# Construction of a Thematic Database on Republican-Era Scholars and Analysis of Their Academic Characteristics: A Postprint from the Academic Community Perspective

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## Abstract

[Purpose/Significance] The Republic of China period was a rare vibrant period of academic development in Chinese history. At present, there exist numerous databases of Republican-era literature, yet they are all topic-oriented thematic databases. The Republican-era Scholars Thematic Database, in contrast, upgrades domain-based, topic-oriented databases to a thematic database with individuals as the dimension, thereby reflecting the characteristics of academic exchange. [Method/Process] This paper introduces the Republican-era Scholars Thematic Database from the perspectives of its overall framework, functional design, and implementation. Based on this database, it sequentially reveals the characteristics of the academic community during the Republic of China period from multiple dimensions, including scholars' organizational affiliations, co-authorship of academic works, and citation behaviors. Finally, it introduces temporal analysis methods to explore the temporal evolution of scholars' research behaviors. [Result/Conclusion] Empirical results demonstrate that the evolution of the academic community during the Republic of China period was influenced by both external political climate and internal organizational changes. Through analyzing the temporal dimensions of scholars' co-authorship and citation relationships, the study finds that scholars' enthusiasm for academic research during the Republican era continued to grow. Additionally, scholars during the Republic of China period tended toward independent work, with co-authorship behaviors becoming more frequent only after the Republican era.

# Full Text

## Preamble

**Title:** Construction of a Thematic Database of Scholars in the Republic of China and Analysis of Their Academic Characteristics—From the Perspective of Academic Community

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**Abstract:** [Purpose/Significance] The Republic of China period represents a rare era of active academic development in Chinese history. While numerous document databases for this period currently exist, they are primarily subject-oriented thematic databases. The thematic database of scholars in the Republic of China upgrades these field-based, subject-oriented databases to a scholar-centered dimensional database, reflecting the characteristics of academic exchange. [Method/Process] This paper introduces the thematic database from the perspectives of its overall framework, functional design, and implementation. Based on this database, it reveals the features of academic communities during the Republic of China period from multiple dimensions, including scholars' organizational affiliations, co-authorship of academic works, and citation behaviors. Finally, time-series analysis methods are introduced to explore the temporal evolution of scholars' research behaviors. [Result/Conclusion] Empirical evidence demonstrates that the evolution of academic communities during the Republic of China period was influenced by both external political atmosphere and internal organizational changes. Through the analysis of co-authorship and citation relationships with temporal dimensions, it is found that scholars' enthusiasm for academic research on the Republic of China period has continued to grow. Additionally, scholars during the Republic of China period tended toward independent creation, with collaborative behaviors becoming more frequent only among post-Republic scholars.

**Keywords:** Republic of China; scholars of the Republic of China; thematic database; academic community

**Classification Number:** G250.74

The Republic of China period (1912–1949) witnessed the breaking of geographical isolation, social system transformation, and liberation from ideological constraints, creating an academic landscape where Chinese and Western knowledge converged and numerous schools of thought competed. Various ideologies and intellectual trends transformed China's traditional "Four Categories of Learning" (classics, history, philosophy, and literature) into the "Seven Fields of Learning" (literature, science, law, business, agriculture, engineering, and medicine). Despite some cultural authoritarian measures, the Nationalist government granted

scholars considerable freedom, allowing diverse academic perspectives to coexist and debate. The relative expansion of social space, including the establishment and rapid development of universities and research institutions, the flourishing of publishing industries, and relatively free public opinion, provided social conditions and practical possibilities for academic elites to freely express their views and form groups with like-minded scholars. Currently, domestic research on Republic of China scholars primarily focuses on individually outstanding contributors, lacking comprehensive and in-depth studies of the academic community as a whole. Moreover, relevant historical materials centered on scholars are widely scattered and underutilized. Therefore, constructing a thematic database can provide detailed materials for in-depth research on academic communities during the Republic of China period. Existing databases of Republic of China literature are primarily thematic collections. Based on this, the thematic database constructed in this paper reorganizes literature by upgrading field-based, subject-oriented databases to scholar-centered dimensional databases. This database provides multi-dimensional data on scholars' organizational affiliations, academic achievements, co-authorship, and citations, which is valuable for exploring the characteristics of academic exchange, understanding the academic ecology and its historical evolution, and supporting humanities research.

