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Comparison of Trends in the Degree of Publication Diversity among Fields of Social Sciences and Humanities at National Taiwan University

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Abstract

This study reviewed the annual changes in the degree of publication diversity among all types of written works produced by faculty members from 11 fields of the social sciences and humanities (SSH) at National Taiwan University over the period of 2000–2017. Among the 20 types of written pieces identified, journal articles were the most prevalent for each of the 11 fields except drama and theater. Among the 20 types, a significant difference in the proportion of journal articles, ranging from 20.8% to 95.4%, was observed among distinct fields. The faculties of economics and library and information science were dedicated to publishing articles in top-tier journals indexed by Journal Citation Reports, whereas faculties focused on other fields preferred to publish in domestic top-tier journals. Book chapters were the second most common type for nine fields (all excluding anthropology and drama and theater). The majority of fields of the humanities had higher degrees of publication diversity than the social sciences fields. History and economics exhibited the highest and lowest degrees of publication diversity, respectively. With the promotion of internationalization, a decreasing trend in the diversity of output was anticipated. However, this did not occur in either the anthropology or sociology fields. Moreover, the research incentive system, which emphasized international visibility, boosted the number of English-language writings, but this trend was not observed in the two fields of Chinese literature or drama and theater.

Keywords: Publication Type; Publication Language; Social Sciences; Humanities; Degree of Publication Diversity

1. Introduction

Researchers' publishing preferences vary in the three broad areas of the natural sciences, social sciences, and the humanities (Bonaccorsi et al., 2017; Huang & Chang, 2008), and even differ from discipline to discipline within the same broad area (Nederhof et al., 1989; Sandoval-Romero & Larivière, 2020). Compared with natural science researchers, social sciences and humanities (SSH) scholars show a greater interest in producing books and book chapters, developing the image that SSH researchers publish in a wider range of publication formats (Engels et al., 2012; Engels et al., 2018). Although studies have investigated the characteristics of research output produced by SSH researchers, they have targeted mainstream research publication types such as journal articles, monographs, book chapters, and

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conference papers (Engels et al., 2012; Pajić et al., 2019). Journal articles indexed by the database of Web of Science (WoS) were a particular focus. Hence, our knowledge of the characteristics of SSH researchers' publication output beyond mainstream research publications remains limited (Bentley & Kyvik, 2011; Gumpenberger et al., 2016).

Fulfilling research requirements is not the only reason that researchers value publishing. Writing popular books for nonacademic readers and expressing comments about social events in newspapers articles also provide opportunities for public engagement (Bentley & Kyvik, 2011; Fecher & Hebing, 2021). Compared with formal academic publications, informal writings are assumed to account for a smaller proportion of SSH publication output. However, informal written pieces are dispersed across diverse types of publications, reflecting the various activities that researchers engage in and elucidating the myriad roles that researchers play in society.

Numerous governments and universities have launched research incentive systems to elevate their academic reputation and visibility by encouraging faculties to publish more high-quality scholarly publications (Mathies et al., 2020). The introduction of such monetary rewards not only improves research productivity (Quimbo & Sulabo, 2014) but also promotes the status of articles by encouraging their publication in journals with high impact factors (Deutz et al., 2021; Shao & Shen, 2012). When a research incentive system is combined with research performance and promotion, researchers are compelled to write certain types of pieces and are unwilling to produce other types that offer little value in terms of academic reputation or career advancement, a phenomenon that presumably reduces publication diversity.

Publication type and language are typically key concerns among researchers, whose main considerations are language familiarity and the promotion of the internationality of their writings (Rhekhalilit & Lerdpaisalwong, 2019). When researchers intend to communicate with readers across countries, English-language publication is the optimal selection. Compared with natural science researchers, SSH researchers have a stronger local orientation in their research topics, and therefore commonly write in the local language (Ochsner et al., 2017). Generally, natural science scholars prefer to publish in English to communicate with wider audiences (Pajić et al., 2019; Sivertsen, 2016), whereas SSH researchers in non-English-speaking countries tend to publish a higher proportion of writings in non-English languages (Gumpenberger et al., 2016; Kulczycki et al., 2020; Pajić et al., 2019). Nevertheless, the trend of internationalization provokes speculation about whether SSH researchers have begun to publish more English-language pieces and the differences among disciplines in the proportion of English-language pieces that have been produced.

In this study, such differences among disciplines were the focus. Therefore, the unit analyzed was an academic field, rather than a broad scholarly area consisting of numerous fields. The individual fields within SSH were thus compared. To explore whether the research incentive system changes the publication practices of researchers in non-English-speaking countries, we targeted the publication output of the SSH faculty of the National Taiwan University (NTU).

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NTU initiated the research incentive system in 2006 to improve international visibility reflecting in global university rankings. Faculty members can apply to obtain monetary rewards for published journal articles, monographs, and book chapters from the previous year. Because NTU is the top research-oriented university in Taiwan, two hypotheses were considered in this study: (1) the research incentive system would focus on certain types of scholarly publications, leading to the narrower scope of publication types after its introduction and (2) the promotion of internationalization would cause English-language writings to be predominant in all fields.

To verify these hypotheses, we observed the changes in the types of publications before and after the launch of the research incentive system. The study period extended back to the publication year of 2000. All types of output produced by the 11 departments of the NTU SSH faculty during the 18-year period (2000–2017) and the publication languages were analyzed in this study. Scholarly literature is primarily in the form of journal articles in many disciplines. Journals are often classified by category and level. Therefore, we conducted additional analyses for journals. In addition, to quantify the changes in the scope of publication types and compare the publication diversity among various fields, an indicator was used to measure the degree of publication diversity. The following four research questions are addressed in this study.

(1) What are the differences in publication types among disciplines?
(2) Does a decreasing trend in the degree of publication diversity occur in each field?
(3) Has the proportion of articles published in top-tier journals increased over time?
(4) Have publications in English language become predominant across all fields?

2. Literature Review

2.1 Publication types

Higher education institutions have long encouraged academics to publish their research results in journal articles indexed by the WoS database, which possesses high international visibility. This partially explains why some studies on the characteristics of SSH publications have focused on journal articles alone (e.g., Koch & Vanderstraeten, 2019) or on articles and some other journal-based pieces indexed by the WoS (e.g. Tripathi et al., 2018). With the addition of other types of publications such as monographs and book chapters in some national or institutional databases, studies on SSH publications have revealed greater diversity of publication types compared with other scholarly areas. Engels et al. (2012) analyzed five types of SSH publications over the period of 2000 to 2009 from the region of Flanders in Belgium. Among articles, books, edited books, book chapters, and proceeding papers, journal articles (followed by book chapters) were most prevalent in each of nine fields in the humanities and six fields in the social sciences. Three fields of the social sciences (economics and business, psychology, and sociology) published more WoS-indexed articles than other fields. The same five categories of publications were also examined in the study by Kulczycki et al. (2018), which expanded the number of countries and reviewed works published between 2011 and 2014. Their results

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indicated that among overall works published, articles, monographs, and book chapters accounted for 44.8% to 77.1%, 1.8% to 12.8%, and 12.8% to 43.1%, respectively. No comparisons were drawn among countries due to the inconsistent categories and definitions of publications.

