

Research Status and Trends of Library and Information Science in Taiwan, 2001–2010

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ABSTRACT

The aim of this study is to determine how Library and Information Science (LIS) research in Taiwan has changed between 2001 and 2010. The major research questions are about the research status and trends of LIS in Taiwan, how Taiwanese government support to the field, and how is the collaborative authorship of journal articles in LIS in Taiwan. The bibliometrics and content analysis methods were conducted to analyze 2,458 journal articles, 983 theses, and 179 research projects between 2001 and 2010. The results show that with respect to journal articles, *LIS and technology* and *book, documentation, and archive* were the most popular topics. For thesis, the well-received topics were *LIS and technology*, *user services*, and *LIS theory and foundation*, which accounted for more than 65% of the graduate theses. The same is true for research projects, with the three subjects having a ratio of more than 70%. In the government-sponsored research projects, the average amount of funding obtained had no significant differences or tendencies for various subjects over the years. In the authorship of journal articles, 66.64% of the articles in key LIS scholarly journals in Taiwan between 2001 and 2010 were conducted by individual researchers.

Keywords: LIS; research status and trends; journal article; thesis; research project

INTRODUCTION

Information technology has gone through substantial changes, especially in the past decade. Since the explosive growth of Internet technology and its widespread use in the 1990s, information technology has become a part of our lives. For the field of Library and Information Science (LIS), this has meant an increase of rapid change.

The aim of this study is to determine how LIS research in Taiwan has changed over the period of 10 years between 2001 and 2010. The study examines professional literature, including journal articles, theses, and research projects, over the period of 10 years. The contents of these documents are investigated and compared based on their differences in perspectives on their research subjects in the attempt to explore the research status and trends. The amount of grants is also compared to determine the degree of support the Taiwanese government provides to the LIS field. Finally, collaborative authorship of journal articles is also examined.

LITERATURE REVIEW

Bibliometrics is among the usual research methods utilized in the field of LIS. A number of LIS papers provide statistical analyses of the LIS field. Järvelin and Vakkari (1993) have analyzed journal articles from 1965, 1975, and 1985 to determine the changes in LIS research in the period from 1965 to 1985. The results of their study indicate that although there have been changes in topics and research methods; the focus of research in the field of LIS remains roughly the same. They have also established a classification scheme and arranged the topics into 12 different main directions in order to analyze their use. Other researchers have used the classification model of Järvelin and Vakkari to conduct related research. Cano (1999) used an earlier classification model of Järvelin and Vakkari (1990) to create an overview of LIS research in Spain. Three hundred and forty-five articles have been located from journals between 1977 and 1994. Åström (2007) also focused on journal articles and utilized time-sliced co-citation analyses to discover changes in the LIS research front. A recent research has identified changes in dominant topics in LIS over time by analyzing the 3,121 doctoral dissertations completed between 1930 and 2009 in the North American Library and Information Science programs. The findings indicate that the main topics in LIS in the period studied (2000–2009) have changed substantially from those in the initial period (1930–1969). However, some themes occur in multiple periods, which represent core areas of the field (Sugimoto, Li, Russell, Finlay, & Ding, 2011).

Using content analysis to determine research phenomenon in LIS is another popular subject in the LIS field. A content analysis of articles from five journals published between 1999 and 2003 showed that systems work in LIS has paid little attention to affective variables, and there is insufficient intellectual access and access to affective issues provided by the primary indexing services (Julien, McKechnie, & Hart, 2005). Meho and Yang (2007) used citations from the work of 25 LIS faculty members as a case study, and examined the effects of using Scopus and Google Scholar on the citation counts and rankings of scholars, as measured by Web of Science. A recent research by Erfanmanesh, Didegah, and Omiidvar (2010) analyzed 61 LIS journals published from 1998 to 2007, and found that the number of citations had grown to more than the number of LIS publications over the period under consideration. Zhao (2010) had conducted a bibliometric study on the characteristics and impact of research projects in the LIS field funded through research grant programs, and compared them to those that did not receive extra funding. Uzun (2002) examined a set of 21 core journals in LIS published from 1980 to 1999 to determine the number of authors or co-authors from developing countries and former socialist Eastern European countries. The study finds information retrieval, information need, and information use to be the top topics of high interest for researchers working in those countries.

