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### ► To cite this version:

Roger Erivan, Julien Dartus, Nicolas Reina, Matthieu Ollivier, Guillaume Villatte, et al.. Full-text publication rate of studies reported as 2013 SoFCOT meeting abstracts. *Orthopaedics & Traumatology: Surgery & Research*, 2019, 105 (8), pp.1447-1452. 10.1016/j.otsr.2019.09.022 . hal-02526493

**HAL Id: hal-02526493**

**<https://hal.science/hal-02526493>**

Submitted on 21 Jul 2022

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## **Full-Text Publication Rate of Studies Reported as 2013 SoFCOT Meeting Abstracts**

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## ABSTRACT

**Background:** Publication of scientific work, although mandatory to ensure dissemination of novel research findings and obtain further funding, can require considerably more time and effort compared to conference presentations. Several national or scientific societies have determined the publication rate of studies reported at their annual meetings. The French Society for Orthopaedic and Trauma Surgery (*Société Française de Chirurgie Orthopédique et Traumatologique*, SoFCOT) has not yet measured this parameter. The objective of this study was to (i) evaluate the full-text publication rate of studies accepted in abstract form for podium presentations or posters at the 2013 SoFCOT meeting and (ii) identify characteristics of abstracts associated with subsequent full-text publication.

**Hypothesis:** The full-text publication rate of abstracts accepted for the 2013 SoFCOT meeting was equal to or greater than the mean reported by French societies, i.e., 44.5%.

**Material and Methods:** Publication rates of the 503 studies reported as abstracts at the 2013 SoFCOT meeting were studied. The time horizon was thus at least 5 years. The topic was orthopaedic surgery for 315 (62.6%) abstracts, trauma surgery for 153 (30.4%) abstracts, and fractures in elderly patients -- the cross-field theme for that year -- for 35 (7.0%) abstracts. Reporting was as a podium presentation for 275 (54.7%) abstracts, an e-poster for 205 (40.8%) abstracts, an instructional course lecture for 20 (4.0%) abstracts, a symposium for 2 (0.4%) abstracts, and a round table for 1 (0.2%) abstract.

**Results:** The full-text publication rate was 35.6% overall and 47.1% (139 publications) for podium presentations. Mean time from podium or poster presentation at the SoFCOT meeting to full-text publication was  $1.2 \pm 1.5$  years (range, -2.5 to 6.1 years). The full-text publications had  $0.8 \pm 2.3$  (range, -6 to 11) more authors compared to the abstract. They appeared in 54 journals with a mean impact factor of  $1.9 \pm 1.3$  (range, 0.25 to 13.77; median, 1.41; interquartile range, 1.26 to 2.47). Subgroup comparisons showed that full-text publication was

more common for prospective than retrospective studies (50.0% versus 30.5%,  $p<0.0001$ ) and for studies showing a significant difference (48.6% versus 33.0%,  $p<0.0001$ ). Systematic reviews were more often published in full than were anecdotal case-reports. The full-text publication rate was also higher for studies reported as podium presentations than as e-posters (47.1% versus 17.6%,  $p<0.0001$ ). Finally, studies of orthopaedic surgery were more often published in full than were studies of trauma surgery (39.7% versus 28.2%,  $p=0.033$ ).

**Discussion:** The 5-year full-text publication rate of studies reported as abstracts at the 2013 SoFCOT meeting was consistent with previously reported data. The impact factors of the journals in which the studies were published are evidence of the high quality of the information shared at SoFCOT meetings.

**Level of evidence:** IV, systematic retrospective analysis

**Key words:** Publication rate. Meeting abstracts. Orthopedics. SoFCOT. Annual meeting. Bibliometrics.

## 1. Introduction

Medical research aims to continuously improve the quality of care provided to patients. Optimisation of the impact of research requires dissemination of the findings, which may take the form of full-text study-report publication in a scientific journal or as presentation at national, international, and speciality meetings as an abstract, oral communication, or poster [1]. Oral communication of study findings ensures rapid dissemination of the results to the target audience of professionals, some of which may not be listed in databases.

