Visualizing University Departments' Research Achievements, Including in the Humanities and Social Sciences: A Non-Bibliometric Index Approach

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Abstract

In recent years, bibliometric indices have been used in various situations to conduct research evaluations, but the difficulties of using such methods for evaluation in the humanities and social sciences are evident. Here, we present a case study of a method for evaluating the research performance of departments in the humanities and social sciences without relying solely on bibliometric indices based on articles written in English. We introduce the process whereby we built our evaluation indices, as well as radar charts for each department, using the multiple indices we created.

Keywords: humanities and social sciences, institutional data, research assessment, visualization.

1   Introduction

In recent years, bibliometric indices have been used to conduct research evaluations in various situations. However, it has become evident that there are difficulties and challenges in using these methods to evaluate research in the humanities and social sciences. Even in the field of Institutional Research (IR), which specializes in analyzing research performance, it is recognized that particular difficulties may arise in analyzing performance in the humanities and social sciences.

The authors belong to the IR office of a national comprehensive university in Japan. The primary objective of this office is to "support the [university's] Executive Office through data." As one of its activities, every six months, the office determines themes related to the university's priority policies and reports the results to the executive board. The themes are sometimes concerned with the university's research achievements, for which we often use bibliometric indicators that are mainly sourced from the Scopus and Web of Science databases, which mostly contain articles written in English. However, it has been pointed out within the university that neither Scopus nor Web of Science covers research outputs in the humanities and social sciences.

We examined the share of the top 15 countries in terms of the total number of papers in Scopus (publication years 2018-2020). Japan ranked sixth in terms of its share of the total number of papers. However, non-English speaking countries tended to have a lower share of papers in the humanities and social sciences, with Japan in 15th place. It appears that fewer Scopus and Web of Science papers are published as research outputs in the humanities and social sciences in non-English speaking countries than in English speaking countries, and that this is particularly true for Japan.

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Therefore, we set up a theme to explore a research performance evaluation method that could evaluate research in the humanities and social sciences using quantitative indicators rather than relying on bibliometric indices based on Scopus or Web of Science [English article indices]. We then proposed the indicators and visualization methods we examined to the executive committee. In this report, we describe the indicators and visualization methods we studied.

2   Issues and Purpose

2.1 The Challenges of Evaluating Research Performance in the Humanities and Social Sciences

There has been much discussion about the difficulties of evaluating research performance in the humanities and social sciences [1][2][3][4].

For example, it has been noted that scholars in the humanities and social sciences tend to have more single-authored papers and fewer co-authored papers than their counterparts in science, engineering, and medicine, and that unlike in the sciences, where progress is also published, in the humanities and social sciences, papers tend to be published as the completed form of a large project [1]. As for the number of citations, which is often used as an alternative indicator of the quality of a paper, the average number of years until a paper is cited is greater in the humanities and social sciences than in the sciences, and it takes longer for the number of citations to grow [1]. This tends to result in a lower volume of papers and a lower number of citations in the humanities and social sciences than in the sciences.

Additionally, the types of research outputs tend to be more diverse in the humanities and social sciences. Rather than journal articles being the sole focus, there is a wide variety of possible outcomes, including the publication of multiple significant articles simultaneously as chapters of a book, translations, archives of historical materials, creative activities and lectures in the arts, case reviews, discussion papers, instructional books, development of educational materials, and so on. In addition, there are cases in which it is difficult to translate research on particular subjects into English, such as history and literature involving archaic Japanese-language sources [2].

This is not to deny the value of English-language journal articles, but it does raise the issue that the overall results of research in the humanities and social sciences cannot be evaluated on the basis of English-language journal articles alone.

2.2 Discussion of the Purpose of the Evaluation

Based on the issues involved in the evaluation of research performance in the humanities and social sciences, we now discuss the purpose of the evaluation we are targeting in this study. Table 1 lists the evaluations surrounding the authors' university. One is the university's "external" evaluation, in which the university is evaluated by external public institutions or private companies. These include national university corporation evaluations, accreditation evaluations, and university rankings. The other is the university's "internal" evaluation. This can be further classified into the evaluation of the departments by the university and the evaluation of individuals by the university and the departments. Bibliometric indices based on Scopus or the Web of Science (databases that make papers and their citation information available) are sometimes used as

indicators for research evaluations (those evaluations for which bibliometric indices were used are underlined).