In Taiwan, a study by Lo, Chen, and Lin (2001) described a task for constructing a subject classification framework under the background of analyses of topics studied in LIS in order to investigate and analyze the future research development and paradigm shift in LIS using the proposed subject classification framework and other approaches. Lin (2004) had analyzed the publication of research articles in selected journals and authored by librarians from Taiwan, focusing on the number of publications, topics, authorship, and research method. Ouyang, Kuan, Tung, and Shiue (2006) have used the wiki platform to collect 1,746 articles from twenty journals and 311 theses from nine Taiwan LIS programs. The results of their study indicate that the 20 journals can be separated into five groups, and that the collected articles can be distributed among eight research areas. Moreover, the study found that the total number of articles from Taiwan articles had been decreasing. Chen (2004) focused on theses from universities in Taiwan, particularly on the procedures of hunting for papers, analyzing subjects, verifying topics, and finally compiling, inducing and classifying theme in order to explore the developments and trends in thesis topics for the past 40 years.

However, most of the studies have focused only on either journals or theses, with only a small number focusing on the entire scope of LIS. In this study, in order to overcome these limitations and obtain a larger perspective of LIS research in Taiwan, journal articles and theses, as well as research projects, are included in the analysis in an attempt to explore the research status and trends of LIS in Taiwan.

RESEARCH METHODS

This research includes three document types: journal articles, theses, and research projects. The bibliometrics and content analysis methods were conducted to analyze the research data. Eleven key LIS scholarly journals (see Table 1) appointed by the Taiwan National Science Council (NSC) have been selected as sources of journal articles. A total of 2,458 research articles has been confirmed as being published between 2001 and 2010.

Eight institutions offer LIS graduate programs in Taiwan, and all of their theses publications can be found in the National Digital Library of Theses and Dissertations (NLTLD) System. Under the period covered by this study, 918 theses were identified in the NLTLD system. For the integrity of the thesis collection, the Electronic Theses System of each institution was used to compare with the NLTLD List. Sixty-five extra theses were found in those systems. Hence, 983 theses were investigated in this study.

The Taiwan NSC funded research projects were also collected in this study. A database under the NSC website lists all research projects funded by the same institution. Based on our aims, research projects in LIS field conducted in the period from 2001–2010 were selected. At this stage, 179 research projects titles were collected. However, the NSC database was too simple and crude for use in the analysis. Hence, the Taiwan Government Research Bulletin System (GRB) was added as a supplementary resource. The bibliographic information for most of the reports funded by the Taiwan government can be found in the system, with some even

providing a full text file for downloading. Bibliographic information, such as keywords and abstracts were selected and combined with the list of projects provided by the NSC database. A problem was identified in this stage: two different keyword records existed in the GRB system bibliographic information pages: bibliographic information on the projects and the report. This made confirming the bibliographic information of the project difficult because no other record could be found for comparison. Hence, keywords were chosen in the report, especially in the full text file, as the final data.

Table 1: Journal Profile

| Journal Title | Frequency | Number of Research Article |
|---|-------------|----------------------------|
| <i>Archives Quarterly</i> | quarterly | 416 |
| <i>Bulletin of the Taipei Public Library Quarterly</i> | quarterly | 253* |
| <i>Instructional Technology and Media</i> | quarterly | 248* |
| <i>Interdisciplinary Journal of Taiwan Library Administration</i> | quarterly | 358 |
| <i>Journal of Educational Media & Library Science</i> | quarterly | 279 |
| <i>Journal of Librarianship and Information Studies</i> | quarterly | 266 |
| <i>Journal of Library and Information Science</i> | semi-yearly | 159* |
| <i>Journal of Library and Information Science Research</i> | semi-yearly | 48** |
| <i>Journal of Library and Information Studies</i> | semi-yearly | 94 |
| <i>National Central Library Bulletin</i> | semi-yearly | 164 |
| <i>University Library Journal</i> | semi-yearly | 173 |

* Journals have condition of delay for year 2010.

** Journal of Library and Information Science Research is published since year 2006.

All journal articles, theses, and projects were classified by their research subjects into eight subjects. The subjects and notations of each subject are listed in Table 2. For articles, theses, or projects with multiple topics, all the titles, keywords and contents were reviewed by the researchers to determine the suitable major subject. Subjects with obvious interdisciplinary topics or were difficult to identify its topic were classified under the subject of *others*.