Publication takes longer but ensures that the results are consistently available and, most importantly, that further funding is obtained (in France via the SIGAPS system). The French Society for Orthopaedic and Trauma Surgery (*Société Française de Chirurgie Orthopédique et Traumatologique*, SoFCOT) holds an international meeting each year, during which studies done in France and elsewhere are reported in French and English. The studies reported at these meetings are selected based on their abstracts to ensure high quality standards [2]. Three experts conduct a blinded peer-review of submitted abstracts. Depending on the scores obtained, the study reported in the abstract is accepted for a podium presentation, accepted for an e-poster, or rejected.

Full-text publication is a lengthy process that delays the dissemination of new findings and requires substantial effort on the part of the authors, who must go through the peer review process designed to optimise the quality of the work [3]. Peer review aims to select the best studies for publication and to limit the publication of studies that either add little to the available corpus of data or fail to comply with ethical standards [4].

Several national or scientific societies have determined the rate of full-text publication of study reports whose abstracts were accepted for their annual meetings. The French Society for Orthopaedic and Trauma Surgery (*Société Française de Chirurgie Orthopédique et Traumatologique*, SoFCOT) has not yet measured this parameter. The objective of this study

was to (i) evaluate the full-text publication rate of studies accepted in abstract form for podium presentations or posters at the 2013 SoFCOT meeting and (ii) identify characteristics of abstracts associated with subsequent full-text publication. The working hypothesis was that the full-text publication rate of abstracts accepted for the 2013 SoFCOT meeting was equal to or greater than the mean reported by French societies, i.e., 44.5%.

## **2. Material and Methods**

### **2.1 Material**

The abstracts published in the proceedings of the November 2013 SoFCOT conference were collected directly from the SoFCOT and subjected to a bibliometric analysis. The rationale for the 5-year time horizon obtained by selecting 2013 for the study came from work by Komagamine et al. [5], in which 95% of full-text publications occurred within 4 years after the conference.

Full-text publications were identified by a systematic search of PubMed for articles by the authors of the abstracts, according to standard bibliometric methods [1,5–8]. The abstracts of the full-text publications retrieved were compared to those accepted for the 2013 SoFCOT meeting to ensure that both referred to the same study. For each abstract and e-poster accepted by the SoFCOT, the following data were collected: study topic, study subcategory, number of authors, type of presentation, country of the first author, number of participating centres, study design, level of evidence [9], anatomical site targeted by the study, whether recruitment was retrospective or prospective, and whether the study was published as a full-text article.

The blind peer-review process conducted by three experts for the 2013 SoFCOT meeting led to the acceptance of 503 abstracts. The studies focussed on adults in 434 (86.3%) case and on paediatric patients in 69 (13.7%) case. The topic was orthopaedics in 315 (62.6%) cases, trauma in 153 (30.4%) cases, and fractures in the elderly – the cross-field theme for the

year – in 35 (7.0%) cases. Of the 503 studies, 275 (54.7%) were reported as podium presentations, 205 (40.8%) as e-posters, 20 (4.0%) during instructional course lectures, 2 (0.4%) during a symposium, and 1 (0.2%) during a round table discussion.

The mean number of authors was  $4.78 \pm 2.31$  (range, 1-17). The first author was French in 320 (63.6%) cases, Moroccan in 58 (11.5%) cases, Tunisian in 40 (8.0%) cases, Algerian in 17 (3.4%) cases, and Canadian in 11 (2.2%) cases. Other first authors were from Switzerland, Portugal, Spain, Czechoslovakia, Belgium, Russia, Senegal, Italy, and Romania. A single centre was involved in the study in 456 (90.7%) cases and more than one centre in 47 (9.3%) cases. Of the 503 studies, 348 (69.2%) were clinical, 27 (5.4%) were experimental, 14 (2.8%) were epidemiological, 25 (5.0%) were meta-analyses or systematic literature reviews, 87 (17.3%) were anecdotal case-reports, and 2 (0.4%) were other types of study.