When English article indices are used in evaluations from outside the university, it is necessary to adopt them, despite the challenges in evaluating research in the humanities and social sciences using English article indices.

Therefore, in this study, we decided to examine and propose an evaluation method for use "inside the university," as this would allow us to devise our own indicators and methods. To solve the problem that total research outcomes in the humanities and social sciences cannot be evaluated by English article indices alone, we examined how to design a suitable evaluation method, especially for cases in which departments are evaluated.

Table 1: The Research Evaluation Landscape Around One Japanese University

	Evaluator	Evaluated	Evaluation
university "external" evaluation	external public institutions	university	National University Corporation Evaluation
			Certified Evaluation and Accreditation
			Grant-in-Aid for Operations (allocation based on performance status with focus on results)
			Allocation of competitive funds (e.g., application requirements for designated national university corporation)
	private company		University rankings
university "internal" evaluation	university	department	Budget allocation to departments
	university/ department	faculty	Evaluation of faculty activities
			Evaluation of the annual salary system

3   Case Study and Selection of Indicators

We began by conducting a case study of performance evaluation in the humanities and social sciences, and then selected the indicators and methods to be used.

3.1 Evaluation in Humanities and Social Sciences Case Study

3.1.1 Number of Papers, Considering Differences among Disciplines

The number of outputs such as papers tends to be lower in the humanities and social sciences than in science and engineering, but since there are differences among the disciplines, an index has been developed to compensate for this (a normalized index to quantify publication productivity) [5].

3.1.2 Counting Books

There are examples of counting "books" by chapter in the humanities and social sciences in order to evaluate the quantity of achievements [1] and of counting the number of library holdings as an alternative to the number of citations of books[6].

3.1.3 Country-specific Approaches to the Evaluation of Humanities and Sociology Journals

The Impact Factor, which is a journal evaluation index, is calculated for the journals that are included in the Web of Science database, but there are examples of countries independently evaluating and ranking their own humanities and social science journals, including domestic ones [7][8]. South Korea, Taiwan, and China have established their own citation index databases, and while the evaluation of faculty performance in these three countries tends to emphasize the Web of Science's SSCI list of top journals in the social sciences, all three countries have established their own lists of top domestic journals [7]. In addition, in the evaluation of universities by government agencies in Norway, Belgium, and Denmark, journals and publishers, including domestic journals, are rated by peer review and classified as belonging to one of two levels, and points are calculated for each university based on the number of papers and books published. A portion of research funding is distributed on the basis of the results [8].

Regarding this example of rating journals and publishers, although there is some reason for caution in the fact that the journal evaluation index represented by the Impact Factor does not evaluate individual papers [9], it tends to be used frequently because it has the merit of saving labor during the evaluation [7].

3.1.4 Other Perspectives

The numbers of internationally co-authored papers and internationally co-authored books have also been mentioned as indicators for measuring international collaboration [10]. There are also examples of institutions developing their own indicators to measure specific things (e.g., an indicator to measure the spread of papers to other fields (REDi) [11] and a diversity index related to academic research fields [12]).

3.1.5 Cases of the United Kingdom and the Netherlands

In the Research Excellence Framework (REF) national university evaluation for the allocation of operating grants in the UK, the evaluation emphasizes not only the "quality" of research achievements but also their "impact" on society, industry, etc. [13] [14].

In the Netherlands, an evaluation of a university by an external organization is conducted once every six years for the purpose of improvement (this is known as an SEP). Here, each university presents its performance in terms of three perspectives of the "Research quality," "Societal Relevance," and "Viability" of its research achievements, which are finally evaluated by peer review [15]. In addition, as part of the self-evaluation (evaluation for the purpose of improvement) element of the university evaluation, there is an example of a radar chart profiling the characteristics of various aspects of a university [16].

In both examples in the UK and the Netherlands, the following characteristics were observed: a tendency to emphasize the "impact on society" and "relations with society" and to evaluate not only "research articles" but also various research achievements.