Table 2: Research Subjects

| Subject | Notation |
|---|----------|
| <i>Library and Librarianship</i> | G |
| <i>Library Management</i> | M |
| <i>Technical Services</i> | T |
| <i>User Services</i> | U |
| <i>LIS Theory and Foundation</i> | L |
| <i>LIS and Technology</i> | I |
| <i>Book, Documentation, and Archive</i> | D |
| <i>Others (Interdisciplinary, Other Subjects)</i> | O |

RESULTS AND DISCUSSION

Research Subjects

Between 2001 and 2010, the 11 key scholarly journals published 2,458 articles. Table 3 shows the distribution of journal articles in eight different subjects. For the ten-year period, the most popular topic for journal articles was *LIS and Technology*, with 600 (24.41%) articles, followed by *Book, Documentation, and Archive* with 531 (21.6%) articles. Notably, on the subject of *Book, Documentation, and Archive*, a large number of articles were published in *Archives Quarterly*. Most of the LIS key scholarly journals contain various subjects; however, *Archives Quarterly* seemed mostly concerned with the study of archive only and had a larger number of

articles per issue. This factor may have caused bias in the analysis. Furthermore, the third most popular subject was *User Services* with 353 (14.36%) articles.

The ratio distribution of subject of *User Services* is approximately 15%; however, in 2009, the number was as high as 23.15%. This could possibly be because *Interdisciplinary Journal of Taiwan Library Administration* is highly concentrated, and therefore published more than five articles related to user services in each issue in 2009. Another possibility is the topic on promotion of reading activities has caught increasing attention in recent years. In 2009, 15 articles that focus on reading issues were published, approximately twice than the number of articles in previous years, causing the ratio for the subject on *User Services* to increase rapidly. Library and Information Science researchers in Taiwan have gradually paid attention to improving the quality of research on theoretical and fundamental studies. In addition, bibliometrics and informetrics studies appear to carry increasing weight in recent years. These phenomena may have caused the articles categorized *LIS Theory and Foundation* to increase.

In contrast, the ratio of subject of *Library and Librarianship* decreased increasingly because related research in Taiwan began focusing on more sophisticated issues, rather than on general topics. From 2001 to 2009, subject of *LIS and Technology* was the most important issue of LIS journal articles for each year. This result is consistent with the significant impact on information technology by the status quo. However, in 2010, the ratio became significantly reduced. The lesser number of articles may be because the *Bulletin of the Taipei Public Library Quarterly*, *Instructional Technology and Media*, and *Journal of Library and Information Science* suffered from delays in publication in 2010. This shortage may have seriously affected the amount of articles focusing on *LIS and Technology*. If these three journal make up for the deficiency, there is a great possibility that subject of *LIS and Technology* ratio would not have shown any significant change.

Table 3: Research Subjects of Journal Articles by Year

| | G | | M | | T | | U | | L | | I | | D | | O | | Total |
|--------------|-----|-------|-----|-------|-----|--------|-----|--------|-----|--------|-----|--------|-----|--------|-----|-------|--------------|
| | | % | | % | | % | | % | | % | | % | | % | | % | |
| 2001 | 17 | 7.05 | 32 | 13.28 | 17 | 7.05 | 37 | 15.35 | 25 | 10.37 | 78 | 32.37 | 27 | 11.20% | 8 | 3.32% | 241 |
| 2002 | 14 | 5.22 | 25 | 9.33 | 22 | 8.21 | 32 | 11.94 | 16 | 5.97 | 83 | 30.97 | 61 | 22.76% | 15 | 5.60% | 268 |
| 2003 | 21 | 7.09 | 29 | 9.80 | 26 | 8.78 | 45 | 15.20 | 30 | 10.14 | 64 | 21.62 | 73 | 24.66% | 8 | 2.70% | 296 |
| 2004 | 22 | 7.83 | 23 | 8.19 | 21 | 7.47 | 38 | 13.52 | 26 | 9.25 | 71 | 25.27 | 65 | 23.13% | 15 | 5.34% | 281 |
| 2005 | 20 | 7.60 | 33 | 12.55 | 17 | 6.46 | 31 | 11.79 | 29 | 11.03 | 57 | 21.67 | 67 | 25.48% | 9 | 3.42% | 263 |
| 2006 | 13 | 5.26 | 25 | 10.12 | 20 | 8.10 | 33 | 13.36 | 24 | 9.72 | 61 | 24.70 | 62 | 25.10% | 9 | 3.64% | 247 |
| 2007 | 16 | 6.87 | 20 | 8.58 | 20 | 8.58 | 31 | 13.30 | 33 | 14.16 | 52 | 22.32 | 42 | 18.03% | 19 | 8.15% | 233 |
| 2008 | 6 | 2.64 | 23 | 10.13 | 19 | 8.37 | 28 | 12.33 | 35 | 15.42 | 59 | 25.99 | 51 | 22.47% | 6 | 2.64% | 227 |
| 2009 | 5 | 2.31 | 12 | 5.56 | 8 | 3.70 | 50 | 23.15 | 33 | 15.28 | 51 | 23.61 | 40 | 18.52% | 17 | 7.87% | 216 |
| 2010 | 3 | 1.61% | 19 | 10.2% | 26 | 13.98% | 28 | 15.05% | 34 | 18.28% | 24 | 12.90% | 44 | 23.66% | 8 | 4.30% | 186 |
| Total | 137 | 5.57% | 241 | 9.8% | 196 | 7.97% | 353 | 14.36% | 285 | 11.59% | 600 | 24.41% | 532 | 21.64% | 114 | 4.64% | 2,458 |

