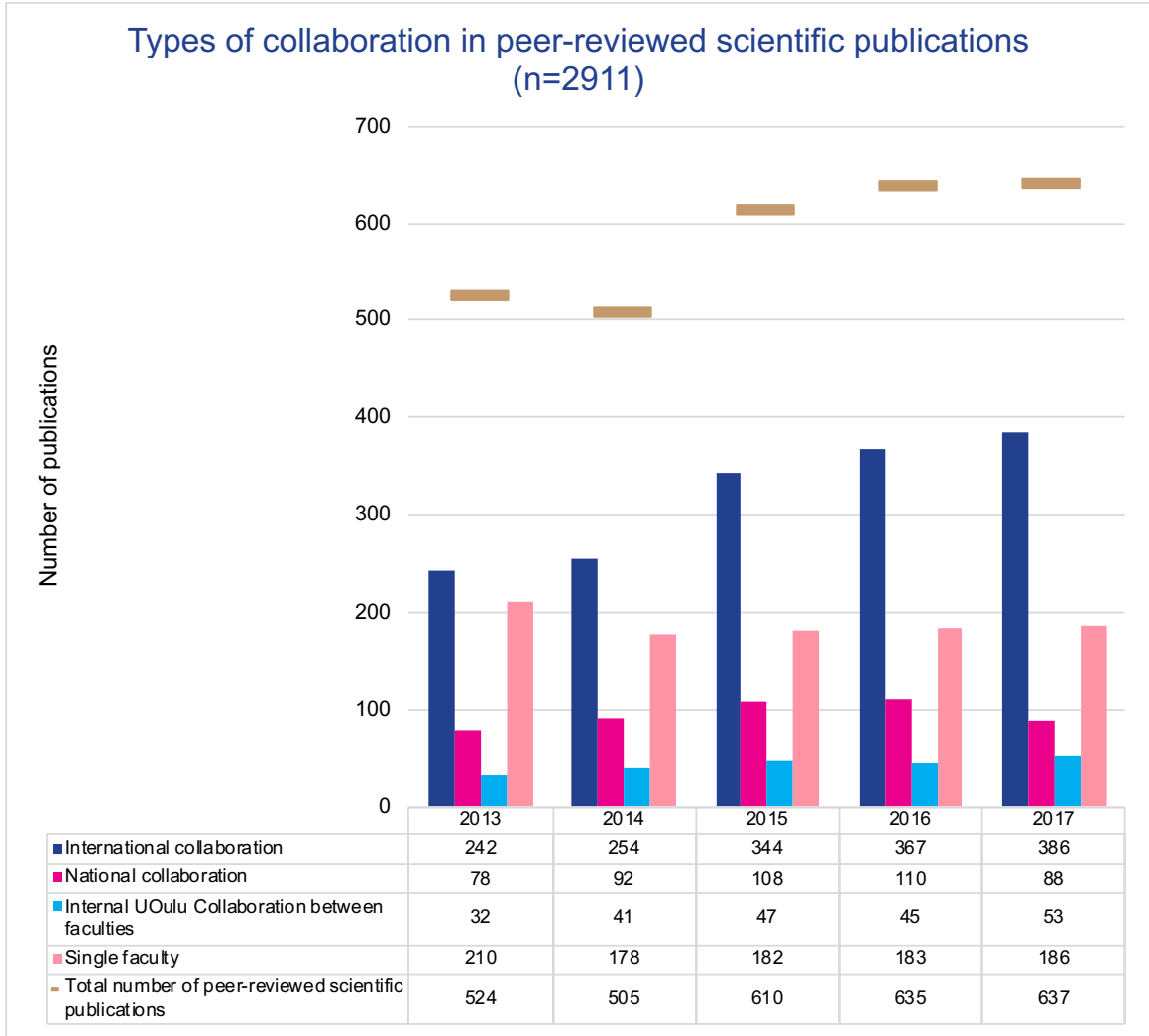


Figure 28. Distribution of peer-reviewed scientific publications of the ITEE into different collaboration types.

During the period under review, the predominant type of collaboration of ITEE was international cooperation, which accounted for 55 percent of the peer-reviewed publications. Publications written alone or through collaborations within the faculty accounted for the second most with 32 percent of the peer-reviewed publications. National collaboration was evident in 16 percent of the publications, while collaboration with other UOulu faculties was found for 7 percent of the publications.

International collaboration showed an upward trend during the period, as its share increased steadily from 46 percent to 61 percent. An equally clear trend was also seen in the proportion of publications by a single faculty, which fell from 40 percent to 29 percent during the period under review.

Language of the publications

The method for studying the language of the publications is described in [chapter 1.3.4](#).

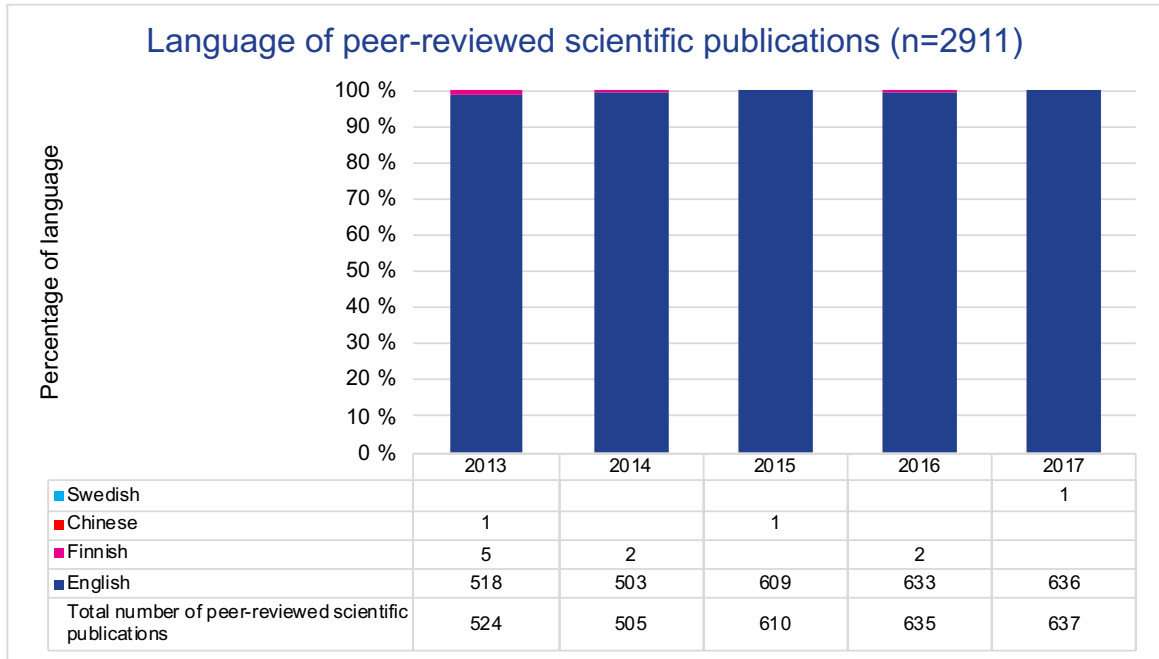


Figure 29. The percentage distribution of the languages of peer-reviewed scientific publications of the ITEE.

Regarding the language of peer-reviewed publications produced by the ITEE, English was dominant, with the combined share of other languages being less than 0.5 percent.

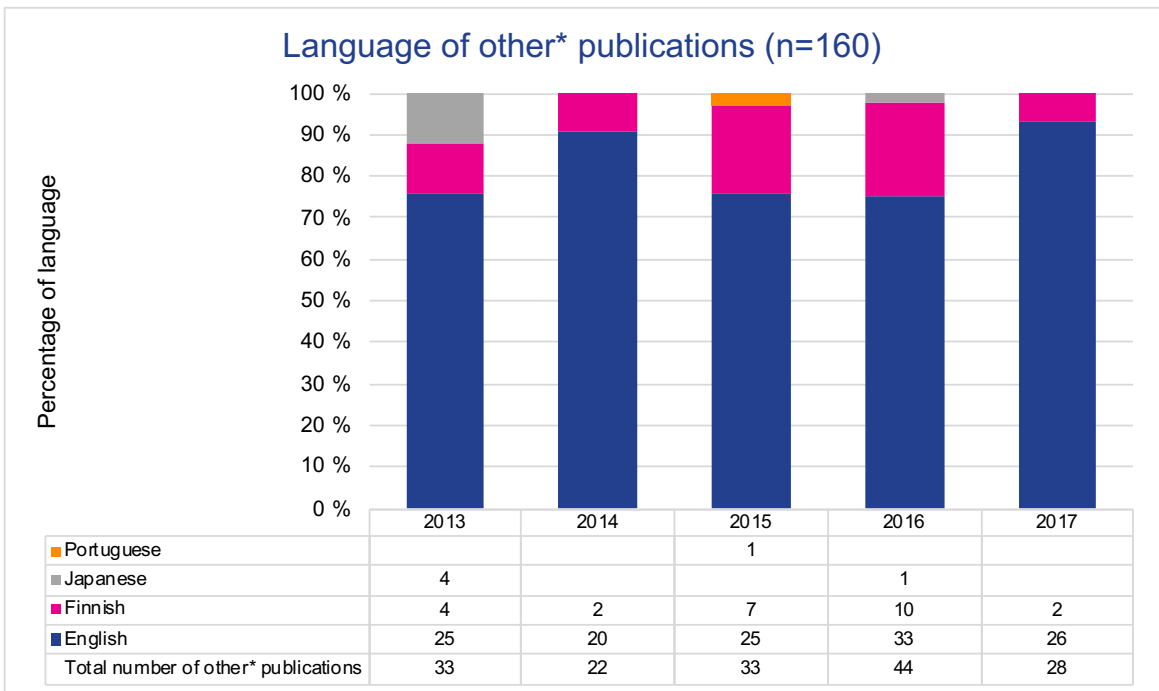


Figure 30. The percentage distribution of the languages of other publications of the ITEE. * Other publications include types: B Non-refereed scientific articles, D Publications intended for professional communities, E Publications intended for the general public and I Audiovisual material, ICT software.

Additionally for non-peer-reviewed publications, English was the dominant language, accounting for 81% of all non-peer-reviewed publications. There were also publications in Finnish every year, accounting for about 16 per cent of all non-peer-reviewed publications during the period under review.

2.2.5 Faculty of Medicine

The Faculty of Medicine (hereafter FMed) collaborates closely with Oulu University Hospital offering a multidisciplinary environment for clinical, translational and health care socioeconomic research. An internationally renowned top-level research generates greater understanding of factors affecting health and how this knowledge can be translated into the benefit of lifelong health. The Northern Finland Birth Cohorts, a longitudinal research program with data from over 20,000 individuals form a strong basis for the multidisciplinary life-course research. The FMed is part of the digital health research and innovation network OuluHealth supporting the link between research and business. At the end of the 2020 the faculty had about 520 employees.

The analysis is based on the publications of the eleven current research units of the faculty and their predecessors from 2013-2017. These current research units are:

- a) Research Unit of Biomedicine
- b) Cancer Research and Translational Medicine Research Unit
- c) Center for Environmental and Respiratory Health Research
- d) Center for Life Course Health Research
- e) Research Unit of Internal Medicine
- f) Research Unit of Medical Imaging, Physics and Technology
- g) Research Unit of Clinical Neuroscience
- h) Research Unit of Nursing Science and Health Management
- i) Research Unit of Oral Health Sciences
- j) PEDEGO Research Unit
- k) Research Unit of Surgery, Anesthesia and Intensive Care

Production of publications

The method for studying publication trends is described in [chapter 1.3.1](#).