3.1.6 Indicators used in the "department-specific evaluation criteria" – An example from one Japanese university

At the university to which the authors belong, a faculty activity evaluation is conducted once every three years by the head of the department to evaluate the activities of individual faculty members. Although there is no university-wide standardized index, some departments have decided to use standardized evaluation criteria within each department, starting a few years ago.

The university has departments in various fields, such as science, engineering, medicine, and the humanities and social sciences, and we investigated which kinds of indicators are used in each department.

We found that a variety of indicators were mentioned but that there was a tendency to use different indicators in departments in humanities and social sciences fields compared to those in science, engineering, and medicine. Ninety percent of departments in the science, engineering, and medicine fields used indicators related to articles—for example, X papers published in journals with a high Impact Factor over a three-year period carry the highest rating. In contrast, few of the humanities and social science departments used an index related to articles, but more than half used books as an index. For example, the best evaluation was given to the author of a single book published within the last three years. Common indicators used by both departments in the humanities and social sciences and in science, engineering, and medicine were grants-in-aid for scientific research (KAKENHI), and awards and prizes. However, the standard values were set differently for each department. For example, one department in the science and engineering field gave the highest evaluation to researchers who received a KAKENHI for Scientific Research "S" (50~200 million yen in 5 years), while another department in the humanities and social sciences gave the highest evaluation if a researcher received a KAKENHI for Scientific Research "A" (20~50 million yen in 3~5 years).

3.2 Selection of Indicators and Methodology

The results of the survey revealed that various indicators are used for research evaluation in other domestic and foreign institutions. In addition, there are cases in which multiple indicators are used to evaluate research activities in order to assess them from multiple perspectives [16]. In light of this, in this study, we attempted to look at the characteristics of each department using a radar chart with multiple indicators. As a method of evaluation using radar charts, we considered ranking the departments by giving a score for each indicator (weighted according to the indicator) and then giving an overall score.

For the indicators to be used, we decided to select from among the indicators that could be used to evaluate research performance in the humanities and social sciences mentioned in the survey.

Table 2: Indicators used to evaluate research achievements in humanities and social sciences

Quantity	Number of books (single/co-authored)
	Number of papers in domestic journals (considering differences by field)
Quality	Define the top journals and top publishers in the humanities and social sciences
	Number of libraries holding books
	Number of citations in domestic journals
	Evaluation by Researchers (KAKENHI, Awards etc.)
Specific Perspectives	International collaboration (international co-authored articles/books)
	Developing own indicators (REDi etc.)
Social Contribution	Contribution to society, economy, and culture

Table 3: Indicators used for radar chart

No.	Item	Detail	Source
1	Books	No. of single authored / person	Q-RADeRS
2		No. of co-authored/ person	Q-RADeRS
3		No. of libraries holding single authored / person	Q-RADeRS・CiNiiBooks
4	English Publisher Books	No. of books (Scopus books, book chapters)	Scopus
5		FWCI (Scopus books, book chapters)	Scopus
6	Japanese Journal Articles	No. of articles / person	Q-RADeRS
7	English Journal Articles	No. of articles / person (Scopus articles, reviews)	Scopus
8		FWCI (Scopus articles, reviews)	Scopus
9	International Collaboration	No. of international co-authored articles and books (Scopus articles, reviews, books, book chapters)	Scopus
10	Research Funding (KAKENHI)	Percentage of person obtaining KAKENHI	Department in charge
11		No. of obtained large scale categories / person	Department in charge
12		Amounts of KAKENHI/ person	Department in charge
13	Awards	No. of awards / person (used in the annual salary criteria in the author's university)	Q-RADeRS
14		No. of awards / person (other than those counted toward No.13)	Q-RADeRS
15	Social Contribution	No. of activities that contribute to policy formation / person	Q-RADeRS
16		No. of members of any project review committees by government / person	Q-RADeRS
17		No. of mass media appearances / person	Q-RADeRS
18		No. of public lectures for citizens / person	Q-RADeRS
19		No. of educational activities for professionals from abroad / person	Q-RADeRS
20		No. of contributions to primary or secondary education / person	Q-RADeRS

Table 2 shows a summary of the indicators that can be used to evaluate research achievements in the humanities and social sciences. In selecting the indicators, we chose those that were available in open databases and in Q-RADeRS, a database owned by our university that researchers can use to disclose their achievements. In Q-RADeRS, in addition to achievements related to education and research, those related to social contributions (e.g., public lectures, appearances in the mass media, etc.) are registered. Table 3 shows those considered as possible sources of data due to the existence of this database.