The level of evidence was I for 7 (1.4%) studies, II for 36 (7.2%) studies, III for 51 (10.1%) studies, IV for 286 (56.8%) studies, and V for 78 (15.5%) studies; the others were reviews, cadaver or animal studies. There were no meta-analyses or technical reviews. Recruitment was retrospective for 377 (75.0%) studies and prospective for 126 (25.0%) studies. Finally, 24 (4.8%) studies were randomised trials.

## **2.2 Methods**

For each full-text publication, the following were recorded: publishing journal with its SIGAPS category at the time of publication and impact factor, date of publication, number of authors, and article citation count. The data about full-text publications were obtained from the SIGAPS (*Système d'Interrogation, de Gestion et d'Analyse des Publications Scientifiques*, Scientific Publication, Retrieval, Management, and Analysis System).

## **2.3 Statistical methods**

Excel™ (Microsoft, Redmond, WA, USA) and Addinsoft (2019) XLSTAT™ statistical and data analysis solution (Long Island, NY, USA) were used for the statistical analysis. Quantitative variables were described as mean±SD (range) if normally distributed and as median [interquartile range] otherwise. Distribution normality was assessed by applying the Shapiro-Wilk test. Differences were tested using Student's test if distribution was normal and the non-parametric Wilcoxon test otherwise. Frequencies were compared using Fisher's exact test or the chi-square test as appropriate. There were no missing data and all 503 abstracts were included in the analysis. Values of  $p$  below 0.05 were considered significant. Finally, 95% confidence intervals (95%CI) were computed.

### 3. Results

The overall publication rate for the podium presentations and e-posters combined was 179/503, i.e., 35.6% (95%CI, 31.3%-39.9%). Of the 295 podium presentations and instructional course lectures, 139 (47.1%; 95%CI, 41.3%-53.0%) were published, a rate significantly higher than the 17.6% rate for e-posters ( $p<0.0001$ ).

Mean time from the SoFCOT conference to full-text publication was  $1.2\pm 1.5$  (range, -2.5 to 6.1 years). **Figure 1** depicts the timing of the publications. Compared to the abstract, the full texts had a larger mean number of authors, the mean increase being  $0.8\pm 2.3$  (range, -6 to 11) (**Figure 2**). The full texts were published in 54 journals (**Table 1**), and the journal with the most full-text publications by far was *Orthopaedics & Traumatology: Surgery & Research* (OTSR). The mean impact factor of the publishing journals was  $1.9\pm 1.3$  (range, 0.25-13.77; median, 1.41 [1.26-2.47]). The distribution of the full-text articles by SIGAPS category was as follows: A,  $n=7$  (3.9%); B,  $n=38$  (21.2%); C,  $n=23$  (12.8%); D,  $n=78$  (43.6%); and E,  $n=17$  (9.5%); the remaining 16 articles (8.9%) were not classifiable in SIGAPS. The mean article citation count was  $11.1\pm 15.3$  (range, 0-98).



Subgroup comparisons showed that full-text publication was more common for prospective than for retrospective studies (50% vs. 30.5%, respectively;  $p<0.0001$ ). Although randomised studies were published slightly more often than non-randomised studies, the difference was not statistically significant (41.7% vs. 35.1%,  $p=0.510$ ). Studies showing a statistically significant difference were published significantly more often than other studies (48.6% vs. 33.6%,  $p<0.0001$ ). Systematic reviews had a higher publication rate compared to anecdotal case-reports (Table 2). Systematic analyses and meta-analyses (level I or II) and level III studies were published significantly more often than were studies with lower levels of evidence ( $p<0.0001$ ) (Table 3). Publication rates were not significantly different between paediatric studies and studies in adults (31.9% vs. 35.9%;  $p=0.512$ ). Finally, the publication rate was 39.7% for studies of orthopaedics and 28.2% for studies of traumatology ( $p=0.033$ ).

#### **4. Discussion**

The 5-year full-text publication rate for the abstracts reported at the 2013 SoFCOT meeting was 35.6% overall and 47.7% for the podium presentations. The working hypothesis is thus confirmed: the full-text publication rate for studies accepted at the SoFCOT meeting as podium presentations was higher than the mean rate of 44.5% found in the 2007 Cochrane meta-analysis by Scherer et al. [10]. Although this meta-analysis is over 10 years old, the number of publications has increased steadily over the interval, further supporting our conclusion [11]. In the meta-analysis [10], the publication rate was highest for randomised trials and clinical trials, in keeping with our findings [12].