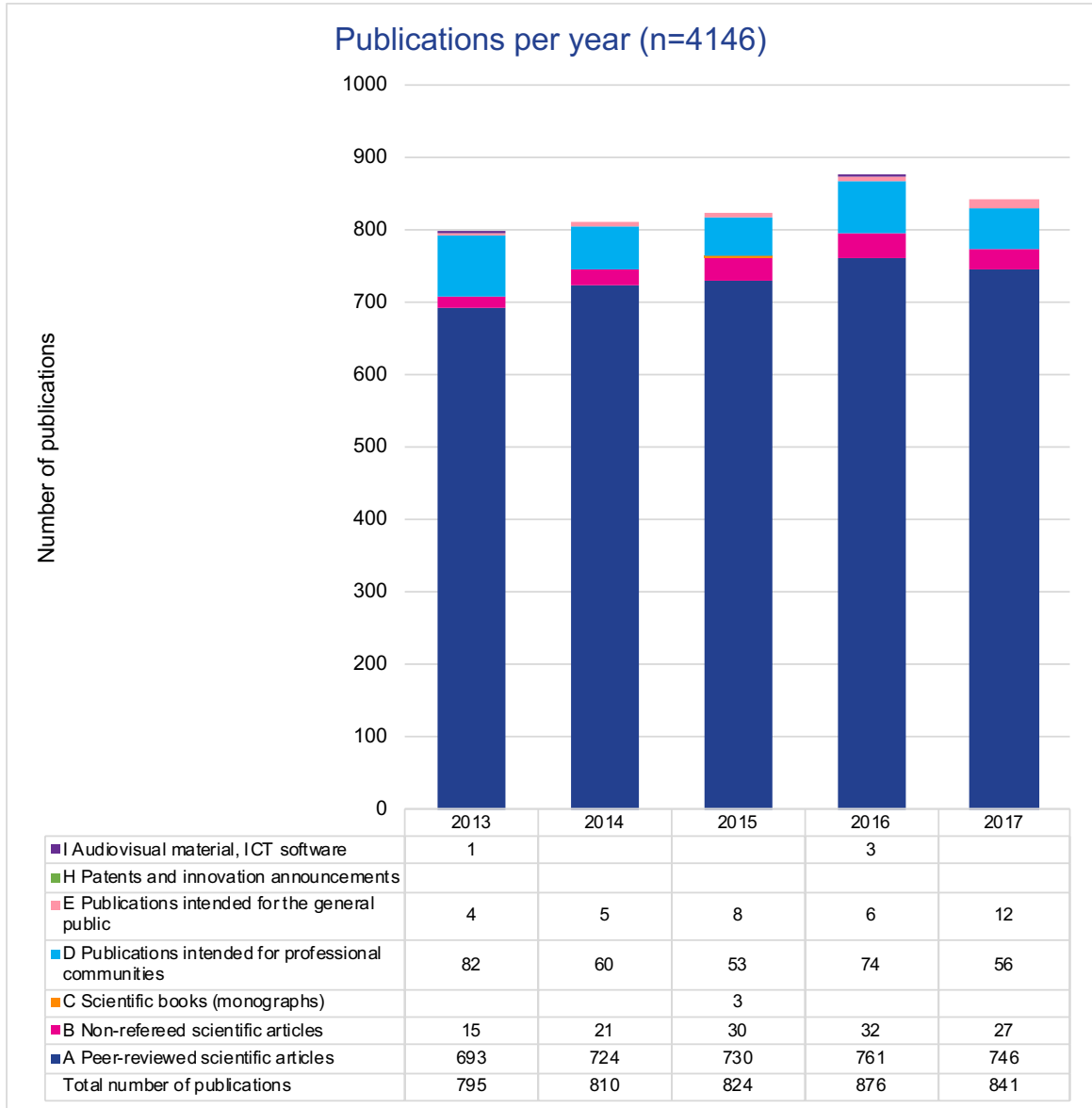


Figure 31. All publications from the FMed from the years 2013-2017 in MinEdu publication categories A-I (excluding categories F Public artistic and design activities, and G Theses).

Of the FMed publications, the most prevalent publication type during the period were peer-reviewed scientific articles with a total share of 88 percent. Of the other types of publications, the majority were publications intended for professional communities, which accounted for 8 percent of all publications during the review period.

The publication volumes rose slightly each year, although the peak was in 2016. However, there were no visible trends in the shares of the different publication types.

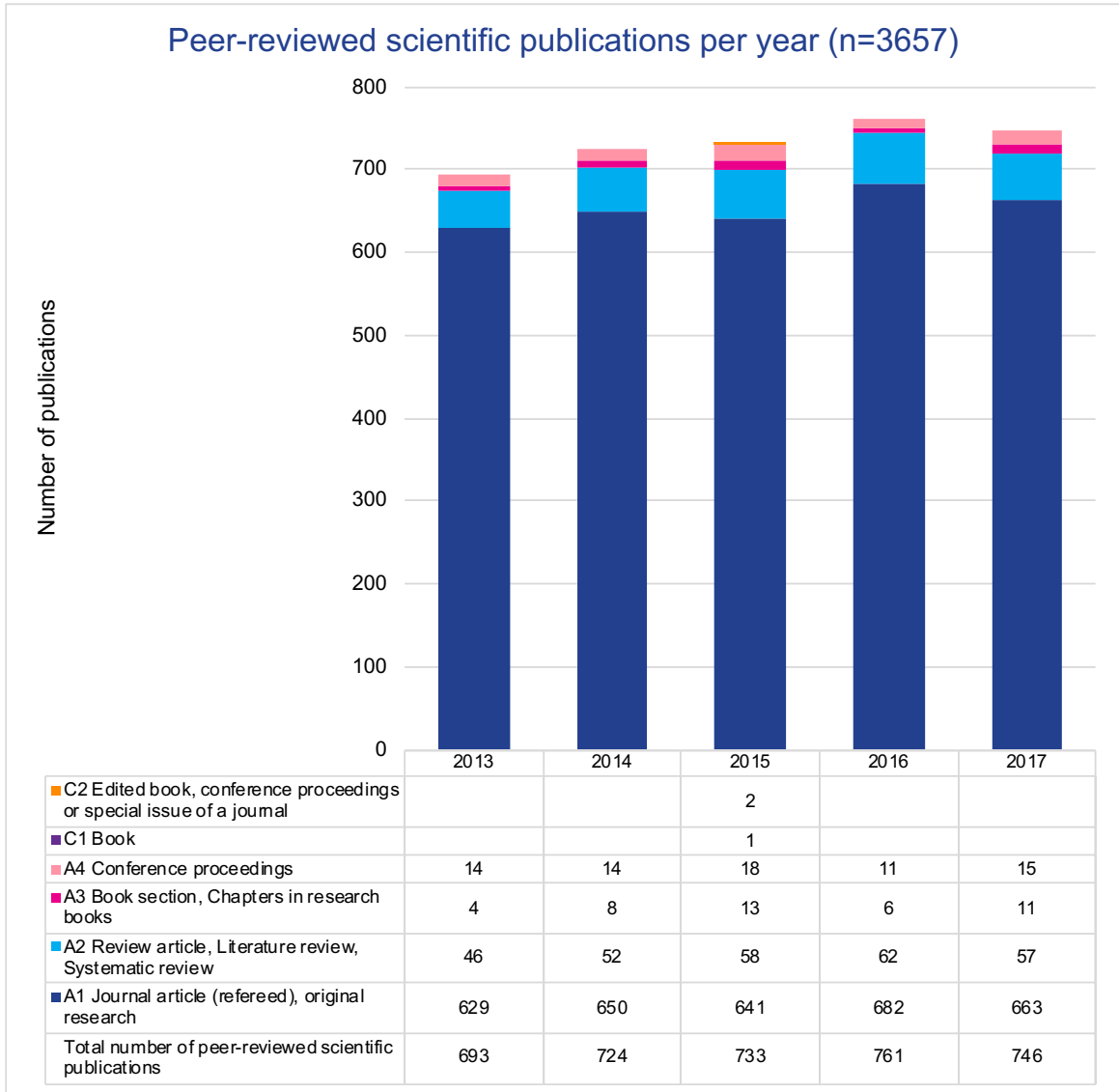


Figure 32. The number of peer-reviewed scientific publications of FMed per year and publication type (publication types A1-A4 and C1-C2).

For peer-reviewed publications of FMed, there is a similar upward trend in the number of publications as for all publications. In the last year of the review period, the number of peer-reviewed publications was about 8% higher than in the first year of the period. The increase in volume can be seen for all types of publications, but the increase is most clearly seen in the number of journal articles.

Journal articles were by far the most prevalent publication type, accounting for 88 percent of all peer-reviewed publications. The share of review articles is also worth mentioning at around 8 percent.

There were no trends in the proportions of the different publication types, and the proportions remained the same over time. The variations between the years were very small.

Quality of publication channels

The method for studying the quality of publication channels is described in [chapter 1.3.2](#).

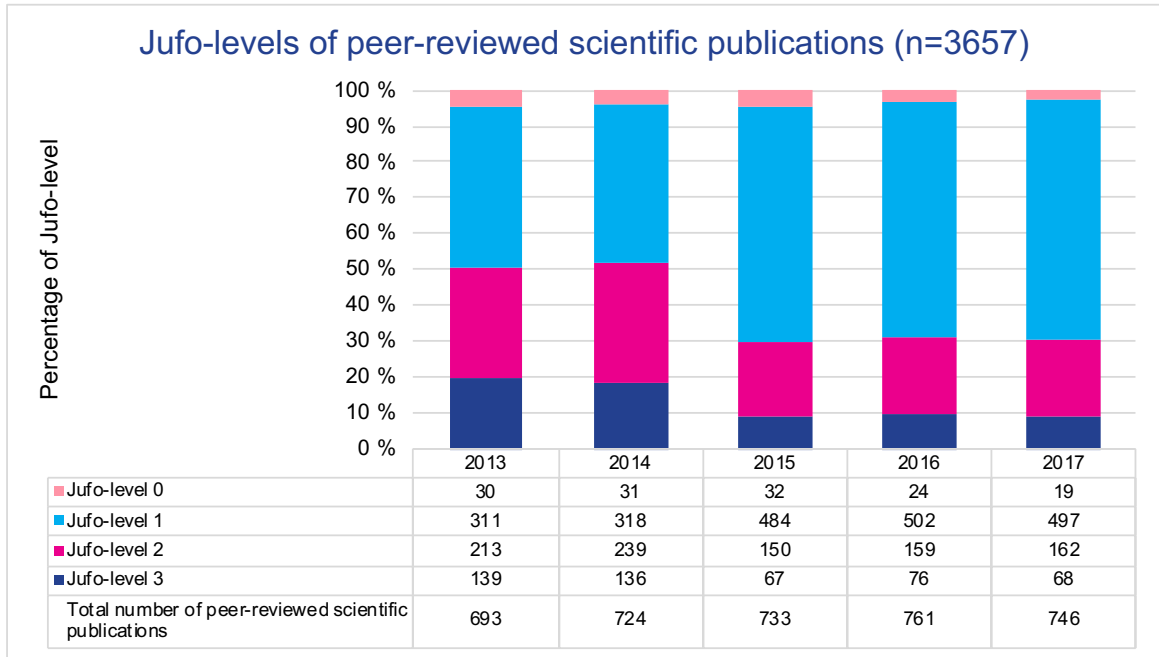


Figure 33. The percentage distribution of peer-reviewed scientific publications of the FMed and their Publication Forum (JUFO) levels (publication types A1-A4 and C1-C2).

With regard to the Publication Forum (JUFO) levels, the FMed analysis clearly shows the change in the calculation method to a volume-based method in 2015. The change in the calculation method is described in more detail in [chapter 1.3.2](#).

In the old calculation method, JUFO level 3 accounted for about 20 percent of all peer-reviewed publications and JUFO level 2 for about 30 percent. Since the introduction of the volume-based calculation method, these same proportions have been around 10 and 20 percent.

In terms of individual journals, PLoS One is FMed’s most distinctive journal (an average of 25 articles per year), which contributed to the decline in level 2 publications in 2015. Moreover, FMed’s data show several dozen other journal channels that dropped from level 2 to level 1 in 2015. Level drops from level 3 to level 2 were also plentiful in 2015, the most significant of which were the Journal of Clinical Endocrinology and Metabolism, Human Molecular Genetics, and PLoS Genetics: all of which had published work by FMed researchers with an average of 5 articles per year.

The trend seen throughout the period is a slight decrease in the number of level 0 publications. The share was low throughout but continued to fall from more than 4 percent to less than 3 percent during the period considered.

Types of collaboration in the publications

The method for studying collaboration and instructions for interpreting the figures are described in [chapter 1.3.3](#).

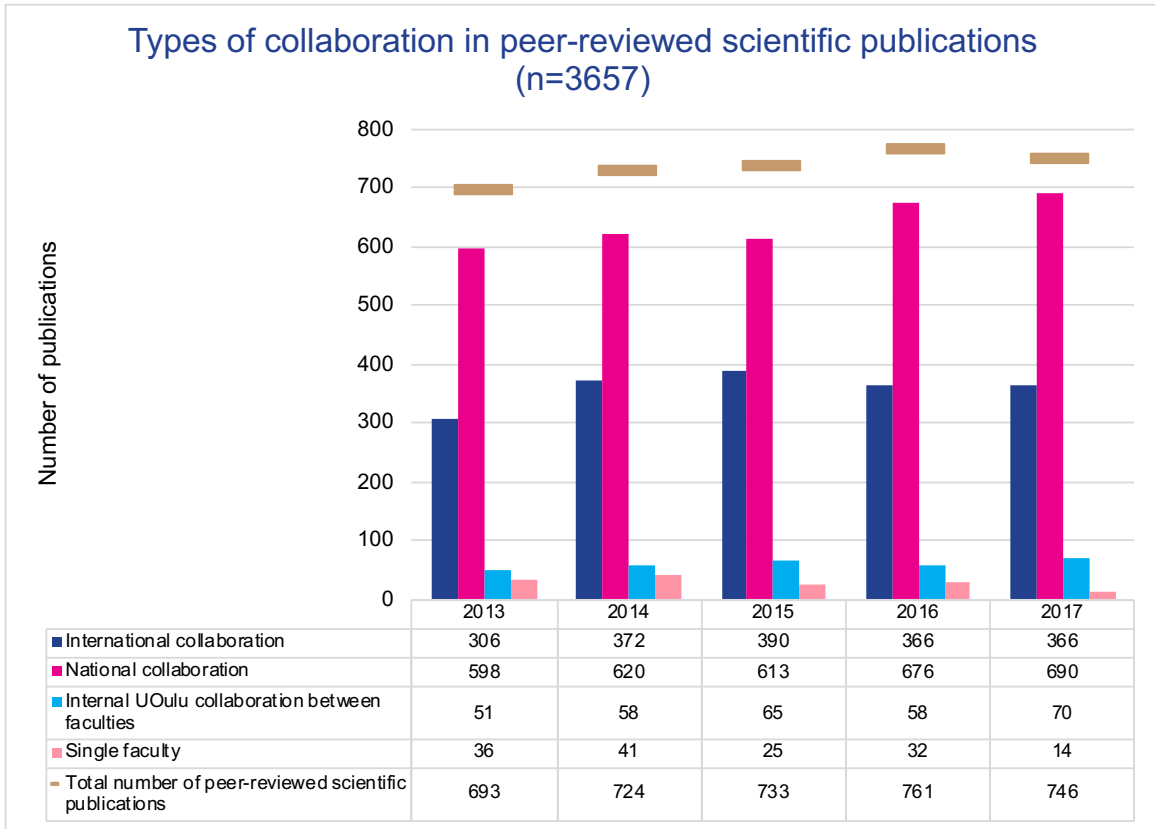


Figure 34. Distribution of peer-reviewed scientific publications of FMed into different collaboration types.