4 Results

First, the activity of each department with respect to the individual indicators is shown. Figure 1 shows a graph visualizing the values for each department using indicators related to books. The horizontal axis indicates the number of single-authored books per person, the vertical axis indicates the number of co-authored books per person, and the size of the circle indicates the number of single-authored books held in the library per person. Most of the departments in the HSS

(humanities and social sciences) group have more single-authored and co-authored books per person than the average for the university. It was discovered that departments in the humanities and social sciences have higher activity related to books than those in science and engineering.

Figure 2 shows a graph visualizing the values of each department using indicators related to social contributions. This is the number of registrations per person of items related to social contribution in Kyushu University's Q-RADeRS. It was found that the number of registrations was higher than the university average in departments in the HSS (humanities and social sciences) group, especially in departments of social science subjects, indicating that the level of social contribution
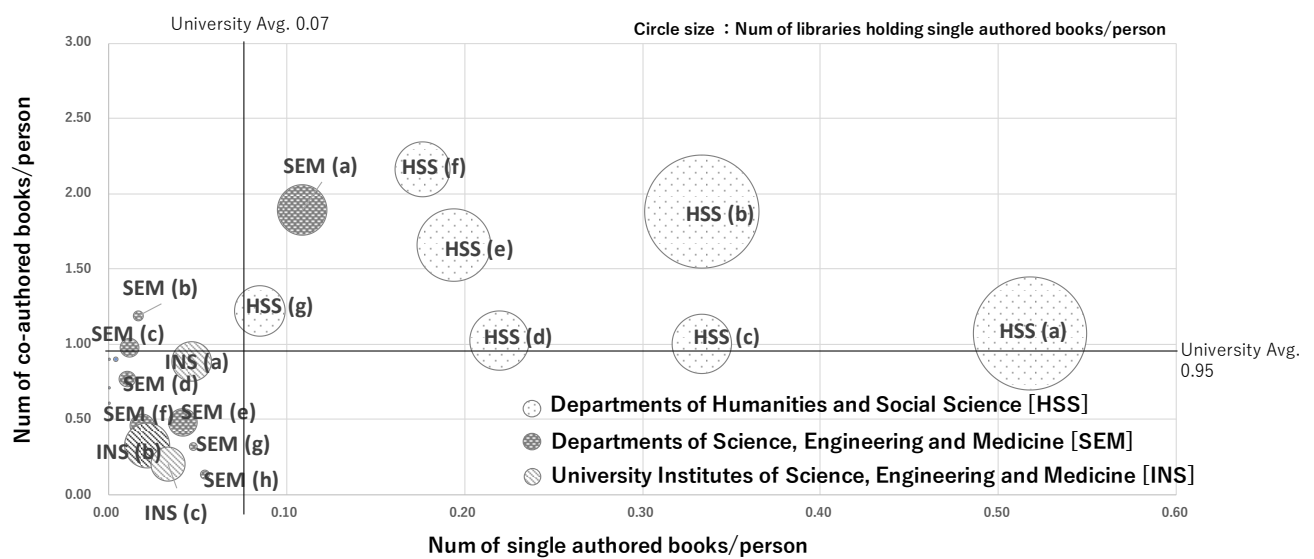