Some researchers have focused on the output contributed by a specific university. Hammarfelt and de Rijcke (2015) analyzed journal articles, books, book chapters, and conference papers published between 2006 and 2013 by scholars from the Art College at Sweden's University of Uppsala. Except for the department of art history, none of the department studies were related to the arts; the majority were related to the humanities. Articles and book chapters were the primary types of works published, each accounting for 40% of overall works. Conference papers and books accounted for 13% and 7%, respectively. Pajić et al. (2019) investigated four types of publications written by 484 full professors at Serbia's University of Novi Sad. Data regarding books, journal articles, conference papers, and other writings were collected from professor promotion or tenure reports submitted between 2009 and 2013. Conference papers accounted for the majority of works in six fields of the natural sciences and three fields belonging to the social sciences (psychology, education, and economics). The professors in biology, chemistry, physics, and mathematics preferred to publish articles in international journals (WoS-indexed), and all SSH fields published over half of their articles in national journals. Gumpenberger et al. (2016) investigated the proportions of publication types contributed by three departments of the humanities and three related to social sciences over the period of 2007 to 2012 at the University of Vienna. In addition to the three common publication types (books, journal articles, and articles in proceedings), four other categories were included: letters, editorial works (e.g., art catalogue and collections, edited books, and proceedings), contributions in edited works, and other publications (e.g., book reviews, translations, newspaper articles, and internet publications).

2.2 Publication language

López-Navarro et al. (2015) analyzed the responses of 1,717 Spanish researchers, revealing that approximately half of natural science and technology researchers published journal articles in English over the previous 10 years, which were a markedly higher proportion than that of social science (3.0%) or arts and humanities (2.5%) researchers. Although English is not the most prevalent language for the publication of SSH works, an increasing trend in the percentage of publications in English was observed. On the basis of records of journal articles, books, book chapters, and conference papers published between 2006 and 2013 by SSH scholars from the University of Uppsala, Hammarfelt and de Rijcke (2015) reported that the ever-increasing proportion of English-language publications has reached 50% of all published works in 2013, which was higher than that of works in Swedish language (45%). Such a considerable increase in English-language publications was also identified in the survey of Gumpenberger et al. (2016). Although German was the dominant publication language for annual works contributed by the six SSH departments at the University of Vienna over a six-year (2007 to 2012) period, the proportion of German-language

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publications decreased over the years. Kulczycki et al. (2020) conducted a large-scale investigation of publication language based on journal articles published between 2013 and 2015 from seven European countries and revealed that multilingual publishing is an ongoing practice in many SSH research fields regardless of the geographical location, political situation, or historical heritage. Although English tends to be the dominant language in science works, SSH researchers often produce culturally and societally relevant work in their local languages.

2.3 Research incentive system and publication

Research incentive systems improve research productivity (LeMaire et al., 2018) and even lead to changes in researchers' publication tendencies. Korytkowski and Kulczycki (2019) analyzed the works submitted for research evaluation over the 2009 to 2016 period in Poland, noting an increasing trend in the proportion of articles published in Journal Citation Reports (JCR) top-tier journals within the six broad fields of natural sciences, engineering and technology, medical and health sciences, agricultural sciences, social sciences, and the humanities. Similar results were observed by Deutz et al. (2021), who investigated the changes in the publication tendencies of Danish researchers. Researchers in the natural sciences, social sciences, and humanities tended to publish more articles in journals with higher impact factors. Although research incentive systems encourage researchers in non-English-speaking countries to publish in English, differences among fields in the main motives of publishing in English have been observed. SSH researchers' main motivations are obtaining recognition and noneconomic rewards (López-Navarro et al., 2015).

In 2006, NTU established a research performance reward system that remains active today. Monographs are divided into five levels determined by peer reviews. Monographs at the five levels obtain 10 to 30 points. Book chapters classified within the five levels of monographs receive 0.5 to 3 points. Regarding journal articles, if they are published in one among the top 40% of journals in the corresponding field as per listings in the Taiwan Social Science Citation Index (TSSCI) and Taiwan Humanities Citation Index (THCI), the top 40% of journals in corresponding fields as indexed by Social Science Citation Index (SSCI) and Science Citation Index (SCI), or journals indexed by Arts and Humanities Citation Index (A&HCI), they would be allocated 1 to 5 reward system points. Notably, the top 40% journals indexed by SSCI and SCI are derived based on 5-year impact factors. The top 15% of journals and other journals (from among the top 40% of journals) are divided into two separate levels. However, individual departments are authorized to adjust the list of eligible journals generated from the JCR database.

3. Methodology

3.1 Faculty members affiliated with SSH departments

To explore the characteristics of works by NTU SSH faculty researchers and the changes in their publication habits over the years, this study targeted full-time faculty personnel affiliated with SSH-related 11 departments in January 2019, when we began collecting data. The 11 departments selected were law, sociology, political science, economics, Chinese literature, foreign

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language and literature (FLL), history, philosophy, anthropology, library and information science (LIS), and drama and theater. Six departments were defined as fields related to social sciences: law, sociology, political science, economics, LIS, and anthropology. The remaining five departments were considered fields of the humanities. In accordance with the official webpages of these 11 departments, 334 full-time faculty members were identified. Retired faculty members were not included because their publications were removed from departmental webpages after their retirement. Table 1 lists the numbers of department faculty members who produced the works analyzed in this study.

3.2 Publication data

Due to the lack of an institutional database recording the various categories of works contributed by faculty members, we referred to two information sources to collect data for our analyses. Each department has established its own website, which includes individual webpages for faculty members to present their CVs and publication lists. Because not all faculty members maintain an updated list of their publications, another information source, the website of the Ministry of Science and Technology (MOST), was consulted to obtain a more complete list of works published by individual faculty members. Faculty members and other researchers are required to provide up-to-date lists of their published materials when applying for MOST funding of research projects, and these lists are available from the MOST's official website. To obtain greater recognition and research evaluation, NTU faculty members were encouraged to apply to the MOST for funding of their research projects. Thus, for NTU faculty members to enhance their academic status, they are obliged to obtain research funding from the MOST. Therefore, faculty members

Table 1. Numbers of Faculty Members, by Department

Broad area	Department	Number of faculty members
Social sciences	Anthropology	13
	Economics	28
	Law	46
	Library and information science	13
	Political science	35
	Sociology	19
Humanities	Chinese literature	48
	Drama and theater	12
	Foreign language and literature	73
	History	26
	Philosophy	21
Total		334

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commonly submit their list of published works as one attached file when applying for MOST research funding, allowing us obtain the latest bibliometric records of works published by NTU faculty members.

Our study period's commencement (i.e., 2000) preceded the establishment of the research incentive system (i.e., 2006). The final year of publications analyzed in this study was 2017. Applicants for academic rewards are required to complete an application form each year listing their certain types of works published in the previous year. Therefore, works published between 2005 and 2017 were considered in the context of the academic reward system data. To determine whether the research incentive system affected the types of works published by faculty members, published works extending back to 2000 were analyzed. Therefore, publications over the 18-year period of 2000 to 2017 were the focus of this study.

3.3 Data processing

Each publication was classified as a specific type based on the format of bibliometric record. Because each faculty member created their list of published works with inconsistent formatting, we expended a considerable amount of time on the coding task. In addition to the common types of publications, such as journal articles, books, book chapters, and conference papers, other types of works were included during the coding phase. Some conference papers were rewritten for journal publication. This led to the same research being counted twice. A total of 20 publication types were developed during the coding assignment (See Table 2). In addition, the publication language for each publication was recorded. The publication language of a given journal article was the language that it was published in.

To calculate the degree of publication diversity, the Shannon–Wiener Diversity Index was used due to its easy calculation and the values being unaffected by sample size. This index has been widely used to measure the degree of biological diversity (Bhuyan et al., 2003). The higher the value of the Shannon–Wiener Diversity Index, the greater the degree of publication diversity. The index's formula is $-\sum_{i=1}^{n} P_i(\ln P_i)$, where P_i is the number of observations. In this study, P_i was the number of publications in type i.