Between 2001 and 2010, eight LIS-related graduate programs produced 983 theses.

Table 4 shows the distribution of the theses in eight different subjects. During the ten-year period, the most popular topic was subject of *LIS and Technology*, with 272 (27.67%) theses, followed by subject of *User Services*, with 236 (24.01%) theses. These two subjects dominated more than half of the total number of theses analyzed in this study. The third most popular subject was *LIS Theory and Foundation*, with 160 (16.28%) theses.

Since 2002, *LIS and Technology* and *User Services* were two of the important subjects, with the ranking for the two subjects sometimes changing places. It was only in the years 2002, 2005, and 2007 that the numbers of theses in subject of *LIS Theory and Foundation* achieved second-place ranking. Between 2007 and 2010, the majority of theses had *LIS and Technology* as the subject.

Technical Services was the second most important topic in 2001; however, its ratio decreased to nearly 40% in 2002 and 2003 respectively. From 2003 to 2009, although though the total number of thesis increased from 56 to 135, the number of theses that focused on *Technical Services* remained steady at five to eight theses. Hence, the ratios remained at a low level. Ratio of theses with *Book, Documentation, and Archive* as subject remained at a low level for years because of a different reason. There is only one graduate program in LIS that emphasizes research on documentation and archiving; therefore, the number of theses over the years remained small but steady. Since 2007, the number of thesis focusing on subjects classified as *Others* has increased because of some LIS programs that establish on-the-job master programs, and one program changed their name to Information and Communication. Students from the on-the-job master programs are able to focus on more interdisciplinary topics when they decide on their thesis topic. Moreover, for the program that changed its program name from LIS related to Information and Communication attracted more students with broader research interests, such as game study, industry and innovation. These topics are no longer directly associated with the LIS field, resulting in an increase in subject of *Others*.