Figure 1: Visualizing the values for each department using book-related indicators
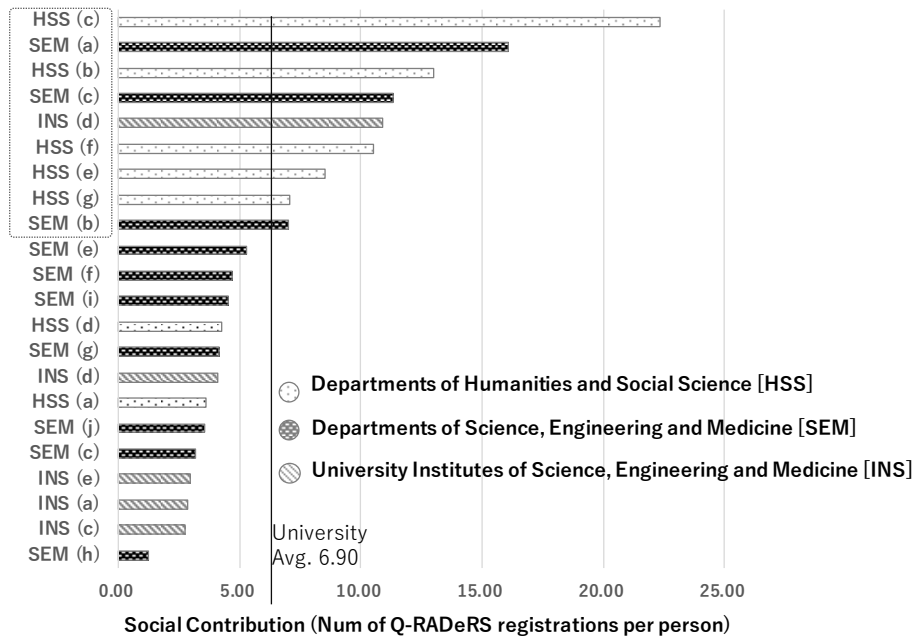
Figure 2: Visualizing the values for each department using social contribution- related indicators

activities were higher for these subjects. We found that indicators related to books and social contributions could potentially represent activity in humanities and social sciences departments.

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Next, we created a radar chart for each department using these indicators. Figure 3 shows examples of radar charts for the departments. As examples, three departments are shown from humanities and social science departments (HSS), science, engineering and medicine departments (SEM), and the science, engineering and medicine research institutes (INS). The 20 indicators used are listed in Table 3.

HSS departments (f) tended to make higher levels of contributions to books and society. In contrast, SEM departments (e) tended to have high numbers of Scopus papers. Many SEM departments also had high international co-authorship numbers. However, there were some departments, such as mathematics departments, where the trend was different. INS departments (b) tended to be high in international co-authorship, to belong to KAKENHI categories that qualify for large-scale project support, and to receive large amounts of KAKENHI funding and high numbers of awards. This may reflect the fact that faculty members affiliated with the university's research institutes have fewer teaching responsibilities and are able to devote more time to research.
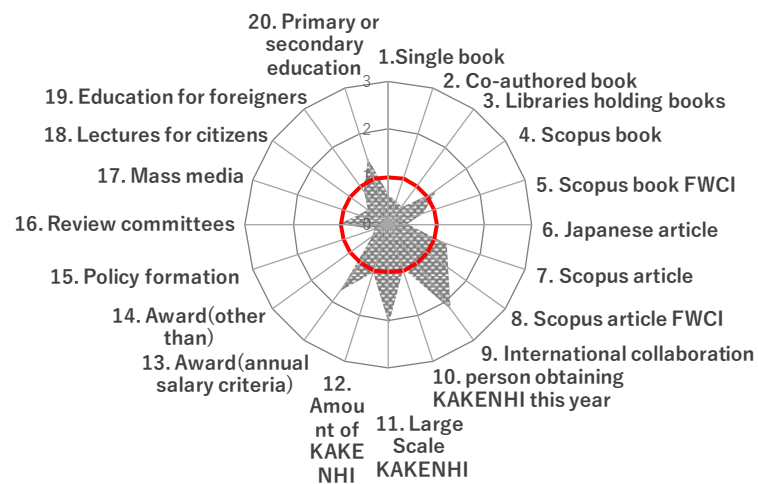
Red line (1) : University average
Rader chart axes: Percentages relative to the university average