Journal articles were further divided into several groups by level of research visibility. These levels did not perfectly match the ones used in NTU's research incentive system because departments could adjust the list of eligible journals for research incentives. In addition, faculty-approved research publications were determined based on academic promotion objectives by using various criteria. The journals indexed by the SSCI and SCI were divided into four levels on the basis of the journal impact factors recorded in the corresponding version of the JCR database. For instance, the current version of the JCR database is the 2020 version in which the most recently published articles in JCR journals are from 2022. Therefore, we verified the corresponding journal level of 2017 articles by referring to the 2015 version of the JCR database on the basis of the 2-year difference between the JCR version marked with a specific year and the publication year of journal articles. The top 25% of journals (in terms of impact factors) were categorized as Q1, followed by

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Table 2. Distribution of Publications by Type and Field

Publication type	Social sciences (%)						Humanities (%)					Total
	Ant	Eco	Law	LIS	Pol	Soc	Chi	Dra	FLL	His	Phi	(%)
Journal article	189	458	2,818	485	760	330	683	109	770	323	315	7,241
	(51.6)	(95.4)	(72.9)	(84.6)	(51.0)	(50.3)	(53.6)	(20.8)	(57.6)	(47.6)	(61.2)	(61.6)
Book chapter	46	10	394	37	339	227	224	23	272	132	62	1,766
	(12.6)	(2.1)	(10.2)	(6.5)	(22.7)	(34.6)	(17.6)	(4.4)	(20.4)	(19.5)	(12.0)	(15.0)
Monograph	20	8	316	19	97	52	108	32	74	59	44	829
	(5.5)	(1.7)	(8.2)	(3.3)	(6.5)	(7.9)	(8.5)	(6.1)	(5.5)	(8.7)	(8.5)	(7.0)
Conference paper	9	2	229	13	55	7	144	29	49	53	57	647
	(2.5)	(0.4)	(5.9)	(2.3)	(3.7)	(1.1)	(11.3)	(5.5)	(3.7)	(7.8)	(11.1)	(5.5)
Newspapers	51	-	1	-	189	-	1	6	9	2	-	259
	(13.9)	-	(0.0)	-	(12.7)	-	(0.1)	(1.2)	(0.6)	(0.3)	-	(2.2)
Drama work	-	-	-	-	-	-	-	233	-	-	-	233
	-	-	-	-	-	-	-	(44.4)	-	-	-	(2.0)
Book review	6	1	6	-	5	9	39	-	40	52	19	177
	(1.6)	(0.2)	(0.2)	-	(0.3)	(1.4)	(3.1)	-	(3.0)	(7.7)	(3.7)	(1.5)
Edited book	5	-	31	5	42	23	25	2	17	9	3	162
	(1.4)	-	(0.8)	(0.9)	(2.8)	(3.5)	(2.0)	(0.4)	(1.3)	(1.3)	(0.6)	(1.4)
Translated book	11	-	54	2	3	6	8	5	43	12	10	154
	(3.0)	-	(1.4)	(0.3)	(0.2)	(0.9)	(0.6)	(1.0)	(3.2)	(1.8)	(1.9)	(1.3)
Art review	-	-	1	-	-	-	1	64	1	-	-	67
	-	-	(0.0)	-	-	-	(0.1)	(12.2)	(0.1)	-	-	(0.6)
Introduction	2	-	4	-	-	-	1	-	39	3	-	49
	(0.5)	-	(0.1)	-	-	-	(0.1)	-	(2.9)	(0.4)	-	(0.4)
Reference book	3	1	6	9	-	-	3	-	4	5	-	30
	(0.8)	(0.2)	(0.2)	(1.6)	-	-	(0.2)	-	(0.3)	(0.7)	-	(0.3)
Internet paper	18	-	3	-	-	2	-	-	1	4	-	28
	(4.9)	-	(0.1)	-	-	(0.3)	-	-	(0.1)	(0.6)	-	(0.2)
Textbook	-	-	-	-	-	-	16	-	1	10	-	27
	-	-	-	-	-	-	(1.3)	-	(0.1)	(1.5)	-	(0.2)
Creative work	1	-	-	-	-	-	2	21	-	-	-	24
	(0.3)	-	-	-	-	-	(0.2)	(4.0)	-	-	-	(0.2)
Preface	3	-	-	-	-	-	1	1	8	5	-	21
	(0.8)	-	-	-	-	-	(0.1)	(0.2)	(0.6)	(0.7)	-	(0.2)
Annotated book	-		-	-	-	-	10	-	-	1	4	15
	-		-	-	-	-	(0.8)	-	-	(0.1)	(0.8)	(0.1)
Newsletter	2	-	1	3	-	-	-	-	3	3	1	13
	(0.5)	-	(0.0)	(0.5)	-	-	-	-	(0.2)	(0.4)	(0.2)	(0.1)
Interview	-	-	-	-	-	-	6	-	1	5	-	12
	-	-	-	-	-	-	(0.5)	-	(0.1)	(0.7)	-	(0.1)
Others	2	-	-	-	-	1	4	-	-	-	-	7
	(0.5)	-	-	-	-	(0.2)	(0.3)	-	-	-	-	(0.1)
Total	366	480	3,867	573	1,491	656	1,274	525	1,336	678	515	11,761
(%)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)

Note. Abbreviations: Ant = anthropology; Eco = economics; Pol = political science; Soc = sociology; Chi = Chinese literature; Dra = drama and theater; His = history; Soc = sociology; - refers to zero.

Q2 (26% to 50%), Q3 (51% to 75%), and Q4 (remaining journals). These four levels revealed the position of journals in which faculty published their articles. For journals with at least two subject categories designated by JCR, the subject category closest to the field with which the faculty member

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was affiliated was referenced. For example, if a JCR journal was connected to both LIS and computer science, the level of journal in the subject category of LIS was used for articles by LIS faculty members. Articles in A&HCI journals are available from WoS, but A&HCI journals are excluded from JCR. Therefore, A&HCI journals formed another level. Regarding domestic journals not included in SSCI and SCI, journals covered by TSSCI and THCI were recorded. The TSSCI and THCI journals were approved by Taiwan's MOST and regarded as core journals in their corresponding fields. Because the TSSCI and THCI journal lists, which are classified by field, are updated once every 2 to 3 years, we referred to the version that corresponded to the publication year of an article published in a Taiwanese domestic journal. Other journals not indexed in any among the SSCI, SCI, A&HCI, THCI, and TSSCI were labeled as "others."

4. Results

4.1 Distribution of publications by type and field

Table 2 shows that the SSH faculty published formal and informal works of 20 types, proving that SSH faculty had a wide range of publication styles. On the basis of 11,761 items recorded, journal articles were the most prevalent publication type (61.6%), followed by book chapters (15.0%), monographs (7.0%), and conference papers (5.5%). These top four types are considered the standard research outputs, explaining why they accounted for the majority of output with 89.1%. The remaining 16 publication types accounted for only 10.9% of overall works.

Although journal articles accounted for over half of all published works, the proportion of journal articles (in relation to overall works) differed markedly among fields. To examine the relation between fields and publication types, a chi-square test of independence was performed. In addition to journal articles, book chapters, monographs, and conference papers, the other 16 types of publications were incorporated into one broad category because not all fields produced these types of publications. The relation between these variables was reported to be significant (X^2 [40, N = 11761] = 2959.9, p = .000). Therefore, post hoc comparisons of the proportion of publications by pairs of fields per publication type were included. The results suggest that economics published a significantly higher proportion of journal articles (95.4%) than any other field. Most fields produced approximately half of their output in the format of journal articles. Notably, journal articles accounted for only 20.8% of published works from the drama and theater field.