Table 4: Research Subjects of Theses by Year

| | G | | M | | T | | U | | L | | I | | D | | O | | Total |
|--------------|----|--------|----|--------|----|--------|-----|--------|-----|--------|-----|--------|----|--------|----|--------|------------|
| 2001 | 2 | 4.26% | 5 | 10.64% | 11 | 23.40% | 13 | 27.66% | 5 | 10.64% | 5 | 10.64% | 4 | 8.51% | 2 | 4.26% | 47 |
| 2002 | 1 | 1.41% | 9 | 12.68% | 10 | 14.08% | 17 | 23.94% | 17 | 23.94% | 10 | 14.08% | 5 | 7.04% | 2 | 2.82% | 71 |
| 2003 | 7 | 12.50% | 6 | 10.71% | 5 | 8.93% | 16 | 28.57% | 6 | 10.71% | 10 | 17.86% | 4 | 7.14% | 2 | 3.57% | 56 |
| 2004 | 1 | 1.19% | 6 | 7.14% | 7 | 8.33% | 24 | 28.57% | 13 | 15.48% | 19 | 22.62% | 10 | 11.90% | 4 | 4.76% | 84 |
| 2005 | 1 | 1.20% | 13 | 15.66% | 8 | 9.64% | 23 | 27.71% | 16 | 19.28% | 16 | 19.28% | 5 | 6.02% | 1 | 1.20% | 83 |
| 2006 | 1 | 0.99% | 10 | 9.90% | 5 | 4.95% | 28 | 27.72% | 16 | 15.84% | 28 | 27.72% | 8 | 7.92% | 5 | 4.95% | 101 |
| 2007 | 3 | 2.83% | 10 | 9.43% | 5 | 4.72% | 18 | 16.98% | 18 | 16.98% | 37 | 34.91% | 5 | 4.72% | 10 | 9.43% | 106 |
| 2008 | 1 | 0.76% | 10 | 7.63% | 8 | 6.11% | 31 | 23.66% | 23 | 17.56% | 41 | 31.30% | 7 | 5.34% | 10 | 7.63% | 131 |
| 2009 | 0 | 0.00% | 12 | 8.89% | 8 | 5.93% | 23 | 17.04% | 19 | 14.07% | 54 | 40.00% | 5 | 3.70% | 14 | 10.37% | 135 |
| 2010 | 2 | 1.18% | 10 | 5.92% | 14 | 8.28% | 43 | 25.44% | 27 | 15.98% | 52 | 30.77% | 5 | 2.96% | 16 | 9.47% | 169 |
| Total | 19 | 1.93% | 91 | 9.26% | 81 | 8.24% | 236 | 24.01% | 160 | 16.28% | 272 | 27.67% | 58 | 5.90% | 66 | 6.71% | 983 |

Between 2001 and 2010, the Taiwan NSC funded 179 research projects in field of LIS. Table 5 shows the distribution of the research projects in eight different subjects. Because all projects have to pass a competitive review process, any irrelevant topic will have no chance of obtaining a research grant from NSC. Therefore, there were no projects that categorized on subjects classified as *Others*. In most of the years, the subjects of *User Services*, *LIS Theory and Foundation*, and *LIS and Technology* accounted for three of the most popular subjects. There were only two exceptions. One quarter of the projects in 2002 were categorized as belonging to the subject of *Library Management*. In 2007, a total of seventeen projects, there are four classified under the subject *Technical Services*. However, these two exceptions were a special case.

Over the years, there have been very few researchers whose research interest was *Book, Documentation, and Archive*. This status resulted in there being only one or two projects conducted in this subject. In contrast, the ratio *Library and Librarianship* was the lowest among the subjects. This phenomenon is similar with the case in the journal articles and theses, and is a result of the LIS research projects in Taiwan tending to focus on more sophisticated issues, rather than general topics.

Table 5: Research Subjects of Projects by Year

| | G | | M | | T | | U | | L | | I | | D | | O | Total | |
|----------------|---|-------|----|--------|----|--------|----|--------|----|--------|----|--------|----|--------|---|-------|------------|
| 2001 | 0 | 0% | 2 | 11.11% | 0 | 0% | 4 | 22.22% | 3 | 16.67% | 8 | 44.44% | 1 | 5.56% | 0 | 0% | 18 |
| 2002 | 0 | 0% | 5 | 25.00% | 0 | 0% | 2 | 10.00% | 2 | 10.00% | 10 | 50.00% | 1 | 5.00% | 0 | 0% | 20 |
| 2003 | 1 | 7.14% | 2 | 14.29% | 2 | 14.29% | 2 | 14.29% | 3 | 21.43% | 3 | 21.43% | 1 | 7.14% | 0 | 0% | 14 |
| 2004 | 0 | 0% | 3 | 16.67% | 2 | 11.11% | 2 | 11.11% | 6 | 33.33% | 4 | 22.22% | 1 | 5.56% | 0 | 0% | 18 |
| 2005 | 0 | 0% | 1 | 7.14% | 1 | 7.14% | 4 | 28.57% | 4 | 28.57% | 3 | 21.43% | 1 | 7.14% | 0 | 0% | 14 |
| 2006 | 0 | 0% | 1 | 6.25% | 3 | 18.75% | 4 | 25.00% | 4 | 25.00% | 3 | 18.75% | 1 | 6.25% | 0 | 0% | 16 |
| 2007 | 1 | 5.88% | 1 | 5.88% | 4 | 23.53% | 4 | 23.53% | 3 | 17.65% | 3 | 17.65% | 1 | 5.88% | 0 | 0% | 17 |
| 2008 | 0 | 0% | 2 | 12.50% | 2 | 12.50% | 5 | 31.25% | 3 | 18.75% | 2 | 12.50% | 2 | 12.50% | 0 | 0% | 16 |
| 2009 | 0 | 0% | 2 | 10.53% | 0 | 0% | 5 | 26.32% | 5 | 26.32% | 5 | 26.32% | 2 | 10.53% | 0 | 0% | 19 |
| 2010 | 1 | 3.70% | 3 | 11.11% | 1 | 3.70% | 7 | 25.93% | 9 | 33.33% | 5 | 18.52% | 1 | 3.70% | 0 | 0% | 27 |
| average | 3 | 1.68% | 22 | 12.29% | 15 | 8.38% | 39 | 21.79% | 42 | 23.46% | 46 | 25.70% | 12 | 6.70% | 0 | 0% | 179 |