The full-text publication rate of studies reported as podium presentations and/or e-posters varies widely, from 26.6% to 60.2% in studies by Daruwalla et al. [13], Al-Hourani et al. [14], Schulte et al. [7], Donegan et al. [15], Kwong et al. [16], Kleine-Konig et al. [8], and Hollenberg et al. [17] (Table 4)

The publication rates in our study are consistent with earlier data, for both the podium presentations and the e-posters. During the blind peer-review process applied for SoFCOT meetings, the selection criteria are considerably less stringent for e-posters than for podium presentations. Thus, e-posters are not scored and are often accepted, chiefly to keep the meeting as open as possible, notably to international contributors. Presentation as e-posters is suggested for abstracts that are rejected for podium presentations but have scores above a cut-off. These aspects of the selection process may explain the difference in publication rates for the overall group of abstracts and for the subgroup of abstracts accepted for podium presentations.

Apart from orthopaedic surgery, abstracts for other specialities dealing with musculoskeletal conditions have lower rates of full-text publication. Of the abstracts accepted for American Physical Therapy Association conferences between 2000 and 2004, 25.4% led to full-text publications [18]. Allart et al. [19] reported that 21.2% of abstracts reported at the French Physical and Rehabilitation Medicine Society in 2008 led to full-text publications. Similar studies exist for other fields, such as vascular surgery, with Javidan et al. [20] reporting a 43.0% full-text publication rate for abstracts accepted for the Society for Vascular Surgery annual meetings in 2012 and 2015.

The full-text publication rate was higher for prospective studies, studies showing significant differences, and level III reviews. Furthermore, among abstracts accepted for podium presentations, those dealing with orthopaedic surgery were more often published than were studies of trauma surgery.

Most of the full-text publications appeared in *OTSR*, followed by *International Orthopaedics* and *Knee Surgery Sports Traumatology Arthroscopy*. The mean impact factor was 1.9, which is at the upper end of the range for work first reported at conferences [7,8,13,14,21]. Few studies have determined the citation counts of full-text articles from

conference abstracts; in our study, the mean citation count was 11.1, a fairly high value compared to the 30 to 169 counts for the top 100 most cited *OTSR* articles [22]. These findings support the high quantity of the publications stemming from SoFCOT meetings.

The need for most journals to submit full-text articles in English may decrease the publication rate of SoFCOT conference abstracts and discourage some authors from sharing their findings [23,24]. *OTSR* accepts articles in French and takes charge of their translation in English. This fact may explain why most of the full-text articles were published in *OTSR*.

Our study has several limitations. The retrospective design may have resulted in loss of data. The PubMed search for full-text publications was annual and may have missed some articles. The conclusions of some studies may have changed between the presentation at the conference and publication of the article [19,20,25,26]. However, tools capable of measuring this source of bias were not available. Although we searched only PubMed, no differences in search results have been found compared to other databases [21] and the methodology we used was the same as in similar published studies [1]. Our study focussed on full-text publications reporting studies presented at a SoFCOT meeting. Another approach of potential interest may be to determine how many of the articles published in peer-reviewed journals were first presented at conferences.

## **5. Conclusion**

The 5-year publication rate of studies reported as podium presentations at the 2013 SoFCOT conference was higher than the previously published mean value. The impact factors of the publishing journals and the article citation counts confirm the high quality of the material shared at SoFCOT conferences. The large number of studies that remain unpublished highlights the challenges of obtaining publication in peer-reviewed journals.

## **Acknowledgements**

We thank the SoFCOT for making the abstracts of the 2013 meeting available to us.

**Disclosure of interest**

RE, JD, NR, GV, MS, and PD have no conflicts of interest to declare.

MO has no conflicts of interest in relation to this study and is a consultant for Arthrex, Stryker, and New-Clip.

**Funding**

None

**Contribution of each author**

RE contributed to design the study, analyse the data, and draft and revise the manuscript.