The proportion of all publications contributed by each publication type is listed in the rightmost column of Table 2. The ratio of the percentage of publications in a given field that are of a given publication type to the corresponding percentage for all 11 fields can be used as a normalized number. If the value of this ratio is greater than 1, the proportion of publications contributed by a given publication type in a given field is greater than the overall proportion. For instance, the ratio of the proportion of journal articles in the field of anthropology (51.6%) to that for all 11 fields (61.6%) was 0.83 (51.6 / 61.6). Three fields had normalized values that were greater than 1, namely law (72.9 / 61.6 = 1.18), economics (95.4 / 61.6 = 1.55), and LIS (84.6 / 61.6 = 1.37). These findings indicate that the scholarly literatures in

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these three fields were more comprised of journal articles relative to those of the other eight fields. For book chapters, the fields of Chinese literature, foreign language and literature, sociology, political sciences, and history had higher proportions relative to the overall proportion.

Numerous publication types were related with books, with faculty members playing various roles including author, annotator, editor, translator, reviewer, and interviewer. Although the most pivotal of these roles is that of the author, in certain types of works they are not valued, such as in the case of book prefaces and introductions. The book chapters were the highest proportion of book-based publication types recorded, and significant differences in proportion were also identified among fields. Sociology registered a significantly higher percentage (34.6%) than any other field, whereas economics had the lowest proportion of book chapters (2.1%). The proportion of monographs published was relatively low in all fields, ranging from 1.7% to 8.7%. No significant differences were identified among fields.

Regarding other types of book-related publications, the history faculty had a higher proportion of book reviews. The drama and theater field focused more on art reviews, which were mainly published on websites and in journals. Art reviews were the third most prevalent type of publication in the drama and theater field. Notably, contributions to textbooks with teaching materials for high school students were also recorded, primarily from the Chinese literature and history faculties. This owes to the fact that Chinese literature and history are locally oriented subjects taught in high schools.

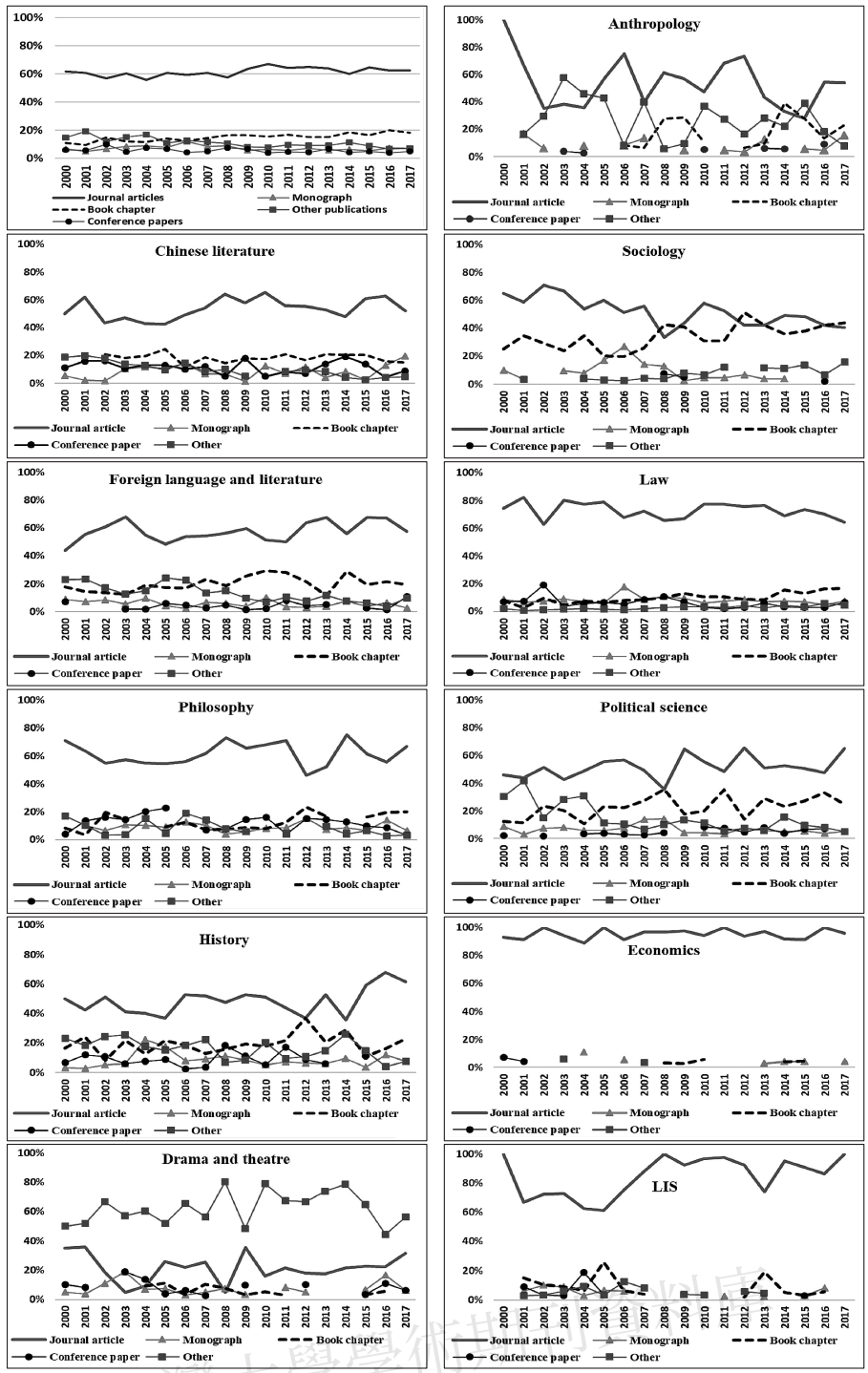
Among nonmainstream publication types, newspaper articles and drama-related works were the most prevalent. Newspapers are the traditional mass media format and profoundly associated with society. The faculties of anthropology and political science emphasized the expression of their views through newspapers more than the faculties of other fields and published a similar proportion of newspaper articles (13.9% and 12.7%, respectively). Drama-related works represent a category of publication rarely noticed by researchers; hence, we were surprised that such works were the primary publication produced by the drama and theater department (44.4%) despite corresponding to their departmental expertise.

In terms of number of publication types, the Chinese literature faculty registered the highest number (17 types), whereas that of economics had the lowest (6 types). For the five fields of the humanities, the average number of publication types per field was 13.8. This was higher than the mean number per field in the social sciences (10.0).

Figure 1 illustrates the changes in the annual proportion of publications by type. No changes based on low numbers could be observed for any types of publications outside of top four. Therefore, 16 types of publications were incorporated into an “others” category. The upper left subfigure shows that journal articles were the most prevalent throughout the years, with a trend of slight increase observed. The substantial difference in annual proportion between journal articles and other types of publications indicates that journal articles will continue to be the predominant publication type in the near future. In addition, no considerable

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Figure 1. Changes in Annual Proportions of Publications by Type and Field



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changes in the proportions of monographs, book chapters, conference papers, or other publications were noted. Book chapters were the second most prevalent publication type in most years, exhibiting a slight increasing trend. Stable annual changes in the proportions of all five categories of published works were noted. However, this ignores the details for individual fields illustrated in the other 11 subfigures.