Of the types of collaboration, FMed was best distinguished by its national collaboration, which accounted for as much as 87 percent of all peer-reviewed publications in the studied period. The high proportion was largely explained by the position of Oulu University Hospital as a national partner in the data, and many FMed researchers have a dual affiliation on both sides. Therefore, the share of national collaboration cannot be seen in a reliable light in the FMed analysis.

There is also international collaboration in more than half of FMed’s publications, with the share varying from 44 to 53 percent annually. The share of internal UOulu collaboration between faculties was considerably lower, appearing in 7-9 percent of publications each year. Only 4 percent of the publications involved single faculty collaboration.

The clearest trend was the steady annual decline in the single faculty collaboration since 2014: the share fell from its maximum of 6 percent in 2014 to 2 percent in 2017. For other types of collaboration, the shares varied from year to year without a visible trend.

Language of the publications

The method for studying the language of the publications is described in [chapter 1.3.4](#).

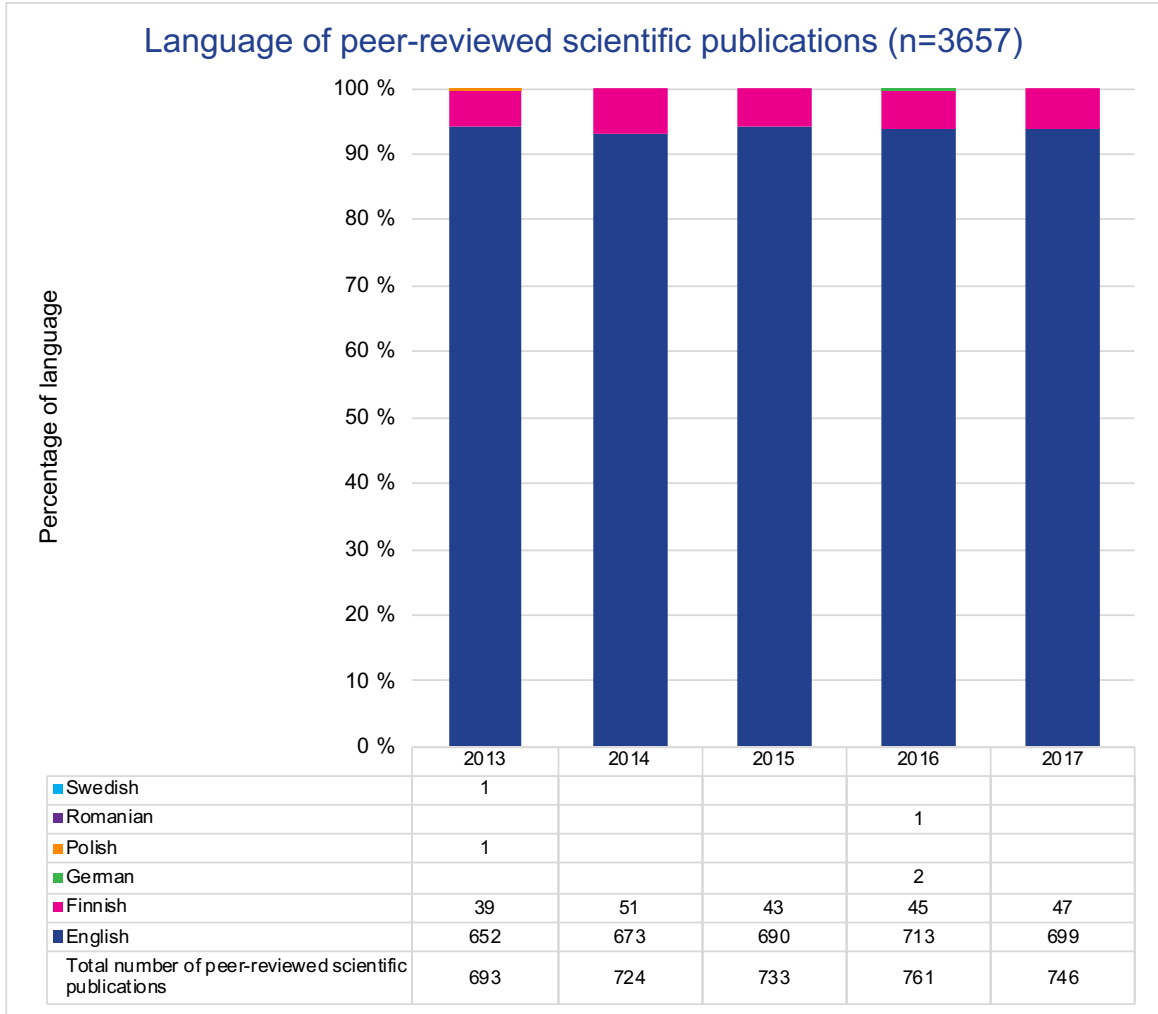


Figure 35. The percentage distribution of the languages of peer-reviewed scientific publications of the FMed.

As expected, in the peer-reviewed publications of the FMed, English was the clearly dominant language with an annual share of about 94 percent. However, about 6 percent of FMed’s peer-reviewed publications are published in Finnish every year.

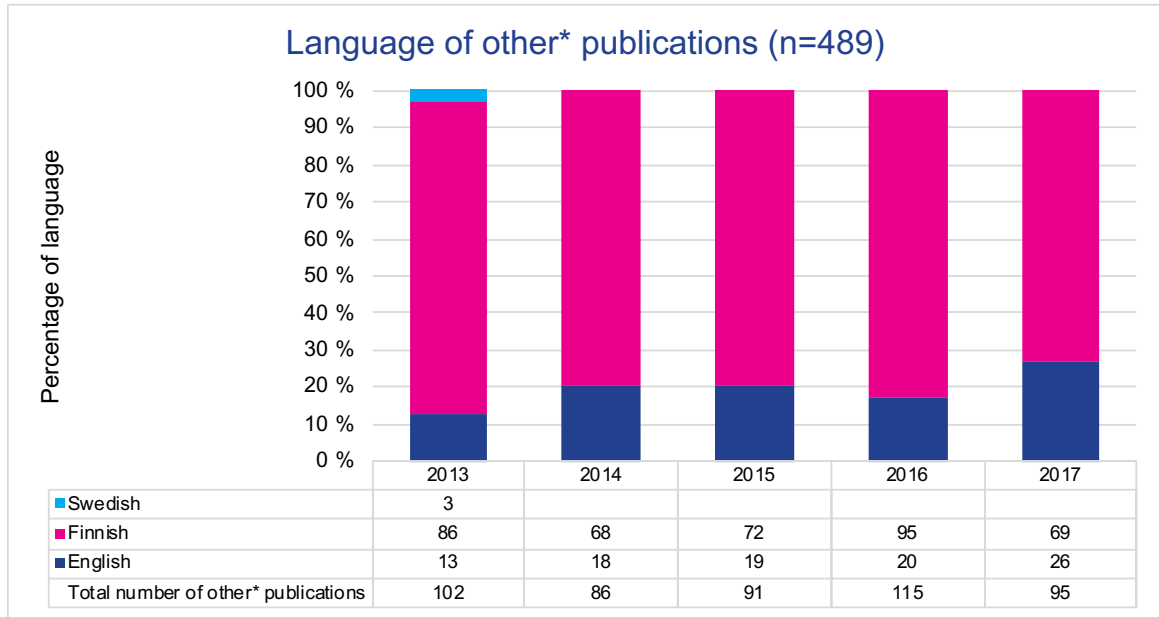


Figure 36. The percentage distribution of the languages of other publications of the FMed. * Other publications include types: B Non-refereed scientific articles, D Publications intended for professional communities, E Publications intended for the general public and I Audiovisual material, ICT software.

Most of the non-peer-reviewed publications of FMed were published in Finnish with an 80 per cent share. The rest of the non-peer-reviewed publications were in practice in English with a share of about 20 percent. The number of Finnish-language publications was remarkably high in 2013 and 2016, which was reflected in both years, especially in the larger share of publications in Finnish. The number of English-language publications, on the other hand, rose steadily from 13 to 26 annual publications.

Somewhat surprisingly, for non-peer-reviewed publications, in addition to English and Finnish, the only language used was Swedish. However, in addition to these, peer-reviewed publications also included publications in German, Polish and Romanian.

2.2.6 Faculty of Science

The Faculty of Science (hereafter FSci) strengthen internationally high-level, impactful basic research that requires long-term commitment and is the basis of education and co-operation with other fields.

Research strengths of FSci are regional change and people in a changing environment, Bayesian data analysis and mathematical analysis, ecology and genetics, the Sun and the Earth’s near-space system, space weather and climate change, galaxies and high-energy astrophysics, quantum and molecular phenomena as well as computational and AI-based process modeling.

An education and doctoral training of FSci, based on strong basic research, strengthen students’ ability to think through the lens of natural science, preparing the students for a variety of international expert and education positions. At the end of the 2020 the faculty had about 240 employees.

The analysis is based on the publications of the six current research units of the faculty and their predecessors from 2013–2017. These six research units are:

- a) Ecology and Genetics
- b) Geography Research Unit
- c) Mathematical Sciences
- d) Nano and Molecular Systems Research unit
- e) NMR Research Unit
- f) Space Physics and Astronomy

Production of publications

The method for studying publication trends is described in [chapter 1.3.1](#).

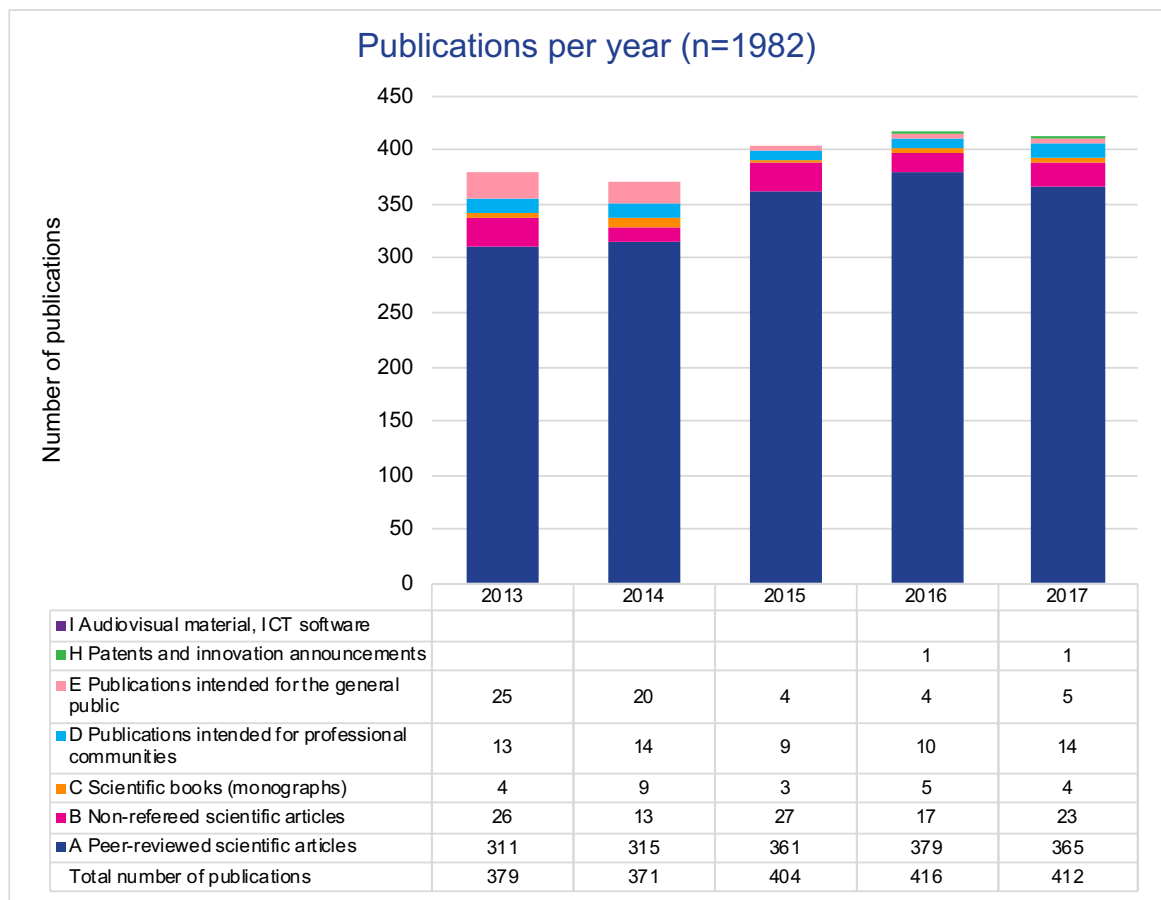


Figure 37. All publications of the FSci from the years 2013-2017 in MinEdu publication categories A-I (excluding categories: F Public artistic and design activities, and G Theses).

