

Observation of Research Productivity from Institutional Collaboration: An Empirical Bibliometric and Content Analysis of Grey Literature

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Abstract

This study employs bibliometric and content analysis methods to analyze the research reports and working papers of the Chung-Hua Institution for Economic Research (Taipei), evaluating the scientific research productivity of collection cooperation partners to plan database systems for digital resource preservation and promote joint construction and sharing of resources; it proposes a concise framework of ‘bibliometrics - content analysis - information systems - communication - deposit,’ investigates grey literature evaluation methods that cannot be detected by traditional scientometrics, and constitutes a preliminary exploratory study with potential for continued development.

Full Text

Insight into Scientific Productivity for Institutional Collaboration: An Empirical Study of Bibliometric and Content Analysis of Grey Literature

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Abstract

This study employs bibliometric and content analysis methods to analyze the research and working papers of the Chung-Hua Institution for Economic Research (CIER) in Taipei, evaluating the R&D productivity of a collaborative partner to inform the design of a digital resource preservation database system and facilitate co-development and resource sharing. The study proposes a streamlined framework of “bibliometrics—content analysis—information system—communication—deposit” and explores evaluation methods for grey literature

that traditional scientometrics cannot adequately assess, representing an exploratory research approach with potential for further development.

Keywords: collaborative collection, resource sharing, economic policy, industry intelligence, information communication

1 Research Background and Objectives

Under the “Three Links” policy and related economic cooperation agreements across the Taiwan Strait, economic and trade exchanges will inevitably become more frequent, necessitating the collection, analysis, and utilization of industrial information from both sides. In response to this demand, information service institutions should progressively develop three key mechanisms: (1) convergence of industrial information from both regions through collaborative deposit, digitization, and knowledge management; (2) organization of industrial data by identifying materials with varying levels of credibility, expertise, impact, and quality; and (3) establishment of industrial research bases that enable scholars and experts from both regions to conveniently access, exchange, and share information.

Collaborative collection development represents an effective approach to developing distinctive collections, interlibrary cooperation, and resource sharing. Scholars on both sides of the Taiwan Strait have conducted numerous relevant studies, including Zhang Qiu’ s comparison of collection development policies in Taiwan [1], Suo Chuanjun and Yuan Jing’ s research on electronic collection development policies [2], Luo Ying’ s study on non-purchase-based strategies for university archives [3], and Qiu Ziheng’ s analysis of citation patterns for collection budgeting [4]. Wu Mingde has advocated for enhancing mutual support capabilities alongside interlibrary resource sharing [5], while Lin Qiaomin and Chen Xuehua have outlined five developmental aspects of electronic resource collections [6]. These studies not only suggested the potential intersection of supply and demand in collaborative collections but also provided substantial theoretical groundwork for this research.

However, significant practical challenges currently hinder cross-strait cooperation: (1) parties with cooperative intentions lack mutual understanding; (2) limited reference experience exists for bilateral collaboration; and (3) these factors make cooperation models difficult to establish. To address these challenges, this study proposes: employing bibliometric methods to understand both parties’ supply and demand; conducting cooperation through a third-party, non-profit, non-governmental institution (such as City University of Hong Kong Library); and gradually developing a cooperation model through collection construction and information services.

In communication studies, “content analysis” constitutes a social science research method primarily involving quantitative analysis of news terminology [7]. In

library science, “bibliometrics” focuses on analyzing authors, word frequencies, citation counts, and other metrics in books and articles [8]. In information exchange studies, both methods serve as fundamental text mining techniques to understand the five elements of communication: communicator, audience, message, noise, and context [9][10]. (For definitions and distinctions among bibliometrics, informetrics, and scientometrics, please refer to Tague-Sutcliffe J’s relevant discussions [9]).

This study originally planned to employ scientometric methods. Scientometrics, a new discipline derived from citation analysis-based domain visualization research, uses bibliometric methods to analyze scientific literature and conduct quantitative studies of scientific communication [11]. Through specialized approaches, scientometrics has been widely applied to measure scientific progress and researcher behavior [12]. However, current scientometrics lacks adequate methods for evaluating and analyzing grey literature without citation databases, making it unsuitable for this study’s background and objectives regarding collaborative collections. Therefore, this study conducts bibliometric and content analysis of CIER (Chung-Hua Institution for Economic Research), a Taipei-based intelligence agency that provides research reports on Taiwan’s economic policy development. Based on this analysis, the study proposes a co-construction and sharing plan for university libraries and economic policy research institutes, offering a reference for other library and information work.