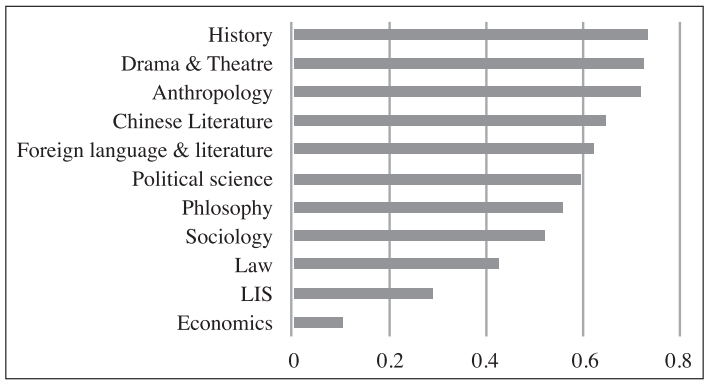
The 11 subfigures illustrate the changes in proportion of publications by type and year for individual fields. Increasing trends in the proportion of journal articles were registered in seven fields, whereas decreasing trends were found in the anthropology, sociology, and law fields. Economics maintained considerably high and stable proportions of journal article publication over the study period. Moreover, in anthropology, sociology, political science, history, and drama and theater, the proportion of journal articles was not always markedly higher than that of other types of publications. The number of journal articles was lower than that of other types of publications in certain years. Furthermore, the proportion of journal articles by the drama and theater faculty was not predominant in any year of the study period. As for book chapter contributions, increasing trends in its proportions were observed in the sociology, law, philosophy, and history fields. The largest growth trend was observed in the sociology field, where book chapters were even the publication type with the highest proportion in certain years. A lack of interest in publishing monographs was observed in the economics and LIS departments. Only five fields published monographs each year. A similar situation was also observed with regard to conference papers; the Chinese literature field published a high proportion of conference papers each year. Notably, however, few conference papers were published in the economics, LIS, sociology, and anthropology departments, perhaps because faculty members in these departments tended to rewrite conference papers and publish them in journals. The proportion of other publications were anticipated to decrease after 2005, when the research reward system began to be launched. However, a slightly increasing trend was observed in the publication of such works by the sociology and drama and theater fields. In particular, the component of other publications pertaining to drama works accounted for the largest proportion of publications in the drama and theater department.

4.2 Degree of publication diversity

Figure 2 illustrates the overall degree of publication diversity based on all publications recorded. History exhibited the highest degree of publication diversity (0.732), closely followed by drama and theater (0.725) and anthropology (0.720). Economics had the lowest degree with 0.105. Apart from anthropology, the five fields with the highest degrees of publication diversity belonged to the humanities. Therefore, the 20 publication types shared the same values. The indicators for measuring publication diversity are unsuitable for application when only a few types of publications are published. In the present study, each of the fields examined had publications of at least six types; this reduced the risk of multiple fields having similar degrees of publication diversity but considerably different compositions of publication types. Two fields may have the

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Figure 2. Degree of Publication Diversity by Field



same degree of publication diversity but different compositions of publication types (e.g., field A's composition is 70% journal articles, 20% book chapters, and 10% monographs, and field B's composition is 70% book chapters, 20% journal articles, and 10% monographs).

Figure 3 illustrates the changes in the degree of publication diversity by year for each field. Overall, a slightly decreasing trend was noted, as depicted in the upper left subfigure. The decreasing trend in the degree of publication diversity did not occur in every field. Economics retained the lowest degree of publication diversity each year, with no increasing or decreasing trend observed. Increasing degrees of publication diversity were identified in law, sociology, and anthropology. Political science showed a stability in its annual degrees of publication diversity, similar to economics. However, political science had a much higher degree of publication diversity each year than economics. The five fields of the humanities all exhibited decreasing trends in publication diversity over time.

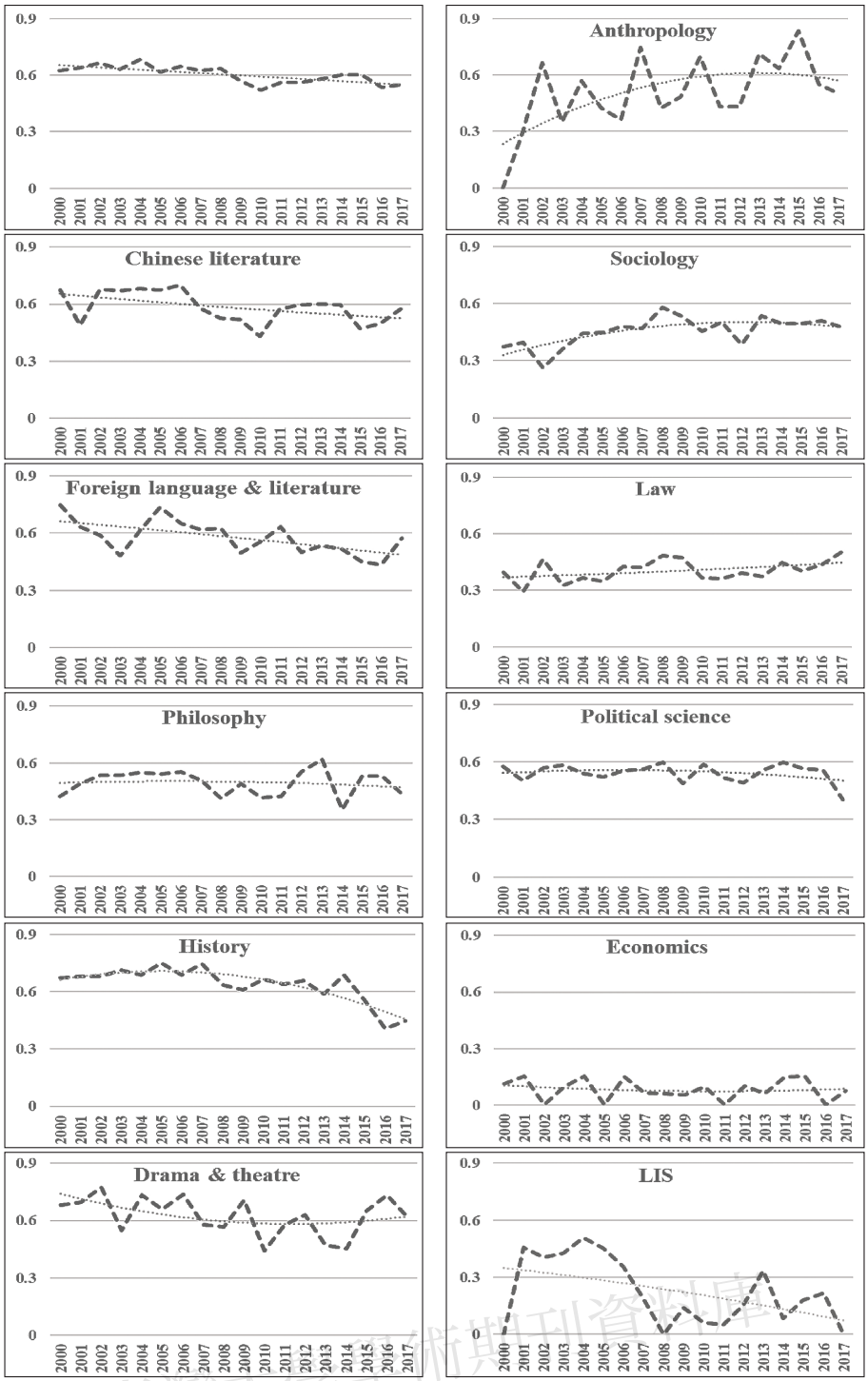
4.3 Distribution of journals by level

Except for the drama and theater department, all departments published journal articles in the greatest proportion among publication types. Journal sources containing published articles were typically divided into various levels. Table 3 shows the distribution of articles within three groups of journals. Journals indexed by WoS (consisting of SCI, SSCI, and A&HCI) were regarded as internationally crucial journals. Journals indexed by SCI and SSCI were divided into four levels (Q1 to Q4) as classified by JCR. Taiwanese journals not indexed by WoS but recognized as TSSCI or THCI journals in the corresponding field were considered the domestic leading journals. Other journals outside of WoS, TSSCI, and THCI were incorporated into an "other" group.

In five fields (Chinese literature, drama and theater, philosophy, history, and LIS), the largest number of articles were published in TSSCI and THCI journals, and in another five fields (anthropology, FLL, law, political science, and sociology), the largest number of articles in were published in "other" journals.