Research Project Funding

Between 2001 and 2010, Taiwan NSC funded NT\$ 85,056,700 for research projects in field of LIS. The total amount of funding has continued to increase yearly, demonstrating governmental emphasis on LIS studies. Table 6 shows the distribution of the seven subjects and its ratio. The subjects of *User Services*, *LIS Theory and Foundation*, and *LIS and Technology* received most of the funding support.

Table 6: Taiwan NSC Funded Research Project by Year/Subject

| | G | M | T | U | L | I | D | Total* |
|-------------|---------|-----------|-----------|-----------|-----------|-----------|---------|------------------|
| 2001 | 0 | 811,700 | 0 | 1,380,000 | 1,255,900 | 3,017,400 | 352,000 | 6,817,000 |
| | 0% | 11.91% | 0% | 20.24% | 18.42% | 44.26% | 5.16% | |
| 2002 | 0 | 1,816,700 | 0 | 860,300 | 1,119,000 | 4,146,700 | 446,100 | 8,388,800 |
| | 0% | 21.66% | 0% | 10.26% | 13.34% | 49.43% | 5.32% | |
| 2003 | 120,000 | 999,100 | 871,600 | 724,900 | 2,016,600 | 1,506,900 | 508,800 | 6,747,900 |
| | 1.78% | 14.81% | 12.92% | 10.74% | 29.88% | 22.33% | 7.54% | |
| 2004 | 0 | 1,386,900 | 959,000 | 914,200 | 3,465,900 | 1,733,000 | 604,000 | 9,063,000 |
| | 0% | 15.30% | 10.58% | 10.09% | 38.24% | 19.12% | 6.66% | |
| 2005 | 0 | 418,000 | 370,000 | 1,903,000 | 1,839,000 | 1,366,000 | 403,000 | 6,299,000 |
| | 0% | 6.64% | 5.87% | 30.21% | 29.20% | 21.69% | 6.40% | |
| 2006 | 0 | 681,000 | 1,298,000 | 2,040,000 | 2,351,000 | 1,429,000 | 420,000 | 8,219,000 |
| | 0% | 8.29% | 15.79% | 24.82% | 28.60% | 17.39% | 5.11% | |
| 2007 | 189,000 | 872,000 | 2,432,000 | 1,601,000 | 2,342,000 | 1,551,000 | 790,000 | 9,777,000 |

| | | | | | | | | |
|------|---------|-----------|---------|-----------|-----------|-----------|---------|------------|
| | 1.93% | 8.92% | 24.87% | 16.38% | 23.95% | 15.86% | 8.08% | |
| 2008 | 0 | 990,000 | 847,000 | 2,345,000 | 1,658,000 | 1,464,000 | 638,000 | 7,942,000 |
| | 0% | 12.47% | 10.66% | 29.53% | 20.88% | 18.43% | 8.03% | |
| 2009 | 0 | 1,068,000 | 0 | 2,364,000 | 2,461,000 | 3,055,000 | 749,000 | 9,697,000 |
| | 0% | 11.01% | 0% | 24.38% | 25.38% | 31.50% | 7.72% | |
| 2010 | 571,000 | 1,735,000 | 316,000 | 3,254,000 | 3,593,000 | 2,214,000 | 423,000 | 12,106,000 |
| | 4.72% | 14.33% | 2.61% | 26.88% | 29.68% | 18.29% | 3.49% | |

*New Taiwan dollar.

Table 7 illustrates the average amount for each year and various subjects. In 2007, the subject of *Library Management* had the highest average grant amount. This is because only one project was classified into the subject and the research grant was particularly high; however, this is not the normal condition. Apparently, the average amount for various subjects does not indicate any tendency. Certain subjects may obtain relatively high funding one year, but may receive less funding in the next year.