2 Research Design

2.1 Research Object

CIER’s research program reports focus on three areas: (1) policy research on Taiwan’s economic development; (2) advocacy on major Taiwan economic and industrial policy issues; and (3) knowledge and analysis of Taiwan’s industrial development strategies.

2.2 Research Methods

Bibliometrics involves descriptive statistical analysis of metadata formats and their contents, with research scope defined as specific databases or document tables. CIER’s research program list constitutes the research scope, with metadata including project number, institute, project title, commissioning unit, publication year, and blank fields (remarks). Content analysis, meanwhile, focuses on extracting and statistically analyzing keywords and phrases.

2.3 Research Process

Following the research objectives, this study first conducts bibliometric analysis (quantitative analysis) of CIER’s research program list, then performs content analysis of online materials, and finally proposes collaboration recommendations. The research steps are: (1) data collection—downloading existing CIER research

program lists from the internet; (2) data cleaning—verifying 1,232 metadata entries online and supplementing the “remarks” field; (3) data analysis—analyzing CIER’ s research program list and publicly available reports; (4) chart generation—depicting analysis results with histograms and providing interpretations; and (5) recommendation development—proposing policy recommendations for collaborative development based on analysis results.

The data source (http://www.cier.tw/sp.asp?xdurl=publish/web/plan_list.asp&ctNode=99) is an institutional website supporting Open Access. Data were collected on September 24, 2009, with final access on January 10, 2010, enabling subsequent researchers to replicate and verify the study.

3 Results

Based on the research methods and process, findings are described below:

3.1 Cumulative Literature Growth Over 30 Years

According to CIER’ s online data, several noteworthy results emerge from calculations that can inform discussion of cooperation plans, as shown in Table 2 :

Table 2 Cumulative Literature Growth Over 30 Years

[Table content showing approximately 105, 110, 170, 113, 103, 127, 143, 122, 130, and 12 papers across different years]

As Table 2 indicates, CIER has produced approximately 120 research reports annually in recent years, a workload and budget figure that future cooperation plans should consider.

3.2 Monthly Publication Volume Over 30 Years

CIER’ s cumulative monthly publication volume over 30 years is shown in Figure 1 [Figure 1: see original paper]:

[Figure description: Histogram showing publication distribution]

Figure 1 reveals that report deadlines (which coincide with submission dates to the CIER library) concentrate in June, July, and December. Future cooperation plans could schedule deposit activities in February and August each year.

3.3 Subject Categories and Policy Recommendation Patterns

Based on CIER’ s characteristics, analysis of project titles yields the following categorizations: by regional category, research subjects can be divided into Taiwan, mainland China, United States, Japan and Korea, Asia-Pacific, European Union, and Central America; by economic category, research themes include trade, taxation, agriculture, services, energy, technology, international trade, innovation, financial securities, information, electricity, electronics, commerce,

and environmental protection; by research method, report formats include “XX Research,” “XX Plan,” “Impact of XX,” “XX Analysis,” “XX Policy,” “XX Strategy,” “XX Evaluation,” “XX Survey,” “XX Measures,” “Discussion on XX,” “XX Project,” and “Countermeasures for XX” ; and by commissioning unit nature, other policies include industry, small and medium enterprises, WTO, Taiwan businessmen, foreign businessmen, knowledge economy, output value, customs, and state-owned enterprises.

While these quantity and cumulative rankings cannot fully represent CIER’ s research directions and methods, they reflect certain categories and preferences valuable as library navigation references to facilitate scholars’ use of such documents.

3.4 Institute Report Share and Research Value

Based on institute codes in the list (0–Institute-wide, 1–First Research Institute, 2–Second Research Institute, 3–Third Research Institute, 4–Energy and Environment Research Center [previously discontinued but recently reestablished], 5 –Economic Outlook Center, 6–Financial Strategy Center, 7–Japan Center, W –Taiwan WTO Center), 1,214 reports were analyzed as shown in Table 3 :

Table 3 Institute Report Share

[Table showing report distribution: Institute 0 with 62 reports, etc.]

Results indicate the report quantity distribution ranks as: Third Research Institute, Second Research Institute, First Research Institute, and Taiwan WTO Center. The Third Economic Institute focuses on Taiwan’ s macroeconomics, monetary finance, fiscal policy, economic development, industrial economics, human resources, natural resources, and social welfare. The Second Economic Institute conducts regional studies of areas outside Taiwan and mainland China. The First Economic Institute specializes in mainland China’ s economic research, academic activities, and economic information services.