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Figure 3. Changes in the Degree of Publication Diversity by Year and Field



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Table 3. Distribution of Articles by Journal Category

	Social sciences (%)						Humanities (%)					Total
	Ant	Eco	Law	LIS	Pol	Soc	Chi	Dra	FLL	His	Phi	(%)
WoS	15	296	29	147	131	64	-	-	55	3	9	749
	(7.9)	(64.6)	(1.0)	(30.3)	(17.2)	(19.4)	-	-	(7.1)	(0.9)	(2.9)	(10.4)
Q1	6	74	4	92	35	24	-	-	11	-	-	246
	(3.2)	(16.2)	(0.1)	(19.0)	(4.6)	(7.3)	-	-	(1.4)	-	-	(3.4)
Q2	1	87	6	26	25	14	-	-	10	1	2	172
	(0.5)	(19.0)	(0.2)	(5.4)	(3.3)	(4.2)	-	-	(1.3)	(0.3)	(0.6)	(2.4)
Q3	7	81	8	19	28	12	-	-	5	-	-	160
	(3.7)	(17.7)	(0.3)	(3.9)	(3.7)	(3.6)	-	-	(0.6)	-	-	(2.2)
Q4	1	54	11	10	43	14	-	-	10	-	1	144
	(0.5)	(11.8)	(0.4)	(2.1)	(5.7)	(4.2)	-	-	(1.3)	-	(0.3)	(2.0)
A&HCI	-	-	-	-	-	-	-	-	19	2	6	27
	-	-	-	-	-	-	-	-	(2.5)	(0.6)	(1.9)	(0.4)
TSSCI-THCI	82	111	549	208	299	129	461	71	323	202	180	2,615
	(43.4)	(24.2)	(19.5)	(42.9)	(39.3)	(39.1)	(67.5)	(65.1)	(41.9)	(62.5)	(57.1)	(36.1)
Other	92	51	2,240	130	330	137	222	38	392	118	126	3,876
	(48.7)	(11.1)	(79.5)	(26.8)	(43.4)	(41.5)	(32.5)	(34.9)	(50.9)	(36.5)	(40.0)	(53.5)
Total	189	458	2,818	485	760	330	683	109	770	323	315	7,240
(%)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)

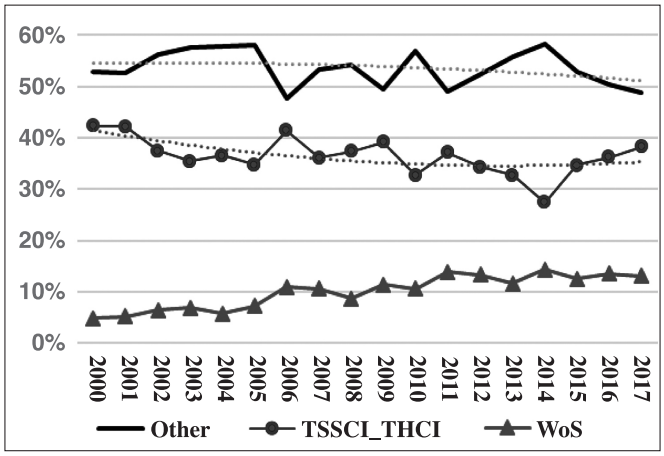
Notes. - refers to zero.

The exception was economics, whose faculty members were dedicated to publishing SCI and SSCI articles, accounting for 64.6% of their published journal articles. LIS registered the second highest proportion of WoS-indexed journal articles (30.3%). Overall, the social science fields published higher proportions of articles in international journals than the humanities fields. Chinese literature and drama and theater did not publish any WoS-indexed journal articles. Anthropology, FLL, law, philosophy, and history had less than 10% WoS articles. For the top two fields with the highest proportions of WoS articles, LIS publish articles mainly in Q1-level journals, whereas economics published most articles across Q1- to Q3-level journals. Four fields of the humanities (Chinese literature, philosophy, history, and drama and theater) published over half of their articles in THCI journals, whereas law and FLL published most articles in lower levels of journals outside of the WoS and TSSCI ones. Although domestic journals are mainly published for Taiwanese readers, some also call for papers in English. Moreover, although most international journals prefer to use English as the international language, some journals published in non-English are also indexed by WoS.

Figure 4 illustrates that an increasing trend was identified in the proportion of WoS-indexed articles. Because TSSCI and THCI journals are

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Figure 4. Comparison of Proportion of Journal Articles by Category and Year



valued and recognized by the research incentive system, they are the journals that faculties prefer their members to publish in. However, a slight decreasing trend over time was noted in the publication of articles in TSSCI and THCI journals. This may be due to the limited number of TSSCI and THCI journals certain faculties' corresponding fields or because not all articles published in them would entail a research reward. An examination of the proportion of articles published in WoS journals of various levels revealed that the largest growth occurred in articles published in Q1 journals (Figure 5).

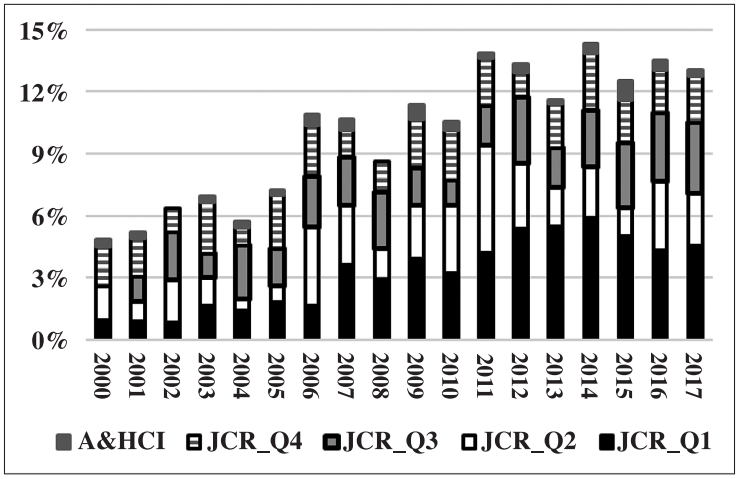
Figure 6 presents the individual fields' distribution of journal articles by level and year. A notable annual change was observed in LIS article publication, with a remarkable increase in the proportion of articles in Q1 journals during the period of 2011 to 2017. Decreasing trends in the proportion of articles in TSSCI and THCI journals contributed by sociology, political science, and LIS were observed. These three fields have begun to publish more articles in WoS-indexed journals.

4.4 Publication language

Figure 7 illustrates that Chinese was the dominant publication language. However, a decreasing trend in the proportion of publications in Chinese was identified. A considerable difference between the proportion of publications in Chinese and English was observed. Publications in other languages accounted for a relatively low percentage. The annual changes in the proportions of publications by language varied from field to field. Except for the economics, Chinese literature, and drama and theater departments, an ever-narrowing discrepancy between the proportions of English- and Chinese-language works was registered in each field. Economics had a considerably high and stable proportion of English-language works, whereas both Chinese literature and drama and theater had high and stable proportions of Chinese publications. Moreover, English publications were found to outnumber Chinese publications during certain years in the sociology, political science, LIS, and FLL.