The number of FSci publications increased in the 2013-2017 period, especially in 2015, when the number of publications increased by 9 percent compared to the previous year. There was an increase especially in peer-reviewed scientific articles, which were published on average 18 percent more annually in 2015-2017 than in 2013-2014.

For some reason, the number of publications intended for the general public has fell sharply in the period, from 20 to 25 publications per year in the early years, compared to 4-5 per year in the last three years. In terms of shares, this means a drop in the share from 7 percent to 1 percent of all publications.

Looking at the distribution of publication types, FSci peer-reviewed scientific articles account for 87% of all publications over the entire period. The share of non-refereed scientific publications also stands out with a total of 5 percent of all publications.

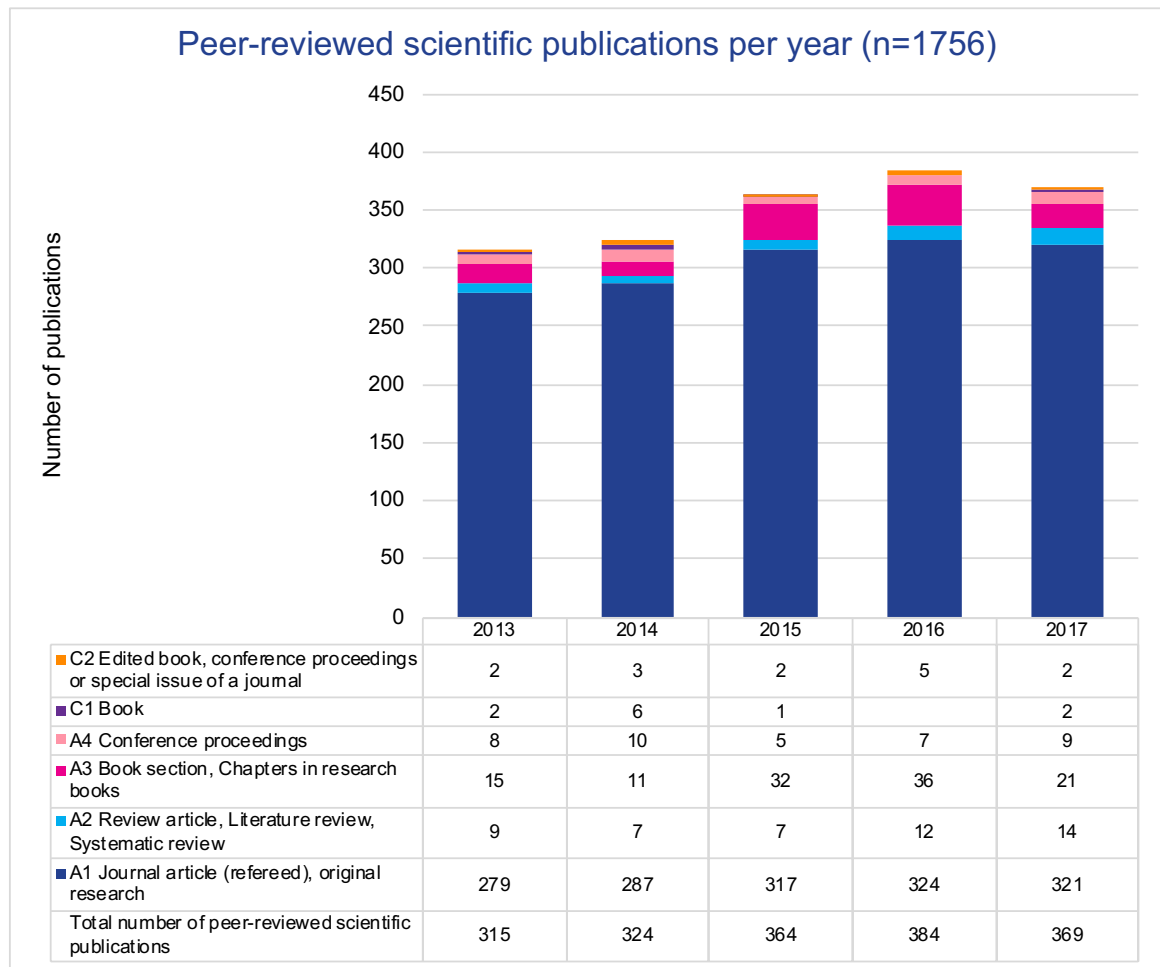


Figure 38. Number of peer-reviewed scientific publications of FSci per year and publication type (publication types A1-A4 and C1-C2).

As shown in Figure 37, there was a clear increase in FSci peer-reviewed scientific publications over the review period. There was an increase in the number of journal articles, but also in the number of book chapters. In 2015 and 2016, book chapters accounted for as much as 9 percent of all peer-reviewed publications. The number of book chapters was mainly based on the involvement of the Geography Research Unit in the faculty.

However, journal and review articles accounted for a significant share of all peer-reviewed publications, accounting for about 90 percent of the total over the period. The share of book chapters for the entire period was 7 percent.

Quality of publication channels

The method for studying the quality of publication channels is described in [chapter 1.3.2](#).

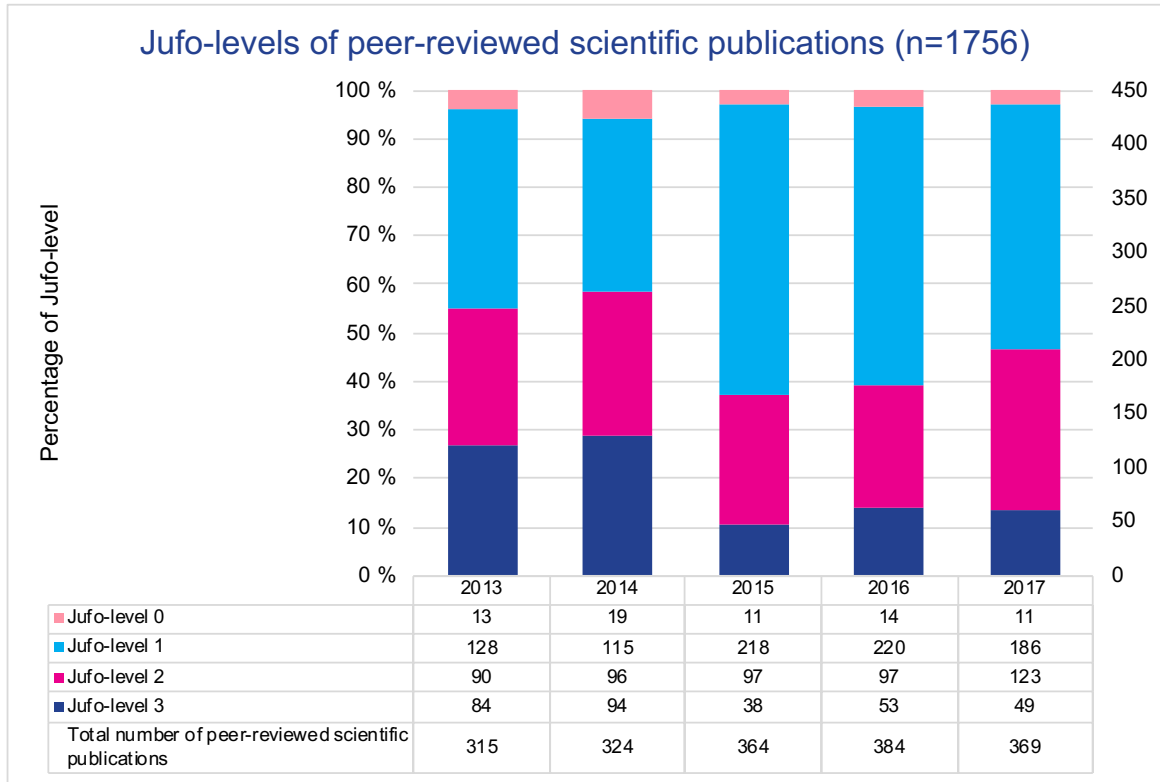


Figure 39. The percentage distribution of peer-reviewed scientific publications at the FSci and their Publication Forum (JUFO) levels (publication types A1-A4 and C1-C2).

As many as 47% of FSci’s peer-reviewed publications during the period were rated at Level 2 or 3 by the Publications Forum (JUFO). Additionally, for the FSci, the analysis highlights the shift in the calculation of JUFO levels to a volume-based method in 2015, when the share of JUFO level 2 and 3 publications fell from 59 percent in 2014 to 37 percent. The decline in the share was particularly large for level 3 publications, when their annual share was almost 30 percent during 2013-2014, but only just over 10 percent annually thereafter. The volume-based calculation method is described in more detail in [chapter 1.3.2](#).

In 2015, the JUFO level decreased from dozens of journal channels by the faculty. There were a particularly large number of such journals in the fields of physics and astronomy where many of the most used journal channels dropped from level 3 to level 2 or even level 1.

Since 2015, the annual number and share of JUFO level 2 publications in particular started to rise again. In 2017, JUFO level 2 publication channels accounted for the largest share in the entire review period, with as many as 33 percent of all publications belonging to level 2.

Level 0 accounted for a low level throughout the period, ranging from 3 to 6 percent annually.

Types of collaboration in the publications

The method for studying collaboration and instructions for interpreting the figures are described in [chapter 1.3.3](#).

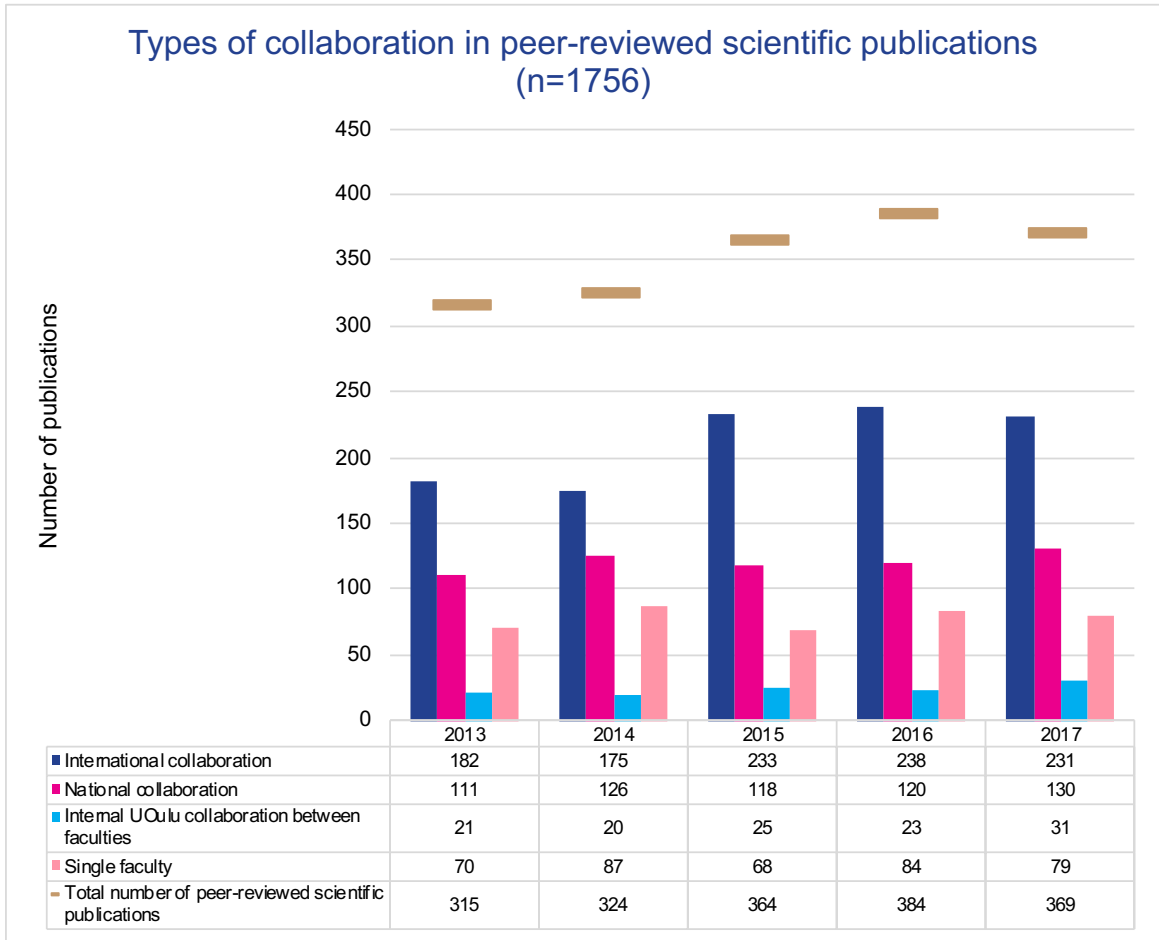


Figure 40. Distribution of peer-reviewed scientific publications of FSci into different collaboration types.

In terms of collaboration, the FSci was versatile, with international collaboration accounting for the largest share of about 60 percent of publications. There was also national collaboration in 34 percent of peer-reviewed publications. However, at the FSci, 22 percent of publications had no collaboration outside of their own faculty. There was collaboration with other faculties for a total of 7 percent of the publications.