Established in 1981, the three research institutes contrast with CIER’ s Taiwan WTO Center, which began in September 2003 under the Ministry of Economic Affairs’ “International Trade and Training Center” program. The WTO Center’ s report volume has grown substantially in recent years, reflecting Taiwan’ s current focus on foreign trade policies. While this ranking cannot represent Taiwan’ s economic policy priorities, it reflects certain policy preferences valuable as library navigation references.

3.5 Principal Investigators and Research Directions

Cooperation on research program reports requires researchers’ consent, necessitating data on principal investigators and individual analysis of their influence. Analysis of investigators is presented in Table 4 :

Table 4 Principal Investigators

[Table showing investigators with 55, 30, 27, 21, 14, and 1 papers, and their research directions]

As Table 4 shows, scholars producing over 20 reports include Wang Jianquan, Liu Danian, Wu Huilin, Wang Suwan, Chen Xinhong, Gu Yinghua, Xiao Daiji, Yang Yahui, Wen Liqi, Liu Mengjun, Du Qiaoxia, Wang Jingming, Wang Lirong, Lian Wenrong, Shi Huici, Chen Zhangzhen, Ouyang Chengxin, and Wen Beizhang—18 scholars with diverse research directions.

4 Discussion

In summary, establishing cooperative agreements facilitates access to CIER' s quality documents on: (1) Taiwan' s regional economic development; (2) Taiwan' s industrial policy formulation; (3) cross-strait trade policy trends; (4) Taiwan' s research on the US, Japan, and Korea; and (5) Taiwan' s evaluation and strategies for participating in international trade organizations.

CIER is a renowned Taiwanese think tank that gathers numerous senior scholars (often university professors and entrepreneurs) whose members are not hidden from society but frequently attend various seminars and academic, policy, and public service events where direct communication with these scholars is possible. Cooperative collection development with CIER not only enhances university library collections but also helps the institution disseminate its research findings.

Based on action objectives for industrial information convergence, data organization, and research base establishment, this study proposes three steps with nine detailed measures:

Step 1: Cross-regional publication delivery includes: (1) organizing bibliographic records of historical research reports (author, publication date, subject, keywords, project number, abstract, classification time); (2) marking usage restrictions and recommendations; and (3) delivering documents in phases.

Step 2: Digitization and archiving includes: (1) editing bibliographic and access permission data (bibliographic data includes author, publication date, subject, keywords, project number, abstract; access permission data includes classification level, classification time, and authorized access numbers); (2) scanning, archiving, protection, preservation, supervision, and inspection; and (3) digital file delivery and information system planning.

Step 3: Cross-regional information system management includes: (1) spot-checking digital archive integrity (missing pages, unclear scans, filename errors, incomplete filenames, unified terminology for new entries, entry accuracy); (2) developing retrieval and browsing systems; and (3) simultaneous activation and proper maintenance.

Information exchange theory borrows methods from library and journalism studies, but this study applies information exchange theory to solve practical library

problems. The analysis results validate external evaluations of CIER' s high-quality research, demonstrating that bibliometrics and content analysis can observe scientific productivity, particularly for grey literature (reports, white papers) that traditional scientometrics cannot adequately assess. However, this approach has limitations requiring further development.

Future research should, based on practical experience, focus on: (1) completing digital archiving of paper research reports; (2) establishing literature and retrieval systems; and (3) developing database update and usage protocols to achieve mutual goals of off-site deposit, digital resource archiving, and database construction and management.

5 Conclusion

As discussed, information communication theory represents an interdisciplinary field between library and journalism studies, primarily exploring information' s role in communication processes and interpreting the essence of communication' s five elements through quantitative information analysis. This study includes: cooperating parties as communication subject (CIER) and object (City University of Hong Kong); communication content (research reports); context (consensus on collaborative collections); and noise (obstacles to collaboration). Subject and object are geographically separated, requiring surface-level understanding to identify potential phenomena before negotiating cooperation and developing mutual trust.

To eliminate noise in the communication context from the object' s perspective and achieve effective interaction with communication content requires understanding the subject and content from the object' s viewpoint (the "Other" in philosophy). CIER is a prestigious Taiwanese think tank gathering many scholars and experts with notable reputation. However, few have conducted in-depth studies of it, and its mysterious nature has even led to misconceptions as a spy agency. In reality, it is a research institution that brings together numerous senior scholars.

This study demonstrates that applying bibliometrics and content analysis can effectively evaluate grey literature and observe scientific productivity. The methodology validates external assessments of CIER' s high-quality research, though it requires further development.

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Note: Figure translations are in progress. See original paper for figures.

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