JD contributed to design the study, collect the data, and revise the manuscript.

NR contributed to collect the data and revise the manuscript.

MO collect the data, and revise the manuscript.

GV contributed to revise the manuscript.

MS contributed to collect the data.

PD contributed to collect and analyse the data and to revise the manuscript.

## **FIGURE LEGENDS**

Figure 1: Time to publication with reference to the 2013 SoFCOT meeting

Figure 2: Changes in number of authors between the SoFCOT abstract and full-text publication

Table 1: Journals in which the 179 full-text publications appeared, by order of frequency

| Journal                             | Number of publications | Impact Factor | SIGAPS during the study period |
|-------------------------------------|------------------------|---------------|--------------------------------|
| Orthop Traumatol Surg Res           | 68                     | 1.393         | D                              |
| Int Orthop                          | 11                     | 2.387         | B to C                         |
| Knee Surg Sports Traumatol Arthrosc | 11                     | 3.097         | B                              |
| Chir Main                           | 6                      | 0.287         | E                              |
| J Arthroplasty                      | 6                      | 2.666         | B to C                         |
| J Shoulder Elbow Surg               | 6                      | 2.849         | B to C                         |
| Bone Joint J                        | 5                      | 2.66          | B                              |
| Knee                                | 4                      | 1.976         | C to D                         |
| Pan Afr Med J                       | 4                      | 0             | NC                             |
| Arthroscopy                         | 3                      | 3.191         | A to B                         |
| Hand Surg Rehabil                   | 3                      | 1.14          | D to E                         |
| World J Orthop                      | 3                      | 0             | NC                             |
| Acta Orthop Belg                    | 2                      | 0.576         | E                              |
| Arch Orthop Trauma Surg             | 2                      | 1.31          | C to D                         |
| Clin Orthop Relat Res               | 2                      | 3.127         | B                              |
| Eur Spine J                         | 2                      | 2.473         | C                              |
| Foot Ankle Int                      | 2                      | 1.506         | C                              |
| J Bone Joint Surg Am                | 2                      | 3.272         | A                              |
| PLoS One                            | 2                      | 2.766         | B                              |
| Spine                               | 2                      | 2.792         | C                              |
| Acta Orthop                         | 1                      | 2.617         | B                              |
| Am J Sports Med                     | 1                      | 4.699         | A                              |
| Ann Chir Plast Esthet               | 1                      | 0.581         | E                              |
| Biomed Res Int                      | 1                      | 2.476         | C                              |
| Blood Transfus                      | 1                      | 2.138         | D                              |
| Case Rep Orthop                     | 1                      | 0             | NC                             |
| Comput. Aided Surg.                 | 1                      | 1.077         | D                              |
| Diagn. Microbiol. Infect. Dis.      | 1                      | 2.26          | D                              |
| Eur J Orthop Surg Traumatol         | 1                      | 0             | NC                             |
| Eur J Trauma Emerg Surg             | 1                      | 0.346         | E                              |
| Int J Shoulder Surg                 | 1                      | 0.647         | E                              |
| J Child Orthop                      | 1                      | 1.092         | E                              |
| J Med Case Rep                      | 1                      | 0             | NC                             |
| J Orthop Case Rep                   | 1                      | 0             | NC                             |
| J Orthop Sci                        | 1                      | 1.133         | D                              |
| J Orthop Trauma                     | 1                      | 1.84          | C                              |
| J Orthop Traumatol                  | 1                      | 0             | NC                             |
| J Pediatr Orthop                    | 1                      | 1.695         | C                              |
| J Pediatr Orthop B                  | 1                      | 0.594         | E                              |

|                             |   |        |    |
|-----------------------------|---|--------|----|
| J Wrist Surg                | 1 | 0      | NC |
| J. Bone Miner. Res.         | 1 | 6.314  | A  |
| J. Clin. Invest.            | 1 | 13.765 | A  |
| Joint Bone Spine            | 1 | 3.329  | C  |
| Mil Med                     | 1 | 0.969  | D  |
| Neurochirurgie              | 1 | 0.802  | E  |
| Open Orthop J               | 1 | 0      | NC |
| Osteoarthr. Cartil.         | 1 | 4.165  | A  |
| Sarcoma                     | 1 | 0      | NC |
| Skeletal Radiol.            | 1 | 1.51   | D  |
| Spine J                     | 1 | 2.66   | C  |
| Surg Radiol Anat            | 1 | 1.195  | D  |
| Transfus Clin Biol          | 1 | 0.561  | E  |
| Vestn. Akad. Med. Nauk SSSR | 1 | 0      | NC |