Only the increase in the international collaboration stands out from the temporal trends, being present in about 56 per cent of publications in 2013-2014, but after that in an average of 63 percent of publications annually.

Language of the publications

The method for studying the language of the publications is described in [chapter 1.3.4](#).

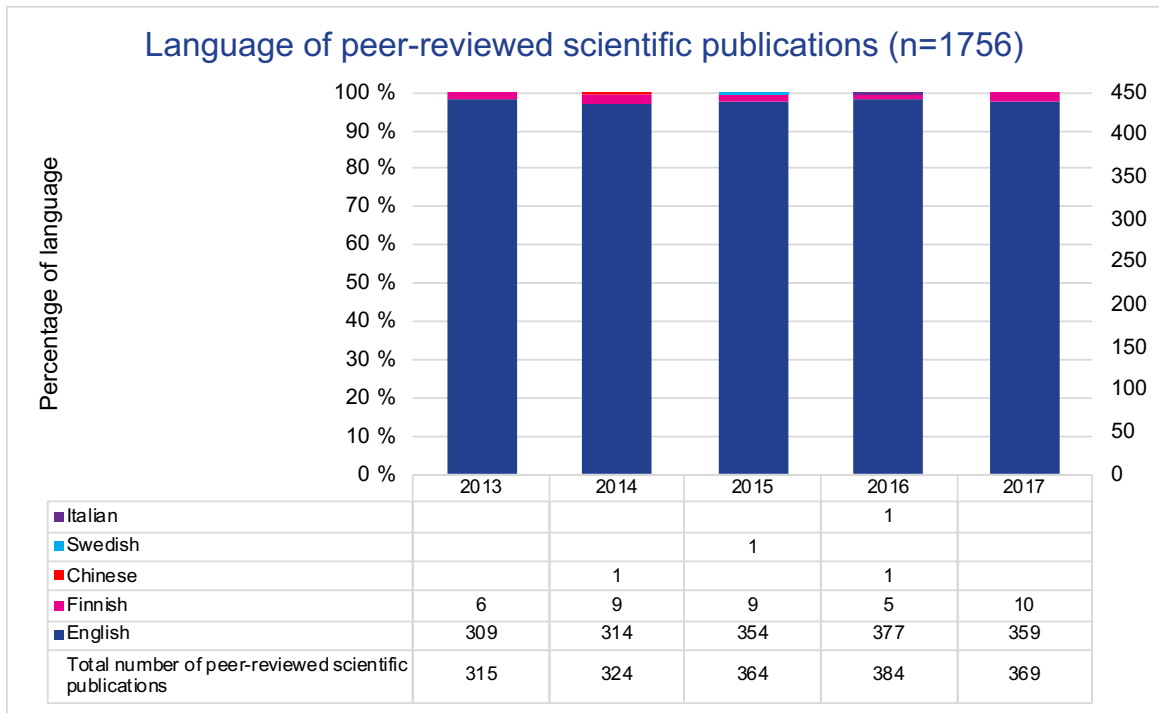


Figure 41. The percentage distribution of the languages of peer-reviewed scientific publications of the FSci.

Almost all of FSci’s peer-reviewed scientific publications, i.e. about 98 percent, were published in English and the share of Finnish was about 2 percent. Italian, Chinese and Swedish appeared only as individual publications.

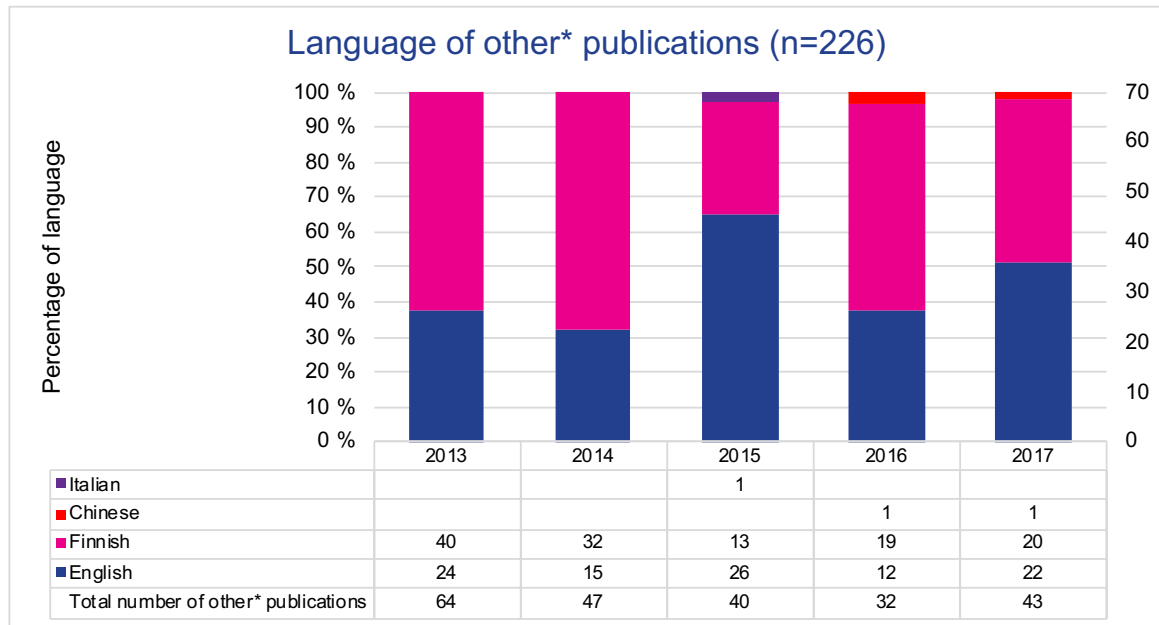


Figure 42. The percentage distribution of the languages of other publications of the FSci. * Other publications include types: B Non-refereed scientific articles, D Publications intended for professional communities, E Publications intended for the general public and I Audiovisual material, ICT software.

In other publications, the volumes of publications in Finnish and English were close to each other. About 55 percent of other publications were in Finnish and about 44 percent were in English. Publications in Chinese and Italian appeared as individual publications.

In terms of distributions, the share of Finnish-language publications was about 65 percent in 2013-2014, compared to about 45 percent in the last three years. In the proportion of English-language publications, the change was more or less the opposite.



2.2.7 Faculty of Technology

The Faculty of Technology (hereafter FTech) operates in the fields of architecture, chemistry, civil and construction engineering, environmental engineering, geosciences, industrial engineering and management, mechanical engineering, mining engineering and mineral processing, and process engineering. The FTech is one of the leading experts in sustainable utilization of natural resources and in providing new information on the use of technology to control climate change and promote sustainable development and wellbeing. Education and research are conducted in close collaboration with national and international universities, research institutes, companies, and public sector organisations. At the end of 2020 the faculty had about 430 employees.

The analysis is based on the publications of the twelve current research units of the faculty and their predecessors from 2013-2017. These twelve research units are:

- a) Chemical Process Engineering
- b) Environmental and Chemical Engineering
- c) Fibre and Particle Engineering
- d) Industrial Engineering and Management
- e) Intelligent Machines and Systems
- f) Process Metallurgy
- g) Materials and Mechanical Engineering
- h) Oulu Mining School
- i) Oulu School of Architecture
- j) Structures and Construction Technology
- k) Sustainable Chemistry
- l) Water, Energy and Environmental Engineering

Production of publications

The method for studying publication trends is described in [chapter 1.3.1](#).

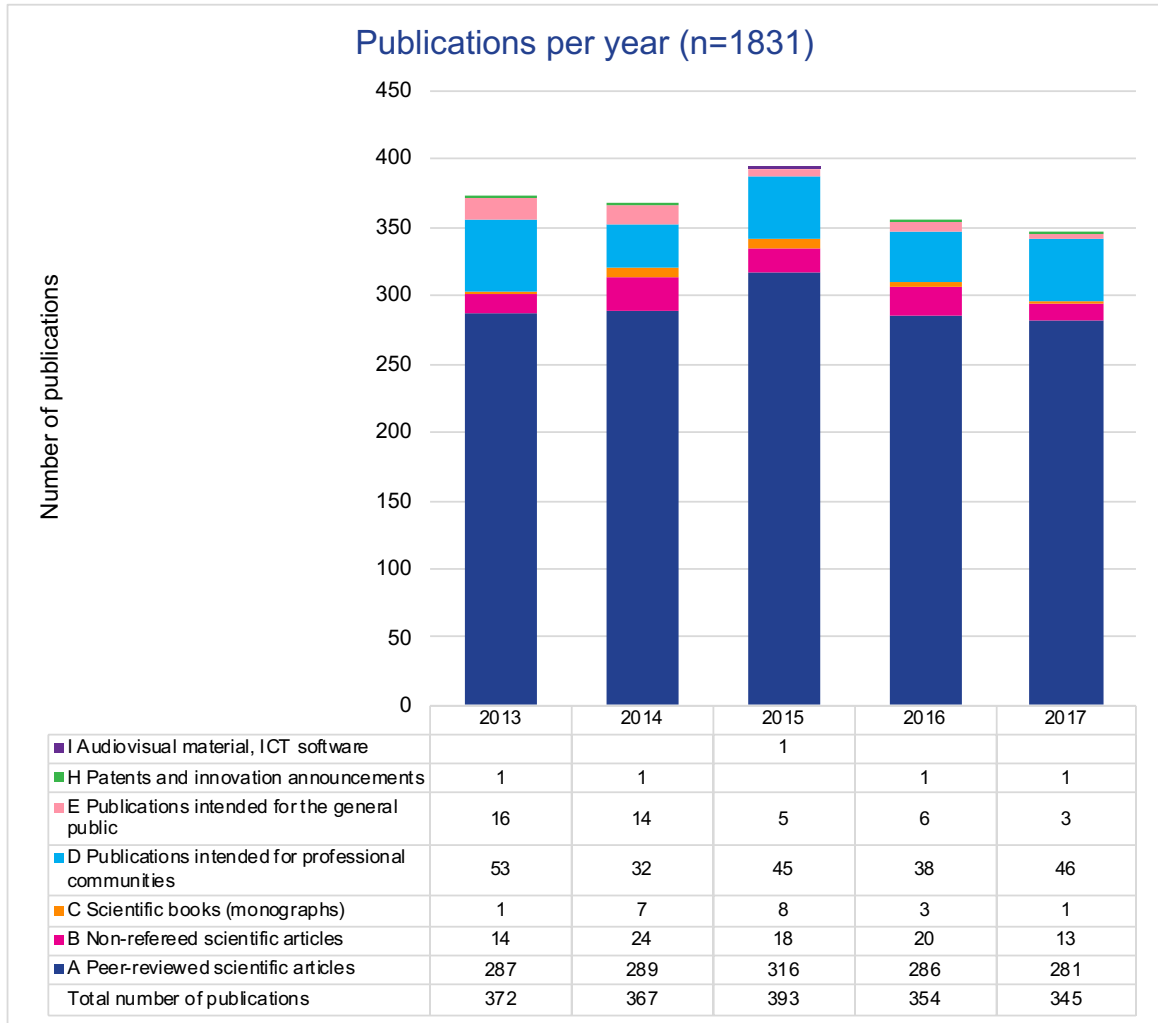


Figure 43. All publications of the FTech from the years 2013-2017 in MinEdu publication categories A-I (excluding categories: F Public artistic and design activities, and G Theses).

A slight downward trend can be seen in the publication production of the FTech. However, the decrease is small and in 2017 the total number of publications was 7% lower than at the beginning of the review period in 2013. In addition, in the middle of the review period, the decline was temporarily interrupted, with 2015 being the largest annual publication volume in the review period.

For the different types of publications, the annual numbers were relatively even, although there was some annual variation. Only the number of publications intended for the general public (type E) clearly decreased during the period. However, the relative share of publications in MinEdu publication category E was small over the period, falling from 4 percent to 1 percent.

The relatively large number of publications intended for professional communities is also noteworthy, accounting for 12 percent of all publications over the whole period.