Table 7: Average Amount of Taiwan NSC Funded Research Project by Year/Subject

| | G | M | T | U | L | I | D | Average amount* |
|------------------------|---------|---------|---------|---------|---------|---------|---------|-----------------|
| 2001 | 0 | 405,850 | 0 | 345,000 | 418,633 | 377,175 | 352,000 | 378,722 |
| 2002 | 0 | 363,340 | 0 | 430,150 | 559,500 | 414,670 | 446,100 | 419,440 |
| 2003 | 120,000 | 499,550 | 435,800 | 362,450 | 672,200 | 502,300 | 508,800 | 481,993 |
| 2004 | 0 | 428,850 | 479,500 | 457,100 | 577,650 | 433,250 | 604,000 | 503,500 |
| 2005 | 0 | 418,000 | 370,000 | 475,750 | 459,750 | 455,333 | 403,000 | 449,929 |
| 2006 | 0 | 681,000 | 432,667 | 510,000 | 587,750 | 476,333 | 420,000 | 513,688 |
| 2007 | 189,000 | 872,000 | 608,000 | 400,250 | 780,667 | 517,000 | 790,000 | 575,118 |
| 2008 | 0 | 495,000 | 423,500 | 469,000 | 552,667 | 732,000 | 319,000 | 496,375 |
| 2009 | 0 | 534,000 | 0 | 472,800 | 492,200 | 611,000 | 374,500 | 510,368 |
| 2010 | 571,000 | 578,333 | 316,000 | 464,857 | 399,222 | 442,800 | 423,000 | 448,370 |
| Subject Average | 293,333 | 527,592 | 306,547 | 438,736 | 550,024 | 496,186 | 464,040 | |

*New Taiwan dollar.

Collaborative Authorship

Among the 2,458 journal articles, 1,638 articles were written by single authors, and 820 articles were written by multiple authors or group authors. Hence, 66.64% of the articles in key LIS scholarly journals in Taiwan between 2001 and 2010 were written by individual authors. However, 33.36% of the articles were collaboratively authored by two or more individuals. Table 8 shows that the ratio of single authored article decreased yearly. In 2001, more than three-fourths of the articles were written by a single author, whereas in 2010, more than 40% articles were written by two or three authors. The trend of collaborative authorship is clear and definite.

Table: 8 Single/Multiple Authored Article by Year

| | Single-Author | | Multiple-Authors | | | | | | | | | | | |
|------|---------------|--------|------------------|--------|----|-------|---|-------|---|-------|---|----|-------------|-------|
| | | | 2 | | 3 | | 4 | | 5 | | 6 | | 7-9 & group | |
| 2001 | 183 | 75.93% | 41 | 17.01% | 12 | 4.98% | 3 | 1.24% | 0 | 0% | 0 | 0% | 2 | 0.83% |
| 2002 | 208 | 77.99% | 44 | 16.42% | 7 | 2.61% | 6 | 2.24% | 2 | 0.75% | 0 | 0% | 0 | 0% |
| 2003 | 214 | 72.30% | 63 | 21.28% | 13 | 4.39% | 4 | 1.35% | 2 | 0.68% | 0 | 0% | 0 | 0% |
| 2004 | 180 | 64.06% | 68 | 24.20% | 25 | 8.90% | 7 | 2.49% | 1 | 0.36% | 0 | 0% | 1 | 0% |

| | | | | | | | | | | | | | | |
|------|---------|--------|----|--------|----|-------|---|-------|---|-------|---|-------|---|-------|
| 2005 | 19 7 | 74.90% | 52 | 19.77% | 12 | 4.56% | 1 | 0.38% | 1 | 0.38% | 0 | 0% | 0 | 0% |
| 2006 | 16 1 | 65.59% | 58 | 23.48% | 24 | 9.72% | 3 | 1.21% | 0 | 0% | 0 | 0% | 0 | 0% |
| 2007 | 13 9 | 59.66% | 79 | 33.91% | 9 | 3.86% | 2 | 0.86% | 2 | 0.86% | 0 | 0% | 2 | 0.86% |
| 2008 | 13 2 | 58.15% | 64 | 28.19% | 18 | 7.93% | 7 | 3.08% | 2 | 0.88% | 1 | 0.44% | 3 | 1.32% |
| 2009 | 11 5 | 53.24% | 73 | 33.80% | 20 | 9.26% | 6 | 2.78% | 1 | 0.46% | 1 | 0.46% | 0 | 0% |
| 2010 | 10 7 | 57.53% | 60 | 32.26% | 16 | 8.60% | 2 | 1.08% | 0 | 0% | 1 | 0.54% | 0 | 0% |