NC: not classifiable in the SIGAPS



Table 2: Publication rates according to type of study design

The  $p$  values compare the type of study for each row to all other types of study combined; the values in bold type indicate statistically significant differences.

| Type of study                   | Publication rate | $p$ value                             |
|---------------------------------|------------------|---------------------------------------|
| Clinical study                  | 37.1%            | 0.50                                  |
| Epidemiological study           | 35.7%            | 1.00                                  |
| Experimental study              | 44.4%            | 0.60                                  |
| Literature review/Meta-analysis | 80.0%            | <b><math>1.1 \cdot 10^{-5}</math></b> |
| Case-report                     | 12.6%            | <b><math>6.8 \cdot 10^{-6}</math></b> |

Table 3: Publication rate according to level of evidence

The  $p$  values compare the level of evidence for each row to all other levels of evidence combined; the values in bold type indicate statistically significant differences.

| Level of evidence | Publication rate | $p$ value                               |
|-------------------|------------------|---|
| 1                 | 28.6%            | 0.704                                   |
| 2                 | 50.0%            | 0.057                                   |
| 3                 | 60.8%            | <b><math>6.30 \cdot 10^{-05}</math></b> |
| 4                 | 31.5%            | <b>0.030</b>                            |
| 5                 | 14.1%            | <b><math>1.90 \cdot 10^{-05}</math></b> |
| Animal studies    | 25.0%            | 0.536                                   |
| Systematic review | 87.0%            | <b><math>1.19 \cdot 10^{-07}</math></b> |
| Technical note    | 0.0%             | 0.294                                   |

Table 4: Publication rates found in previous studies. AOA Australian Orthopaedic Association, EFORT European Federation of National Associations of Orthopaedics and Traumatology, SICOT Société Internationale de Chirurgie Orthopédique et de Traumatologie, ORS orthopaedic research society, AAOS American Academy of Orthopaedic Surgeons, BOA British Orthopaedic Association, IOA Irish Orthopaedic Association, GSOTS German Society of Orthopaedics and Trauma Surgery, TOTC Turkish Orthopaedic and Traumatology Congress, CBOT Congresso Brasileiro de Ortopedia, SOA Singapore Orthopaedic Association, EPOS European Paediatric Orthopaedic Society,.

| Conference             | Number of abstracts | Type of presentation           | Publication rate |
|------------------------|---------------------|--------------------------------|------------------|
| AOA (1998)             | 200                 | Not specified                  | 31.0%            |
| EFORT (1999 et 2001)   | 278                 | Podium presentation only       | 40.3%            |
| SICOT (2009)           | 329                 | Podium presentation only       | 31.3%            |
| ORS (2012-2014)        | 1063                | Podium presentation only       | 60.2%            |
| Cochrane meta-analysis | 29729               | Podium presentation and poster | 44.5%            |
| AAOS (2001)            | 756                 | Podium presentation and poster | 58.1%            |
| BOA (2001)             | 179                 | Podium presentation and poster | 36.3%            |
| IOA (2002-2005)        | 203                 | Podium presentation and poster | 32.5%            |
| GSOTS (2003)           | 1100                | Podium presentation and poster | 34.9%            |
| TOTC (2007)            | 770                 | Podium presentation and poster | 29.5%            |
| CBOT (2007)            | 653                 | Podium presentation and poster | 26.6%            |
| SOA (2007,2009-2013)   | 443                 | Podium presentation and poster | 28.2%            |
| SAO (2007-2013)        | 443                 | Podium presentation and poster | 35.8%            |
| EPOS (2006-2008)       | 646                 | Podium presentation and poster | 36.7%            |
| Our study: SoFCOT 2013 | 275                 | Podium presentation only       | 47.7%            |
| Our study: SoFCOT 2013 | 503                 | Podium presentation and poster | 35.6%            |