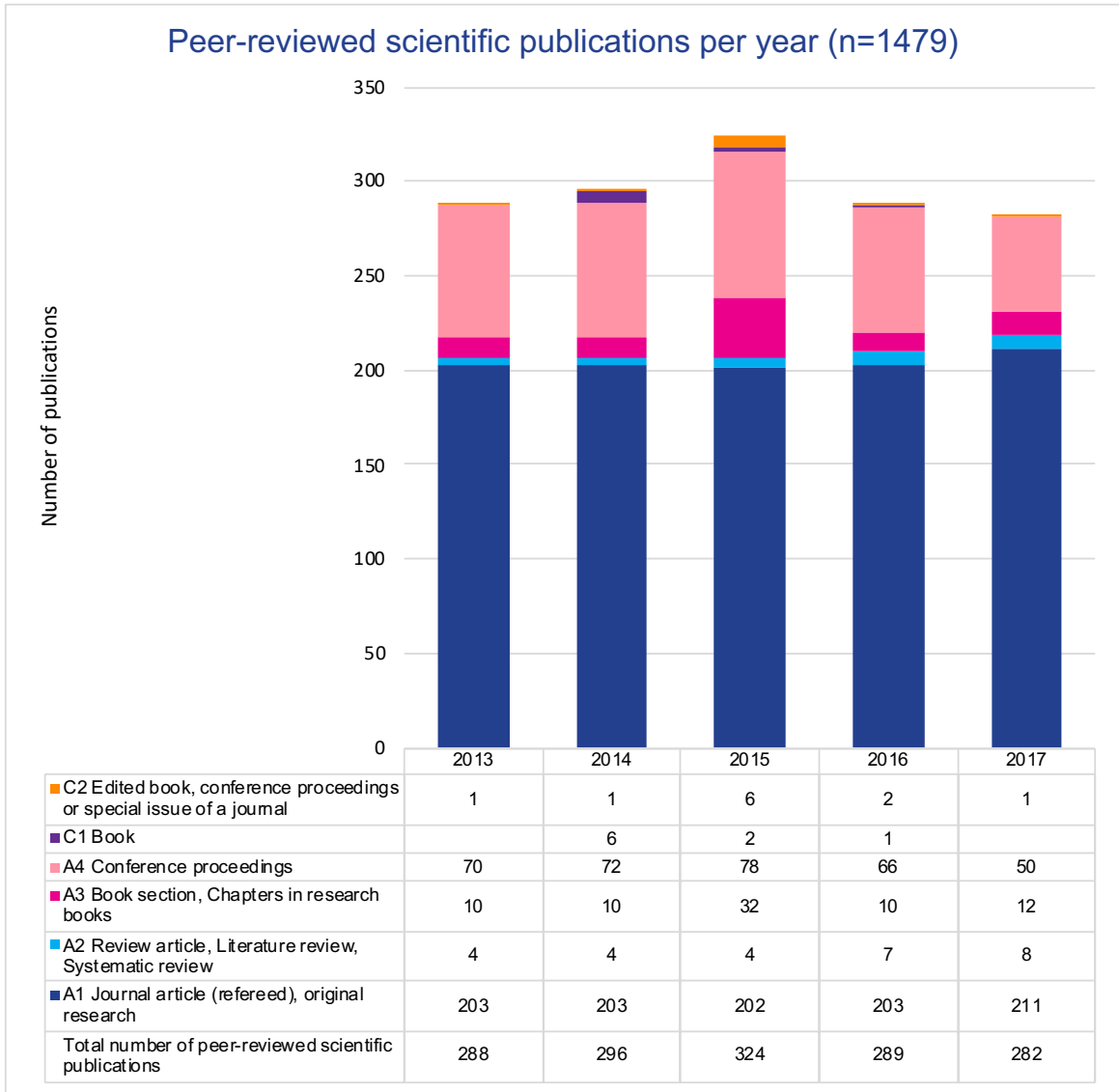


Figure 44. The number of peer-reviewed scientific publications produced by the FTech per year and publication type (publication types A1-A4 and C1-C2).

For the FTech, the number of peer-reviewed scientific publications per year was fairly steady, with the only exception being 2015, when a particularly large number of book chapters were published. Based on the data, the exceptionally large number for that year is largely explained by two books in which FTech researchers published 18 book chapters in the same year. FTech researchers were also editors of these books.

FTech’s publication production was mainly based on journal articles and conference publications with a total share of 94 percent. However, the number and share of conference proceedings decreased in recent years and in 2017 these were produced 29 percent less than in the first year of the review period.

Quality of publication channels

The method for studying the quality of publication channels is described in [chapter 1.3.2](#).

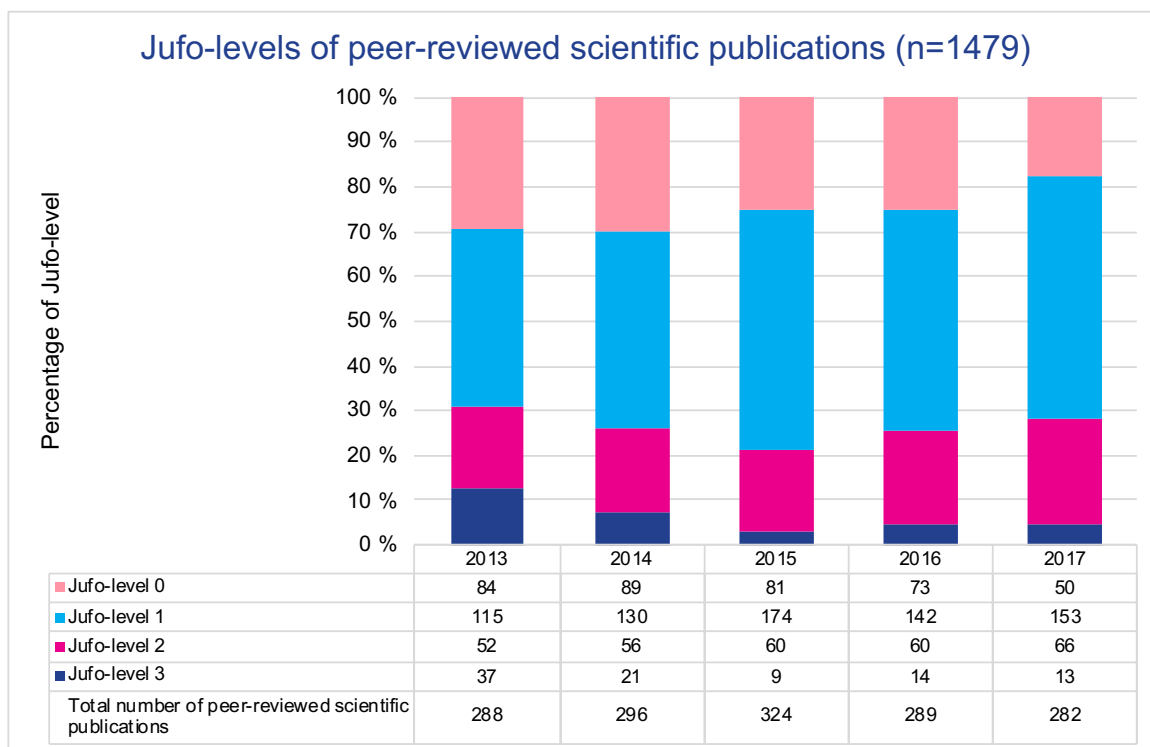


Figure 45. The percentage distribution of peer-reviewed scientific publications of the FTech and their Publication Forum (JUFO) levels (publication types A1-A4 and C1-C2).

About 26 percent of the FTech's publications in the review period were published on the highest JUFO Level 2 and 3 publication channels. The trend declined for two years until the number and share started to rise again for both levels. For JUFO level 2, the number of publications slowly increased throughout the period, so the largest decrease was in the number of level 3 publications. This decline is clearly explained by the move to the volume-based calculation method in 2015 (more details in [chapter 1.3.2](#)). For the Ftech, the new calculation method specifically affected level 3 publication volumes, as a large number of publication channels used by the faculty in 2013 and 2014 fell from level 3 to level 2 or even level 1. Materials Science and Engineering A, Inorganic Chemistry, Journal of Hydrology and Dalton Transactions are a few examples of channels whose level rating fell in 2015.

The number of JUFO level 0 publications was quite high throughout the period, however, with the annual share falling from 30 percent in 2014 to 18 percent in 2017. Based on the data, the majority of level 0 publications were conference publications, accounting for more than 70 percent of all level 0 publications.

Types of collaboration in the publications

The method for studying collaboration and instructions for interpreting the figures are described in [chapter 1.3.3](#).

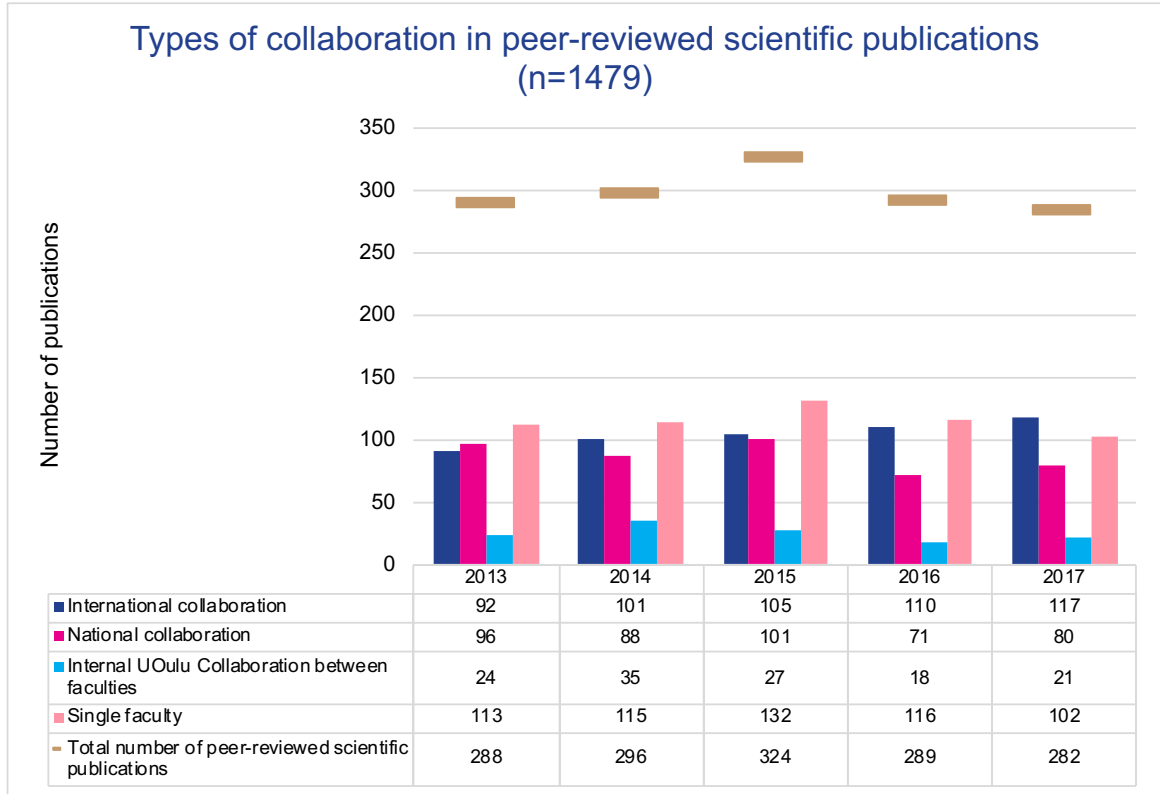


Figure 46. Distribution of peer-reviewed scientific publications of FTech into different collaboration types.

At the FTech, collaboration took place evenly on several levels. However, the largest share was occupied by publications that had not been collaborated outside the faculty (type Single faculty), accounting for 39% of the publications over the entire period. The annual share of this type of collaboration also remained at approximately the same level during the period.

With regard to other types of collaboration, growth can be seen in international collaboration, which accounted for 33 percent of all publications in 2013-2015, but already 40 percent in 2016-2017.

Throughout the period, 29 percent of the publications involved national collaboration, while collaboration with other faculties accounted for 8 percent of the publications.

Language of the publications

The method for studying the language of the publications is described in [chapter 1.3.4](#).

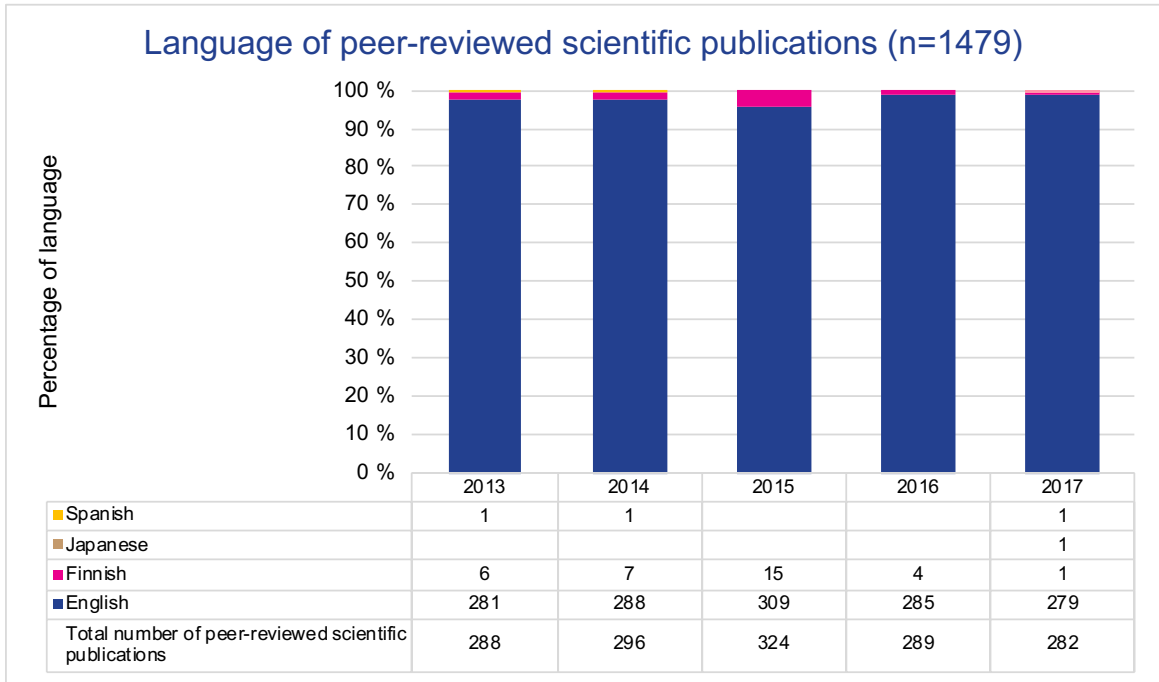


Figure 47. The percentage distribution of the languages of peer-reviewed scientific publications of the FTech.