Dividing the articles by eight subjects, Table 9 shows the relationship between authorship and article subject. In most subjects, the ratios of single-author articles were over 50%, with *LIS and Technology* as the only exception. In studies focusing on *LIS and Technology*, authors tended to conduct research with others; thus, regardless of the number of authors in the group, articles focusing on *LIS and Technology* had the highest ratio. *Library and Librarianship* and *Book, Documentation, and Archive* had the highest ratios for single-author articles; researchers of these topics tended to write their articles by themselves.

Table: 9 Single/Multiple Authored Article by Subjects

| Subject | Number of Article | Single-Author article | Multiple-Authors article | | | | | | | | |
|---------|-------------------|-----------------------|--------------------------|-----|--------|----|--------|----|-------------|---|-------|
| | | | 2 | | 3 | | 4 | | 5-9 & group | | |
| G | 137 | 118 | 86.13% | 17 | 12.41% | 1 | 0.73% | 0 | 0% | 1 | 0.73% |
| M | 241 | 181 | 75.10% | 46 | 19.09% | 8 | 3.32% | 5 | 2.07% | 1 | 0.41% |
| T | 196 | 126 | 64.29% | 51 | 26.02% | 14 | 7.14% | 3 | 1.53% | 2 | 1.02% |
| U | 353 | 249 | 70.54% | 84 | 23.80% | 14 | 3.97% | 2 | 0.57% | 4 | 1.13% |
| L | 285 | 160 | 56.14% | 97 | 34.04% | 19 | 6.67% | 8 | 2.81% | 1 | 0.35% |
| I | 600 | 291 | 48.50% | 206 | 34.33% | 76 | 12.67% | 18 | 3.00% | 9 | 1.50% |
| D | 532 | 432 | 81.20% | 79 | 14.85% | 17 | 3.20% | 3 | 0.56% | 1 | 0.19% |
| O | 114 | 81 | 71.05% | 22 | 19.30% | 7 | 6.14% | 2 | 1.75% | 2 | 1.75% |

CONCLUSION

This research examines the professional literature, including journal articles, theses, and research projects between 2001 and 2010 to contribute the better understanding of research status and trends in LIS in Taiwan. In all, 2,458 journal articles published by eleven key scholarly journals, 983 theses from eight LIS graduate programs, and 179 research projects supported by NSC were analyzed. Three document types were investigated and compared from the perspective of research subject. The amount of grants was also calculated to inspect the level of support from the Taiwanese government to LIS field. The collaborative authorship of journal articles was also discussed.

The results show that with respect to journal articles, *LIS and Technology* and *Book, Documentation, and Archive* were the most popular topics, whereas the ratio of *Library and Librarianship* became increasingly small due to related research in Taiwan focusing more on sophisticated issues rather than general topics. For thesis, the most well-received topics were *LIS and Technology*, *User Services*, and *LIS Theory and Foundation*, which accounted for more than 65% of the graduate theses. The same is true for research projects, with the three subjects having a ratio of more than 70%.

In the government-sponsored research projects, the average amount of funding obtained had no significant differences or tendencies for various subjects over the years. There has also been a substantial increase in both the project and grant amount in 2010. The total amount increased by about 25% in 2010 from the amount in 2009. The question of whether this status will continue to be a trend is well worth a closer observation.

In the authorship of journal articles, 66.64% of the articles in key LIS scholarly journals in Taiwan between 2001 and 2010 were conducted by individual researchers. This is particularly true for the articles focusing on *Library and Librarianship* and *Book, Documentation, and Archive*, with more than 80% of the articles written by individual authors. However, co-authorship is becoming a common trend, particularly for articles focusing on *LIS and Technology*.

With limited time, this research only focused on articles and disregarded the references. For further study, an in-depth cross citation analysis for journal articles, theses, and research projects is recommended. In addition, the document type can also be extended to conference papers in order to broaden the scope of the study and obtain a deeper understanding of the status of LIS research in the entire country.

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