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Figure 5. Distribution of WoS Articles by Level and Year



5. Discussion and Conclusions

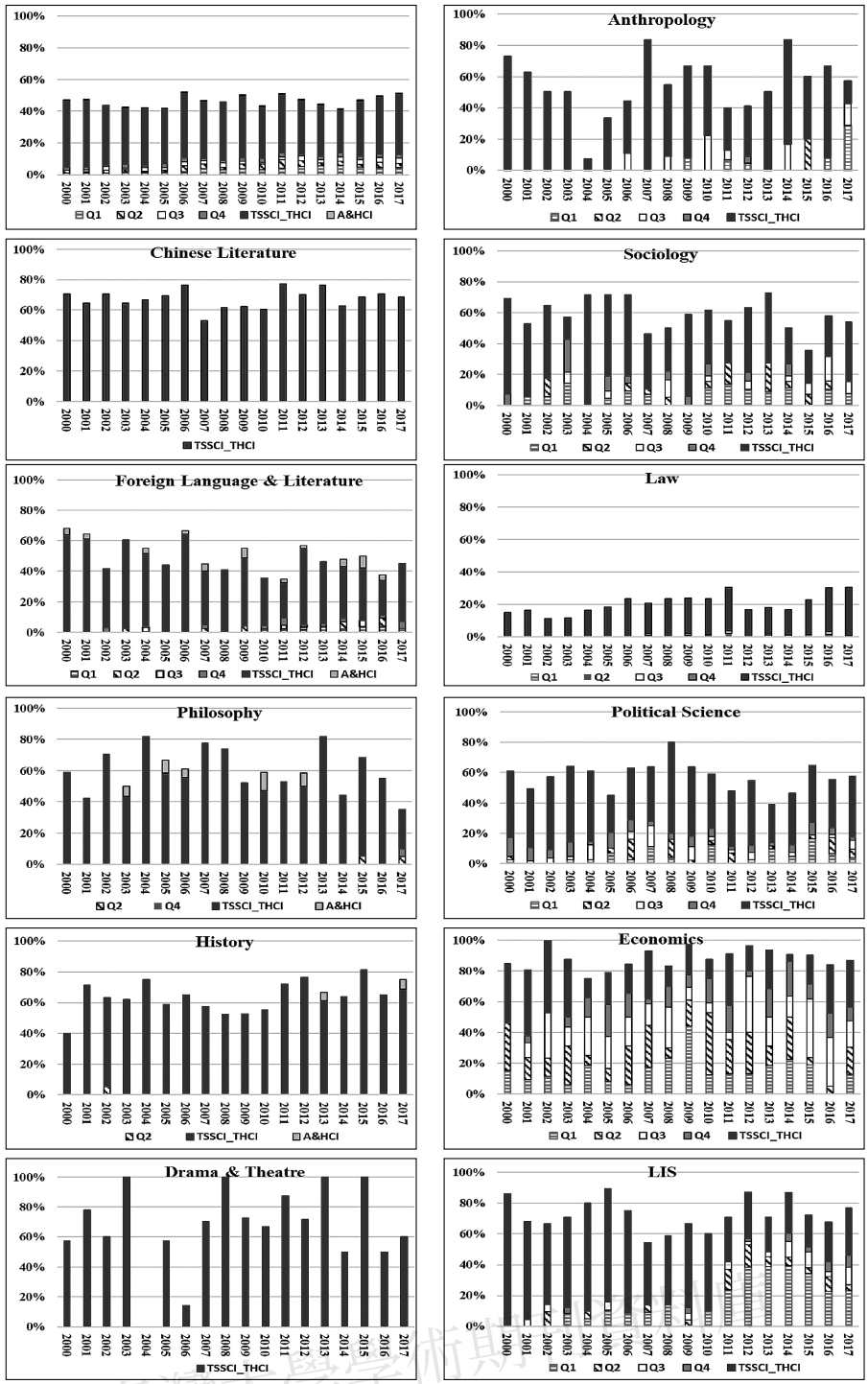
This study confirmed that NTU scholars from 11 SSH faculties published a diverse range of publication types including informal works. On the basis of publication data from the 18 years between 2000 and 2017, this longitudinal study identified 20 types of published works and observed decreasing trends in the publication diversity of most fields. Not restricting the publication types analyzed allowed us to consider several publication types that have rarely been mentioned in previous studies, such as drama-related works, newspaper articles, and annotated books. The differences among fields in terms of both the numbers and proportions of publications of varying publication types were explored. Analyses at the field level elucidated the differences in the publication diversity and preferred publication language among fields.

Although up to 20 types of publications were identified in this study, journal articles and book contributions were predominant. In addition to articles, some book and art reviews were published in journals. Regarding book-related publications, monographs, edited books, translated books, annotated books, textbooks, and interviews can be regarded as various forms of book contributions. Other types of publications contribute to partial content of a book included book reviews, articles in reference books, and book chapters, prefaces, and introductions. Despite the numerous types of publications related to journals and books, however, only journal articles, monographs, book chapters are highly valued in research evaluation and promotion.

Monographs have frequently been reported as works contributed more by SSH researchers than by natural sciences ones (Hammarfelt & de Rijcke, 2015; Korytkowski & Kulczycki, 2019). In general, the proportions of journal articles and book chapters were considerably higher than that of monographs (Nederhof et al., 1989). The findings of this study verify the aforementioned publication characteristics in all fields except that

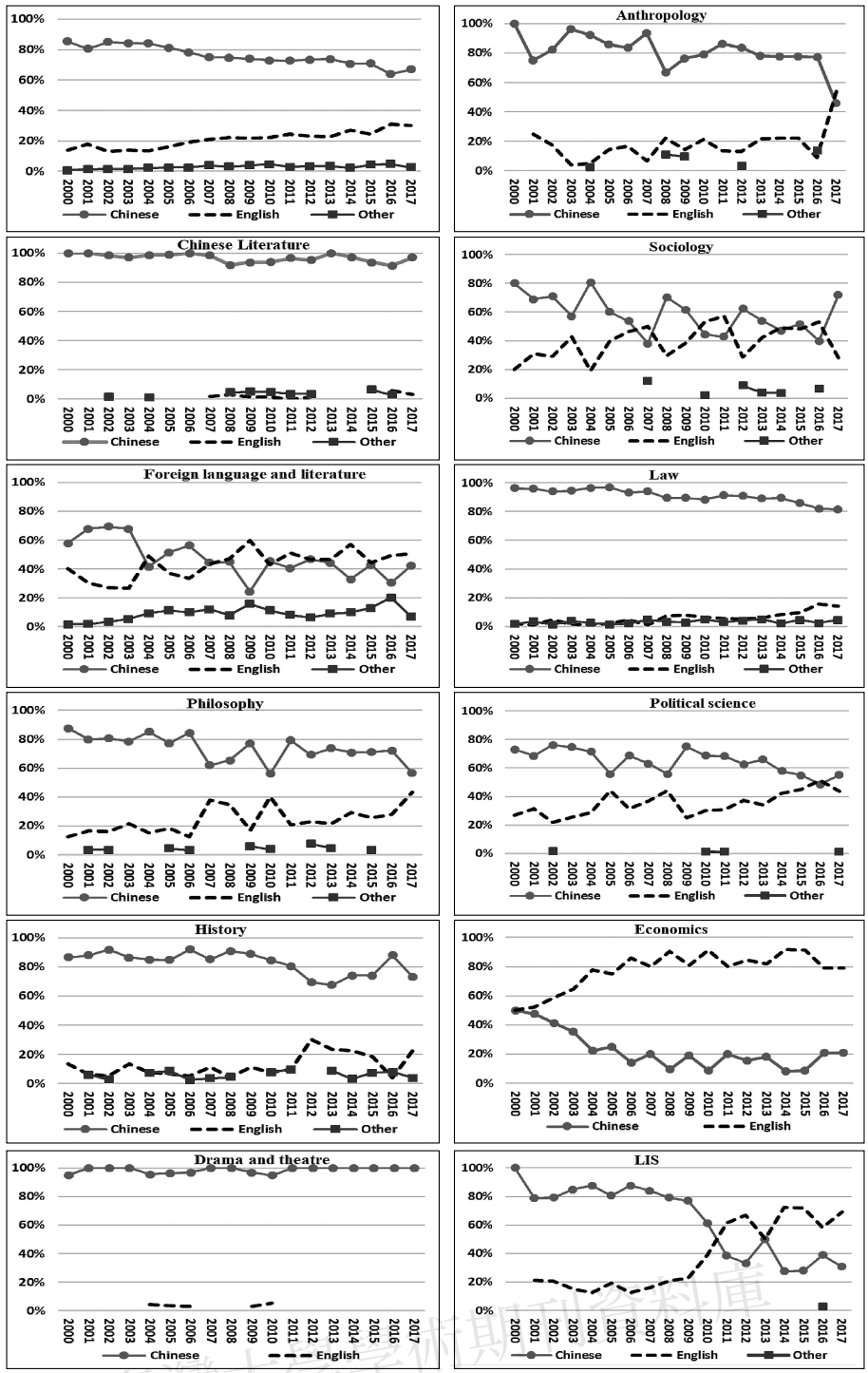
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Figure 6. Comparison of Journal Articles by Level across Fields