97 percent of the FTech’s peer-reviewed scientific publications were in English. Publications in Finnish were published throughout the period, but in the last two years the number remained smaller. For other languages, there were only individual publications in Spanish and in Japanese.

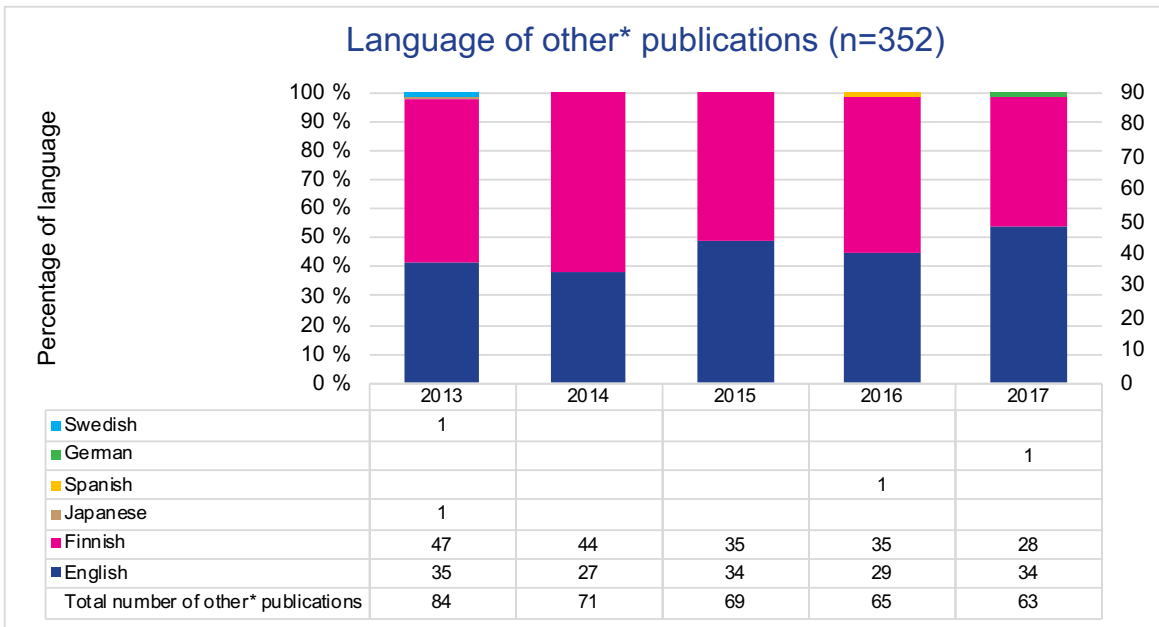


Figure 48. The percentage distribution of the languages of other publications of the FTech. * Other publications include types: B Non-refereed scientific articles, D Publications intended for professional communities, E Publications intended for the general public and I Audiovisual material, ICT software.

For non-peer-reviewed publications, there were approximately the same number of publications in Finnish and English, and the proportion varied from year to year. The number of publications in Finnish shows a declining trend during the period. Other languages appear only as individual publications.



2.2.8 Oulu Business School

The University of Oulu Business School (hereafter OBS) offers extensive and high-quality accredited education in business and related subjects. Its best research is of a high international standard. The OBS contributes especially to the development of northern Finland and Europe in a constructive and research-based manner. At the end of 2020 the faculty had about 100 employees.

The analysis is based on the publications of the three current research units of the faculty and their predecessors from 2013–2017. These three research units are a) Department of Economics, Accounting and Finance, b) Martti Ahtisaari Institute and c) Department of Marketing, Management and International Business.

Production of publications

The method for studying publication trends is described in [chapter 1.3.1](#).

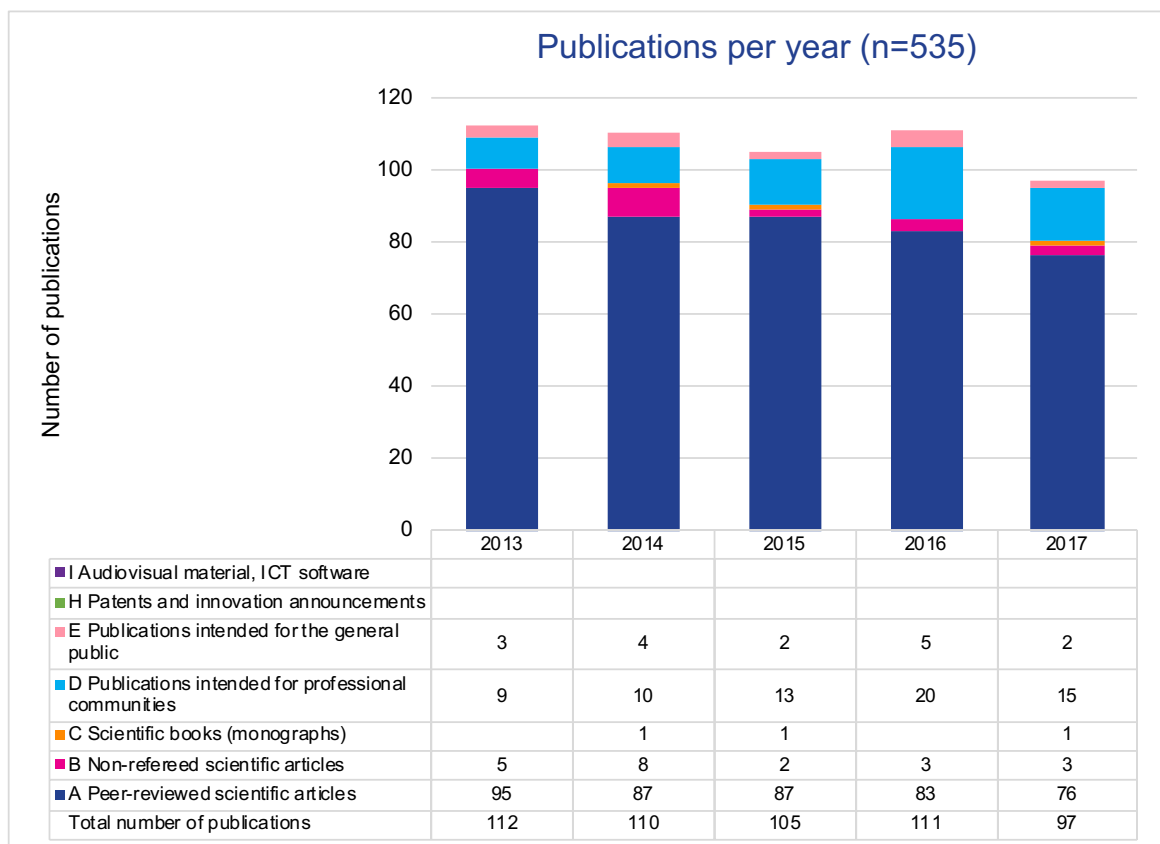


Figure 49. All publications by the OBS from the years 2013-2017 in MinEdu publication categories A-I (excluding categories: F Public artistic and design activities, and G Theses).

The OBS published about one hundred publications per year during the period, with the highest number of publications in 2013 and the lowest in 2017. The difference in the number of publications at the extremes was 13 percent.

80 percent of all publications were peer-reviewed scientific articles and the second type stands out as publications intended for professional communities (type D), which accounted for 13 percent of all publications. The share of these also increased over the period from 8 percent at its best to 18 percent in 2016. The share of other publication types was small.

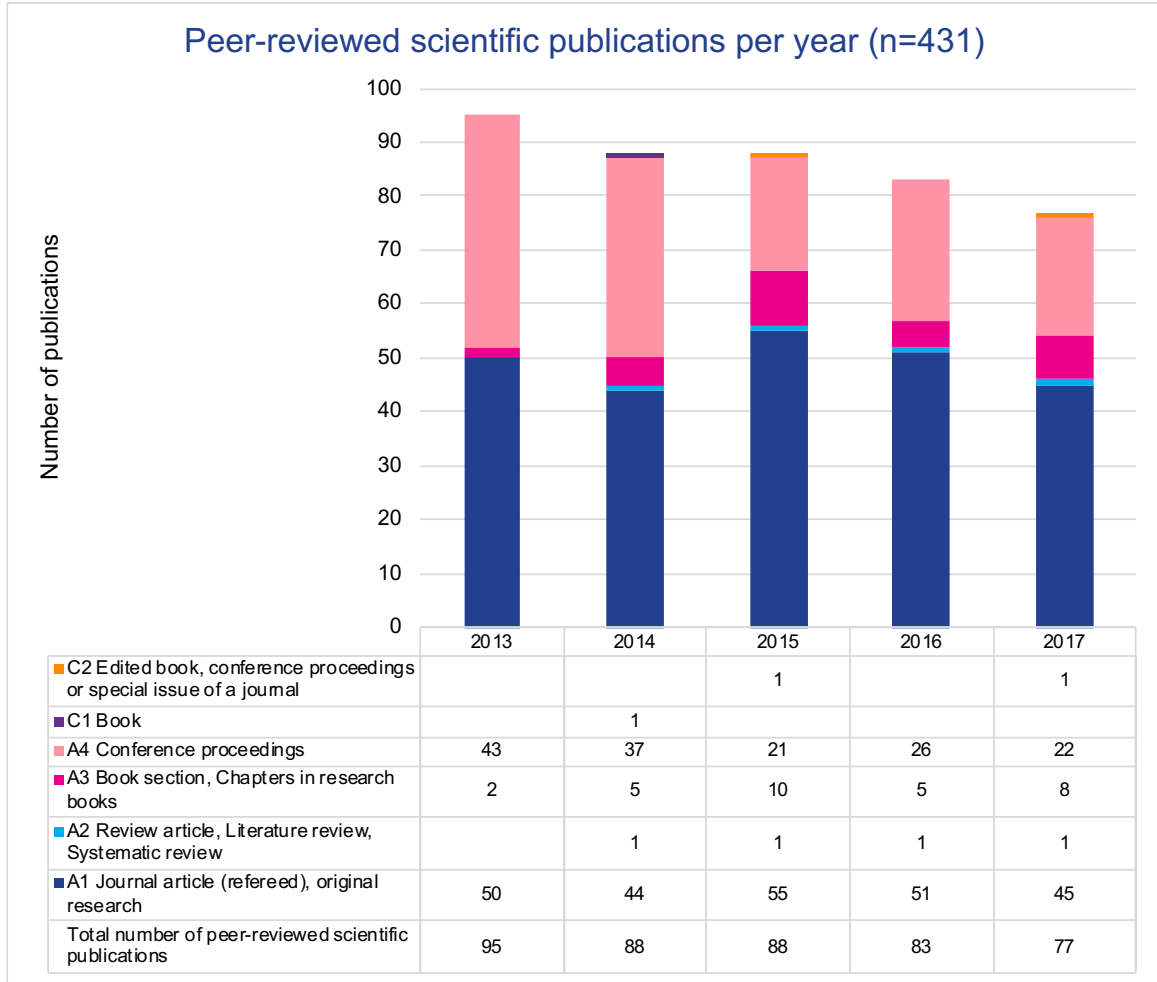


Figure 50. The number of peer-reviewed scientific publications of the OBS per year and publication type (publication types A1-A4 and C1-C2).

In OBS’s peer-reviewed scientific publications, the decline in the number of publications was more visible and steady throughout the period. It is noteworthy that the decrease was largely due to a decrease in the number of conference proceedings, which were 49 percent less in 2017 than in 2013. Their share also decreased steadily, averaging 44 percent in 2013-2014 and 28 percent in 2015-2017. For journal articles, the number varied between 44 and 55 articles per year and accounted for a total of 57 percent for the entire period.

As a third type of publication, OBS stands out for book chapters with a 7 percent share of all peer-reviewed publications.

Quality of publication channels

The method for studying the quality of publication channels is described in [chapter 1.3.2](#).