## 2 Related Research

### 2.1 Research on Republic of China Scholars

Current research on Republic of China scholars concentrates on three aspects: scholar collaboration, academic ecology, and academic evaluation.

**2.1.1 Scholar Collaboration Research** Zhu Haiyan examined English publications by Republic of China library scholars who had studied in the United States, revealing their exchanges with the international library community through paper publications, conference participation, and correspondence with journal editors or the American Library Association [1]. Cheng Cheng studied the Esperanto movement in late Qing and early Republic China, arguing that cooperation between Chinese and foreign Esperantists significantly transformed the movement's landscape in China [2]. Deng Shaogen documented the exchange and cooperation between Columbia University's School of Journalism and Republic of China journalism, which greatly promoted friendly Sino-American collaboration [3]. The Harvard-Yenching Institute, as an inter-university academic community model, cultivated a generation of internationally renowned Chinese scholars [4].

**2.1.2 Academic Ecology Research** Against the backdrop of warlordism and exceptionally active intellectual life, scientific societies proliferated during the Republic of China period, covering extensive fields and sparking a profound educational reform movement. Chen Yi analyzed the contributions of Repub-

lic of China scientific communities to science education history and China's scientific development [5]. Lü Mingcui studied the development nature of painting and calligraphy societies in Jiangnan region during the Republic of China period, using Shanghai's "Bai Society" as an example to explore cross-society phenomena and member relationships [6]. Xia Wenhua proposed the concept of a modern Chinese scientific-cultural community by jointly studying humanists and scientists, providing comprehensive understanding of its development with research institutions and scientific societies [7]. While scientific societies served as limited organizational carriers for scholars, bookstores and journals functioned as broader communication media that connected individuals through their works, serving as resonance points for maintaining academic interests and platforms for showcasing scholarly identity. Jiang Chao and Xia Quan examined the academic ecology of Republic of China scholars in Shanghai by studying the activities of scholars who published or edited works at "Crescent Moon Bookstore" or in *Crescent Moon* magazine [8]. Zhou Bo used Republic of China periodicals such as *Travel Magazine* and *Railway Monthly* to trace the theoretical system construction, development value and path exploration, and the generation of localized travel discourse theory under Western influence, thereby exploring the theoretical origins and development 脉络 of China's international inbound tourism industry [9]. Chen Yibao demonstrated that numerous book reviews in academic journals represented a form of peer review within Republic of China academic communities, enabling recognition, criticism, and understanding of scholarly works [10].

**2.1.3 Academic Evaluation Research** To provide objective evaluation and accurate historical positioning of Republic of China academic development, Ouyang Zhesheng et al. employed historical materialism as theoretical guidance [11]. Du Haijun introduced the fruitful achievements of Republic of China scholars in ancient opera studies, including establishing new opera perspectives and research paradigms that pioneered contemporary opera research [12].

### 2.2 Academic Community Research

Academic communities are widely discussed in contemporary education and other fields, though definitions vary. Narrowly defined, academic communities refer to various levels of groups and organizations formed based on subjective or objective common characteristics, including both tangible and intangible communities [13]. Broadly defined, academic communities are formed based on Kuhn's theory of scientific communities, comprising members who construct commonly followed "paradigms" including shared beliefs, theories, methods, and value standards [14]. Current research on academic communities focuses on scholar collaboration and citation relationships, academic evaluation, and scholar clusters.

**2.2.1 Scholar Collaboration and Citation Relationships** Ren Yan et al. used scientometric methods and author-institution co-occurrence to reveal

cooperation patterns among scholars and institutions, as well as scholar 聚散情况 across different periods, thereby exposing the structure of academic communities and knowledge exchange modes within disciplines. Their research found that the development of competitive intelligence as a discipline was influenced by academic and geographical factors, forming small research groups centered on authoritative information science scholars and their institutions [15]. Tan Chunhui et al. combined citation and word frequency analysis to study the formation trajectory, thematic areas, and disciplinary exchange of informal academic communities connected by journal platforms, using *Journal of Library Science in China* as a case study [16].