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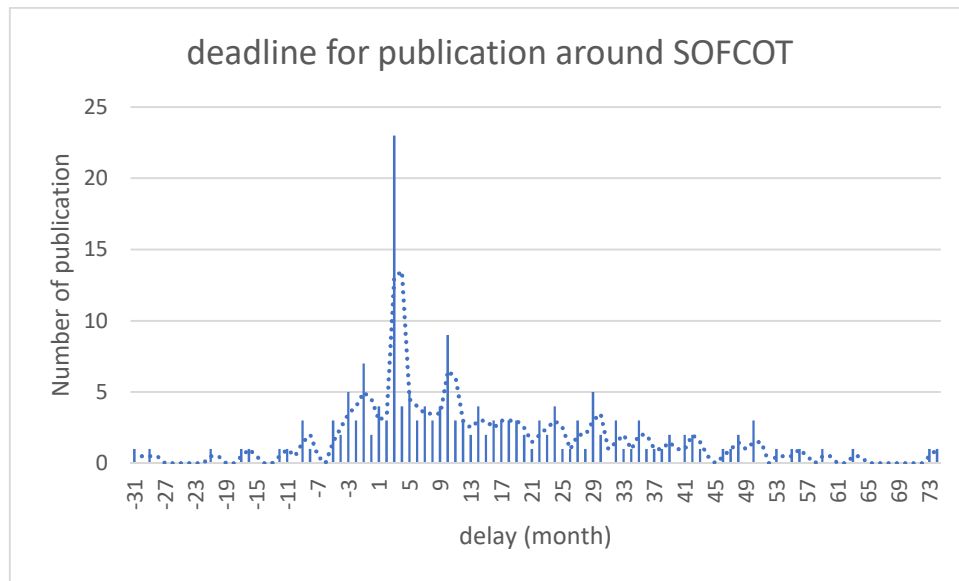


Figure 1: distribution of publication deadlines around the SOFCOT congress

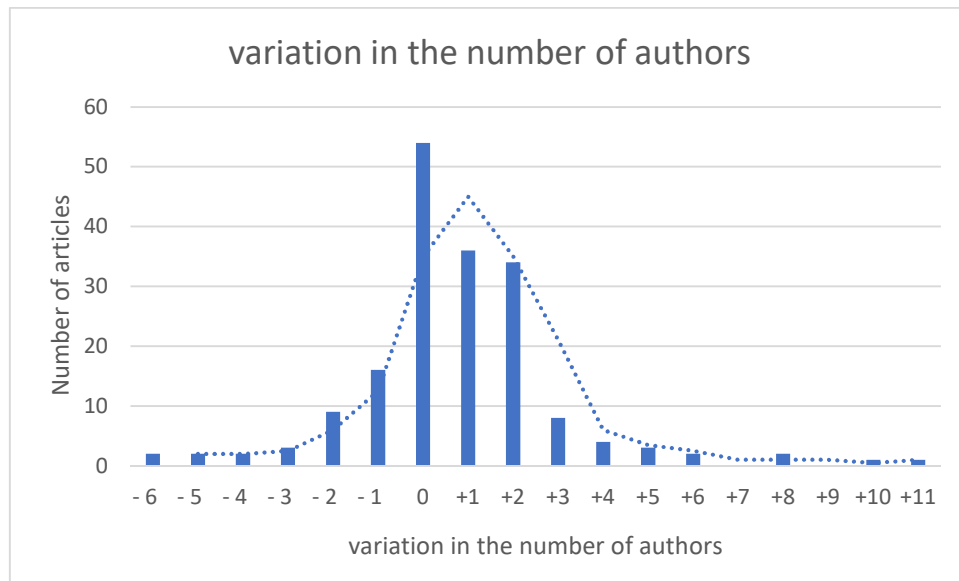


Figure 2: Variation in the number of authors between the SOFCOT communication and the publication