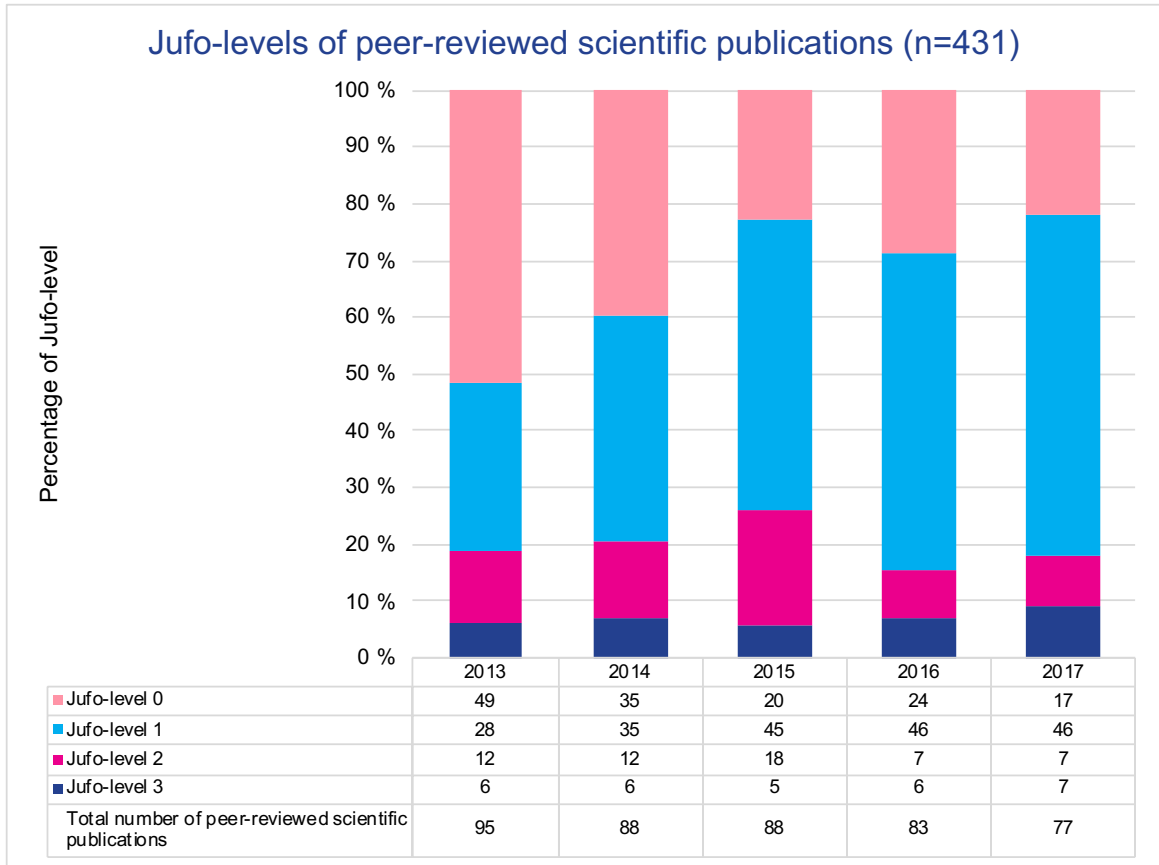


Figure 51. The percentage distribution of peer-reviewed scientific publications by the OBS as Publication Forum (JUFO) levels (publication types A1-A4 and C1-C2).

Approximately 20 percent of OBS’s peer-reviewed publications were at JUFO levels 2 and 3 each year. The biggest change between the years has been reflected in the number of JUFO level 2 publications, which decreased in 2016-2017. The change was also reflected in the relative shares, as the share was on average 16 percent in 2013-2015 and 9 percent in 2016-2017. However, the number and share of JUFO level 3 publications remained stable throughout the period.

A major change can be seen in the number of JUFO level 0 publications. Their share of all publications was as high as 52 per cent in 2013, but the share fell steadily to just 22 per cent in 2017. Based on the data, JUFO level 0 publications were primarily conference papers, accounting for 84 percent of all JUFO level 0 publications.

Types of collaboration in the publications

The method for studying collaboration and instructions for interpreting the figures are described in [chapter 1.3.3](#).

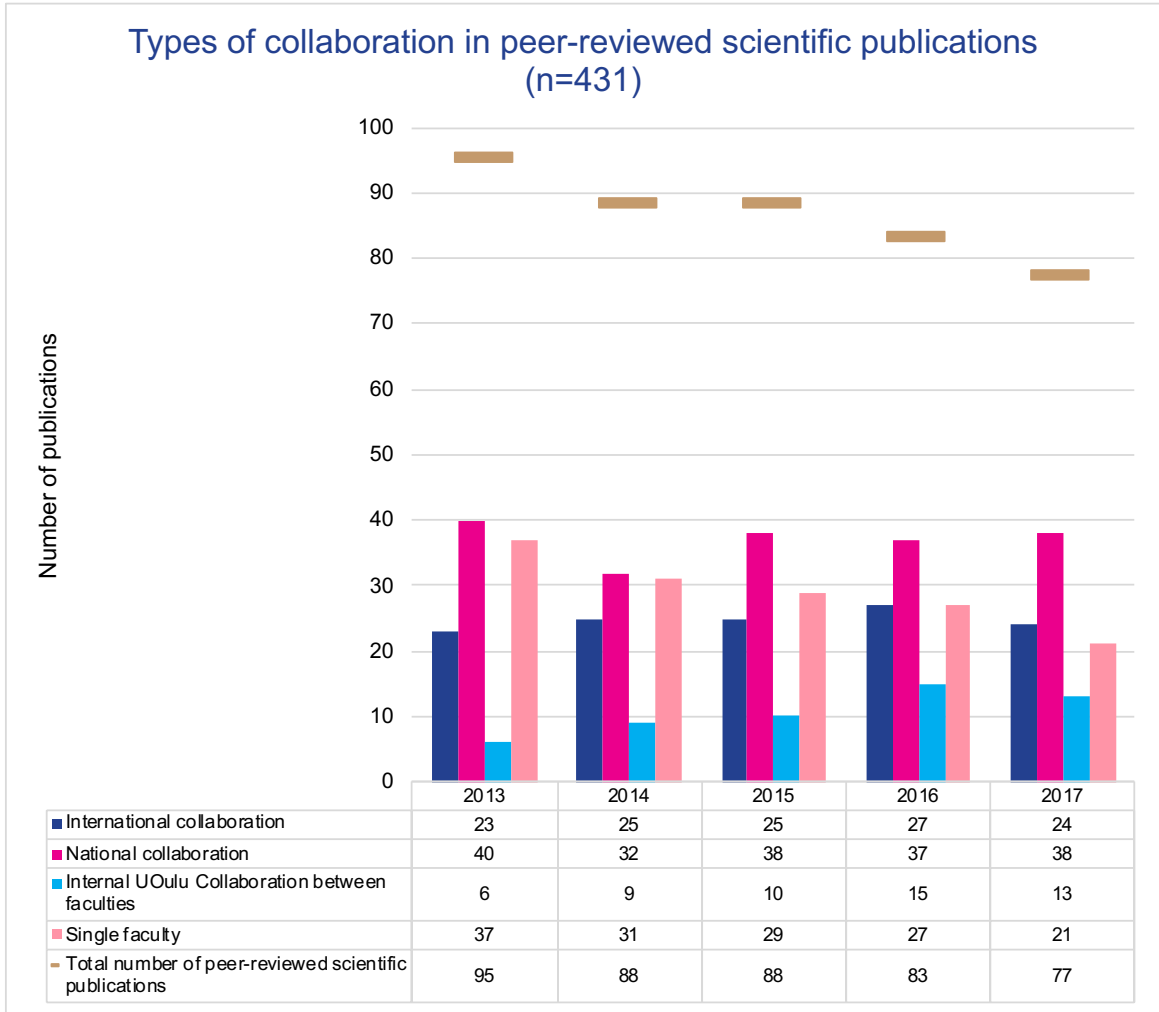


Figure 52. The distribution of peer-reviewed scientific publications of the OBS into different collaboration types.

Of the different types of collaboration, the OBS was distinguished by national collaboration, which accounted for 43 percent of the peer-reviewed publications during the period. As a second type of collaboration, single faculty collaboration stood out with a total share of 34 percent. However, the number and share of this steadily declined, with a share of 39 percent of peer-reviewed publications in 2013 compared to 27 percent in 2017.

Across the review period, international collaboration accounted for a total of 29 percent of peer-reviewed publications. The number of international collaborative publications was fairly steady every year, but its share grew slightly.

Collaborative publications with other faculties covered 12 percent of OBS publications under review. Their share also grew, from 6 percent in 2013 to as much as 17 percent in 2017.

Language of the publications

The method for studying the language of the publications is described in [chapter 1.3.4](#).

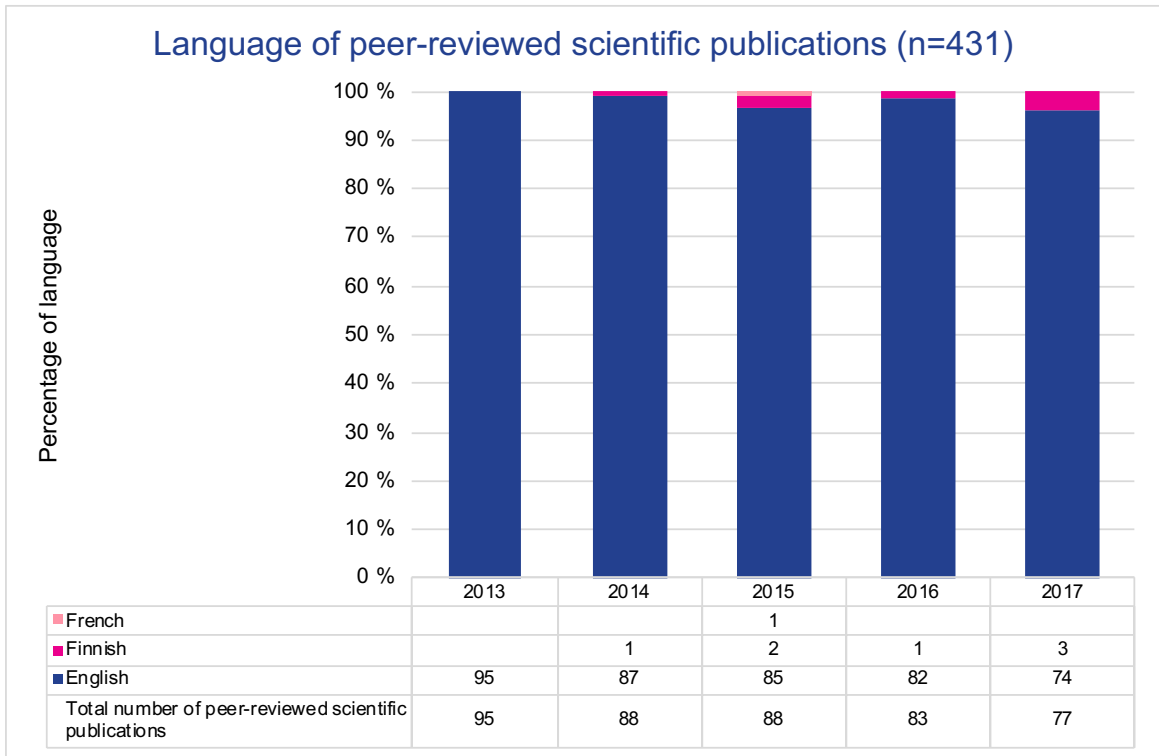


Figure 53. The percentage distribution of the languages of peer-reviewed scientific publications of the OBS.

The OBS’s peer-reviewed publications were almost entirely in English. Of the 431 peer-reviewed publications, only 7 were in Finnish, which means a share of 2 percent.

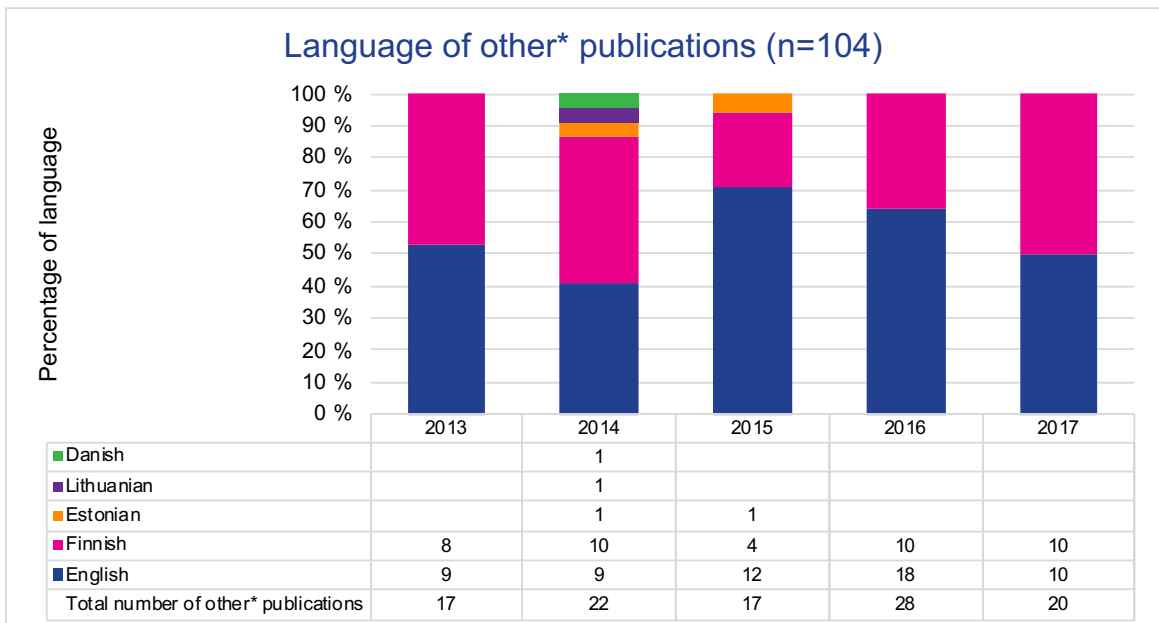


Figure 54. The percentage distribution of the languages of other publications of the OBS. * Other publications include types: B Non-refereed scientific articles, D Publications intended for professional communities, E Publications intended for the general public and I Audiovisual material, ICT software.

Of the non-peer-reviewed publications, English accounted for the largest share, accounting for 56 percent of the 104 publications. Publications in Finnish accounted for about 40 percent and other languages included individual publications in Estonian, Lithuanian and Danish.

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