**2.2.2 Academic Evaluation** Cui Yueqin argued that academic development should follow its own laws, with autonomous and independent academic communities serving as the primary evaluators [17]. Zhang Lingyun et al. evaluated and ranked academic journals, authors, and institutions in tourism research from 2003–2018 using metrics such as scores, h-index, and g-index, revealing the development pattern of the tourism academic community [18].

**2.2.3 Scholar Cluster Research** Within academic communities exist numerous academic circles and clusters formed by like-minded scholars [19]. Sha Xianyi et al. studied the Zhang family of She Garden, examining how family scholar clusters in Qing Dynasty Jiangnan utilized cultural resources for academic research and collaboration, thereby investigating family-based knowledge production [20]. Zhu Weizhu examined Republic of China academic development from multiple perspectives including knowledge structure, academic system, social atmosphere, and political context, exploring the internal and external mechanisms that constrained its development and providing objective evaluation of Republic of China academic history [11].

### 2.3 Scholar Thematic Databases

With the widespread digitization of academic literature, open sharing has become a trend, and scholars' demands for open access and standardized management have grown. Constructing integrated databases that organize research networks and relationships from scholar/institution/achievement dimensions helps scholars quickly understand their influence within fields and identify similar scholars and communities, thereby promoting network construction and knowledge inheritance. CNKI's "Scholar Circle" displays scholars' affiliations, research fields, achievements, influence analysis, and collaborations, enabling rapid discovery of scholar and institutional networks [22]. Tsinghua University Scholar Database provides personal research collaboration networks and international cooperation profiles [23]. Xi'an Jiaotong University offers visual analysis of scholars and collaborators [24]. The China Documentary Research Center established the "Belt and Road" documentary academic community to build a multilateral, public, think-tank international cooperation platform [25].

Currently, most academic community thematic databases are expert databases or disciplinary databases.

Regarding Republic of China scholar research, existing resources are primarily large-scale integrated document collections, such as the Republic of China Documents Database [26], Late Qing and Republic of China Periodicals Database [27], and Republic of China Books Database [28].

In summary, current research on Republic of China scholar academic communities remains limited, with the overall academic landscape and developmental evolution yet to be fully explored. Although integrated resource databases exist, their construction and application effectiveness need improvement: (1) they focus on resource integration but inadequately reveal scholar characteristics or deeply mine cross-relationships between scholars and societies; (2) data is limited to scholar information and academic resources, with insufficient bibliometric data and no presentation of post-Republic utilization of scholars' works, preventing comprehensive evaluation support; (3) application is restricted to basic retrieval functions, lacking automatic tracking of current research trends or effective presentation of scholarly trajectories and relationship evolution, thus not maximizing their potential for academic history and scholar evaluation. Addressing these limitations, this paper constructs a scholar-centered thematic database that presents the academic ecology and developmental evolution of the Republic of China period from multiple dimensions—scholars, works, and academic communities (including societies, schools, parties, and schools of thought)—providing important reference value for comprehensively revealing and evaluating the historical positioning and influence of Republic of China scholars.

## 3 Construction of the Republic of China Scholars Thematic Database

East China Normal University established the Republic of China Scholars Thematic Database in 2019 (http://172.20.4.21:8000/frontSpecialSubject/academicCommunity), a research platform for studying important scholars and academic communities during this period. Centered on "academic communities" and incorporating suggestions from Associate Professor Xiao Peng's research team at Sun Yat-sen University, the platform compiles bibliographic metadata of important Republic of China scholars and academic communities, provides links to Chaoxing Discovery, and offers browsing, navigation, and retrieval functions with emphasis on influence report analysis for scholars and communities.

### 3.1 Overall Framework of the Republic of China Scholars Database

The Republic of China Scholars Database is constructed based on internet resources and Chaoxing book resources, with a bottom-up architecture comprising data, function, service, and user layers [Figure 1: see original paper].