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Figure 7. Changes in Publication Language by Year and Field



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of drama and theater. Moreover, excluding drama and theater and sociology, marked differences in the proportions of journal articles and book chapters contributed by various departments were identified. Journal articles, book chapters, and monographs were the three most common publication types (accounting for as much as 83.6% of all publications), and the proportions of these three types of publications contributed by individual fields suggest that economics and LIS were journal article-oriented fields. Significant differences in the proportions of journal articles among fields were identified. Similar to nature science researchers, economic faculty members strongly emphasized publishing journal articles. Moreover, the economics department's emphasis on a high proportion of journal articles was stable throughout the study period. This differed from LIS, which underwent a remarkable increase in the proportion of journal articles after 2006. Most fields (sociology, political science, history, Chinese literature, and FLL) were oriented toward both journal articles and book contributions. Moreover, in each field, over 25% of publications were book chapters and monographs.

Previous studies examining the impact of monetary incentives on publication patterns have suggested that increasing proportions of specific publication types would be observed. The findings of this study confirmed this assumption—encouraged by research incentive system, researchers published certain types of publications, particularly articles in journals with high impact factors (Kim & Bak, 2020). As expected, journal articles were the predominant publication type over the years (Kyvik, 2003). However, notably, this was not the case in the drama and theater department, which was unique in its publication pattern as an art field that did not resemble the patterns of fields of the humanities.

Although most publication types are not encouraged by research evaluations and even are not covered by literature databases (Hicks, 2004), they provide researchers with opportunities to reach the public. Therefore, their existence exemplifies some of the nonscholarly activities that SSH faculty staff engage in. Fecher and Hebing (2021) conducted a survey, reporting that the majority of researchers across fields agree that public engagement is an aspect of scientific activity in which researchers can exert a societal impact. The differences among disciplines are also reflected in the various formats of such public engagement. For instance, SSH researchers tend to publish more popular articles in newspapers and magazines than researchers in other fields (Bentley & Kyvik, 2011). Although numerous forms of public engagement are not encompassed by the publishing of written work, such as public lectures and communication on social media, only written works, such as exhibitions and comments in newspapers articles, were observed and recorded in this study. Nevertheless, researchers read nonscholarly publications, such as blogs, websites, fictional books, popular science books, newspapers, and magazines, for various purposes (Late et al., 2019). Differences in light reading preferences are noted among scholars of different fields. Humanities scholars read more books than scholars in other fields (Tenopir et al., 2012), which may partially explain their publication diversity and why they publish a higher proportion of books than other scholars.

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Differences among disciplines were also reflected in preferred publication languages (Kuteeva & Airey, 2014). SSH researchers in non-English-speaking countries tend to publish more in their national language than in English (Kishida & Matsui, 1997; Kulczycki et al., 2020). Humanities researchers emphasize local topics more than social sciences researchers (Kuteeva & Airey, 2014), implying that humanities researchers publish more publications in the local language than social science researchers. In the present study, because law, Chinese literature, drama and theater, and history all published higher proportions of works in Chinese than in other languages and exhibited no noteworthy annual changes, we are unable to assert that all fields of social sciences emphasize English-language publications. Except in economics, where English-language publications were predominant almost every year, decreasing trends in the proportions of such publications were observed in most fields despite the proportions of English-language works being higher than those of Chinese-language works in specific years for the four fields of anthropology, sociology, political science, and LIS. Nevertheless, with the goal of enhancing international visibility, SSH researchers in some non-English-speaking countries have been pressured to publish in international journals in English language (Xu, 2020). In particular, some of them have difficulties writing English-language content (Li & Yang, 2020; Mansouri Nejad et al., 2020). Although national government and university research assessment and incentive systems affect the publication language used by researchers (Korytkowski & Kulczycki, 2019; Muresan & Pérez-Llantada, 2014), social science researchers have shown a stronger association with incentive system stipulations in their publishing patterns than arts and humanities researchers (López-Navarro et al., 2015). Arts and humanities researchers tend to publish in their first language to reflect their intentions, regardless of what reward systems attempt to compel them to do (López-Navarro et al., 2015). This may partially explain the slight change in language preferences in humanities faculty recorded in this study.

This study entailed several limitations. First, the publication data was based on the academic faculties' websites, and the types of publications displayed online depended on the faculty's protocol. For instance, few faculty members recorded their public lectures on their websites. Some faculty members even neglected to document their unpublished conference papers. Second, the exclusion of publications by retired faculty members renders the data for each department during the study period incomplete, thereby limiting the accuracy of findings. Finally, a considerable number of publications were not designated as scholarly or nonscholarly by faculty members. Despite conducting further examination, journal article publication type included a small proportion of articles published in nonscholarly journals. The same situation occurred with respect to monographs. These three limitations may have led to an underestimation of publication diversity among the departments.

Few studies have investigated the publication diversity of various SSH disciplines; this study fills that literature gap. Although only one university was investigated, changes in publication patterns between SSH fields were the focus, not the changes among universities. Given that we

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focused on differences in degree of publication diversity among 11 SSH fields, field was a more appropriate unit of analysis than a broad area due to the detailed results that could be observed at the field level. In future research, expanding the number of universities surveyed to include teaching-oriented universities is recommended. Moreover, the characteristics of publications contributed by art-related fields warrant further investigation.

The results of the present study can serve as a reference for NTU policy planners. Most fields exhibited a decreasing trend in degree of publication diversity and an increasing trend for English-language publications and for articles published in JCR, TSSCI, and THCI journals. In this context, the research incentive system adopted by NTU appears to play an indispensable role in gradually changing the publication patterns for most SSH fields. However, we did not explore how the publication pattern of SSH is affected by the promotion of internationalization. Therefore, whether internationalization is the only goal for SSH publications is a topic that policy planners must further explore. In particular, scholars are directed to engage in policy-oriented activities, and various policies consequences should be considered. Therefore, NTU policy makers should regularly examine the effect of its research incentive system on the output of its scholars.

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國立臺灣大學社會科學及人文科學領域之出版品多樣性程度趨勢比較

Comparison of Trends in the Degree of Publication Diversity among Fields of Social Sciences and Humanities at National Taiwan University

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摘　要

本研究檢視國立臺灣大學隸屬社會科學及人文科學之11個科系教師，於2000至2007年產出之各種著作的出版品多樣性程度逐年變化情形。在20種著作中，除戲劇系外，期刊文章是各系最普及之出版品類型，占各系出版品20.8%至95.4%，而經濟系及圖書資訊學系主要將文章發表在Journal Citation Reports收錄之Q1至Q2較高等級期刊，不同於其他系主要發表在TSSCI及THCI國內較高等級期刊。除人類系及戲劇系外，圖書章節是9個系次高之出版品類型。人文科學之科系傾向比社會科學科系有較高的出版品多樣性程度，其中歷史系最高、經濟系最低。在國際化浪潮及研究獎勵機制驅使下，出版品類型之縮減趨勢在預期之中，但此情形未出現於人類系及社會系，而除中文系及戲劇系外，各系教師出版更多英文著作。

關鍵字：出版品類型、出版語言、社會科學、人文科學、出版品多樣性程度

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