HSS (f)
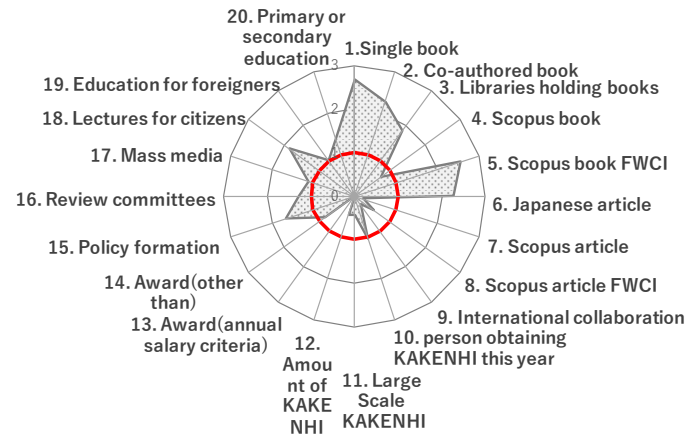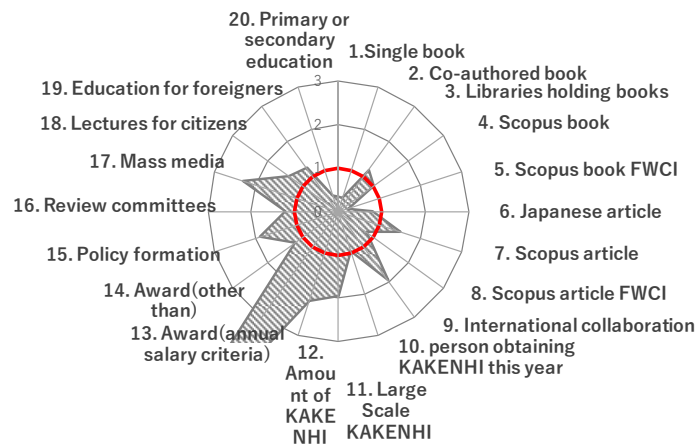

SEM (e)

INS (b)

Figure 3: Examples of radar charts for the departments

5 Discussion

We examined evaluation methods using indicators to evaluate research performance within the university. Among the indicators other than the English article indices that were raised in the case study survey, we selected data that could be obtained in our office. Compared to the university average, departments in the humanities and social sciences tended to score higher on the quantity and quality of books and to show higher levels of activity related to contributions to society. These indicators were also used to confirm departmental trends.

The radar chart was subsequently used as a resource for the Executive Office to enter into dialogue with departments about the current state of their research and other capabilities, as it facilitated at-a-glance identification of trends in the activities of each department. This suggested that the radar chart was useful as a communication tool for discussing research capabilities.

It was decided that further discussion within the university was needed to use for the actual research evaluation, and it has not yet been applied to the actual evaluation system. For the example of application to research evaluation, it could be used for departmental budget allocation. Each indicator is scored (weighted according to the indicator), the departments are ranked according to their overall score, and the budget allocation amount is determined according to the result of the ranking.

Other uses of the radar chart might be to find indicators that could be used as common indicators for the university as a whole, or to use it to determine base values when changing the numerical values for different departments. For example, a department's own evaluation criteria could be used to set a standard value for the size of the value.

Another possibility would be to pick up indicators that could be used to evaluate humanities and social sciences departments and add them to the new indicators used to allocate departmental budgets.

Another possible scenario would be to promote a department that is strong in a certain indicator as a strength in a situation where the university is trying to obtain a budget from the government.

As issues, it is necessary to consider the accuracy of input into the database and operational aspects. Registration in Q-RADeRS, which was used as the database this time, is used within the university to evaluate faculty activities, and operations are in place to promote inputs (budget cuts are made for departments with input rates below a certain level). However, accuracy is problematic because there are no detailed rules for registration; for example, some faculty members register each weekly radio appearance during a month (four times in total), while others register them all together as a single event.

There is also concern about whether humanities and social science subjects can be considered in the same way. It is conceivable that subjects in the social sciences such as psychology and economics may generate more English-language papers than those in the humanities in Japan.

Furthermore, we believe that it is necessary to look at trends in the magnitude of values for the same indicator between different research fields and to set a standard value for each departmental field. Further discussion is needed to resolve these issues.

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