**3.1.1 Data Layer** The data layer directly operates and manages data, sourcing from internet resources (including institutional entities, scholar profiles, portraits, news), public datasets such as Chaoxing Dictionary and Shanghai Library Name Authority Database [29] (for supplementing and verifying scholar information), and digital libraries (including Chaoxing book resources). Information collection tools access relevant webpages to extract publication news and conference reports from HTML code. Chaoxing's open URL scheduling interface obtains Republic of China scholars' published works from Chaoxing's Republic of China book resource database. Based on the OAI-PMH protocol, the database harvests academic resource metadata and digital publication information. The OAI-PMH protocol provides interoperability for digital resource metadata through specified command sets using internet and metadata technologies [30]. The content framework is shown in [Figure 2: see original paper].

**3.1.2 Function Layer** The function layer further processes data through four stages: resource collection and processing, digital object description, resource integration, and resource storage. (1) Resource collection and processing: News information is collected and maintained through automatic updates supplemented by manual participation. (2) Digital object description: Digital resources are described according to digital object rules, generating metadata and scheduling codes to constitute digital objects. (3) Resource aggregation: Based on quantitative thresholds (publication/citation counts) or qualitative indicators (scholar identity), a research team comprising experts from East China Normal University, Sun Yat-sen University, and Chaoxing Company selects scholar data, corresponding book data, and academic community lists (parties and societies). Literature metadata and scholar metadata are extracted and aggregated to highlight scholar characteristics, forming readable, storable, associable, and displayable scholar metadata. The database ultimately includes approximately 158,000 book records, 2,190 scholar records, and 181 academic community records. (4) Resource storage: Provides object and file storage functions, following the principle of centralized metadata storage and distributed digital object storage to address frequent access and large-capacity storage needs.

**3.1.3 Service Layer** Based on data integration and storage, the service layer performs further organization and mining. It integrates metadata frameworks according to research subjects (including Republic of China scholars and related organizations) to form a tagging system, creating homepage profiles for each subject that centrally present and interlink scholar-centered historical materials. Using literature data, organizational affiliation information, and social network data, the database conducts mining and analysis to construct academic community network models from the webbed relationships among different scholars, societies, and academic resources, thereby revealing Republic of China scholar networks. Additionally, it clusters scholars based on their characteristics to mine similar scholars and reveal academic teams.

**3.1.4 User Layer** The user layer provides resource publishing and retrieval services, applying Republic of China scholar resources to functions including scholar retrieval, community retrieval, scholar profiles (research fields, social networks, related communities), and visual displays. The community list retrieval results page displays community details, member profiles, works, influence, and related communities. All visual nodes and works enable jumping to related works, scholars, or academic community interfaces.

### 3.2 Functional Design and Implementation

The functional design includes general and specialized features .

**Table 1 Functional Design of the Republic of China Scholars Database**

| Function Module | Description |
|---|---|
| Retrieval Function | Supports retrieval of important scholars, societies, academic works, announcements, and related news; provides unified search boxes for scholar names, titles, publishers, series names, and keywords; offers entry points for scholars and communities with alphabetical and category filtering (parties, school societies, schools of thought) |
| Navigation and Faceted Browsing | Supports data navigation and faceted browsing by work date, keywords, and publisher |
| Informetric Function | Includes scholar-level and community-level metrics, displaying citation statistics for Republic of China scholars' works |
| Data Update Function | Provides data update and maintenance capabilities |
| Influence Report | Generates scholar influence reports and TOP 100 community influence reports based on informetric data, enabling queries for specific scholars or communities with visualized, templated analysis of academic influence and profiles |

| Function Module | Description |
|---|---|
| Visualized Relationship Graphs | Displays graphs of related scholars and academic communities |

The database supports unified retrieval of scholar names, titles, publishers, series names, and keywords, as well as entry through academic community and scholar portals combined with alphabetical indexing and community categories (including parties, school societies, and schools of thought) [Figure 3: see original paper]. Scholar list result pages display personal identity details, biographical information, works, influence metrics, related academic communities, and visualizations of related scholars. Community list result pages show community details, member profiles, works, influence, and related communities. All visual nodes and works enable jumping to related interfaces.

**3.2.1 Retrieval Function** The database provides unified search boxes and portal-based retrieval combined with alphabetical and categorical filtering [Figure 3: see original paper].

**3.2.2 Navigation and Faceted Browsing** The database supports navigation and faceted browsing by work date, keywords, and publisher [Figure 4: see original paper]. When users cannot identify a specific scholar name, they can quickly locate information through community type and alphabetical indexing.

**3.2.3 Informetric and Influence Report Functions** Informetrics are categorized into scholar-level and community-level metrics. Scholar metrics include work counts, editions/volumes, citation counts, rankings, and ranking percentages. Community metrics include aggregated work counts, aggregated editions/volumes, aggregated citation counts, overall rankings, and ranking percentages. Based on these metrics, the database outputs TOP 100 community influence reports (including ranking, community name, citation count, scholar count, key scholars) and TOP 100 scholar influence reports (including ranking, scholar name, citation count, work count, affiliated communities).

**3.2.4 Visualized Relationship Graphs** Visualized presentation helps transcend temporal and community limitations to discover potential scholars with similar research interests and understand relationships among scholars and communities. The database displays visualized graphs of related academic communities and scholars on scholar profile pages, and related organizational community graphs on community profile pages, enabling cluster viewing and portal jumping. Using annual citation data from academic works, the database calculates scholar relationships to generate co-authorship and citation network graphs, uncovering academic communities with different characteristics.

## 4 Academic Community Identification Based on Thematic Database Data

Republic of China scholars formed collective strength and academic influence through personal networks and organizational establishment to lead academic circles and influence government, with various parties and societies coexisting in a complex landscape of unity and diversification. These institutions' formation and evolution demonstrated China's efforts and challenges in transforming from traditional to modern academia. Many established research institutions continue to influence contemporary academic research, such as the China Association of Agricultural Science Societies (CAASS), which originated from the Chinese Agricultural Society. Founded in 1917 and restructured in 1964, CAASS includes societies such as the Chinese Society of Animal Husbandry and Veterinary Medicine, Crop Science Society of China, Chinese Society for Horticultural Science, Chinese Society of Plant Pathology, Chinese Society of Plant Protection, Tea Science Society of China, and Sericultural Society of China, providing strategic guidance for national agricultural development. Studying the development of Republic of China societies and academic community structures enables better historical examination of existing organizational structures and more objective evaluation of their historical influence and strength.

This section uses the China Association of Agricultural Science Societies as a case study to examine organization-based academic communities, utilizes coauthorship and citation data to mine academic communities, and introduces time-series analysis to explore temporal characteristics of research behavior.

### 4.1 Organization-Based Academic Communities

[Figure 5: see original paper] displays six community clusters centered on China Association of Agricultural Science Societies members, including 21 Republic of China scholars and 27 affiliation relationships, demonstrating scholarly efforts to establish societies during that era.

The figure shows that Zou Bingwen, Chen Rong, Liang Xi, and Zhang Jian maintained relationships across multiple societies or schools, which in turn connected with other scholars. The evolution of these societies and scholars' educational backgrounds were intricately intertwined, with academic communities changing dynamically. Based on the evolution of these societies and parties, three developmental stages can be identified: 1912–1924, 1924–1935, and post-1935.

**(1) 1912–1924: High Tide of Party Formation and Coexistence of Societies**

In party formation, constitutionalist leaders Liang Qichao and Zhang Jian, both domestic and overseas, shared common ground in promoting constitutional politics. In early 1912, to participate in the Nanjing provisional government, Zhang Jian co-founded the Unity Party with Zhang Binglin, which merged with the former Constitutional Preparation Public Association. Despite their close relationship, Liang Qichao initially refused to join and instead founded the Demo-

cratic Party in spring 1912. He later joined the Republican Party (formed by merging the Unity Party and Min Society) in 1913 to promote conservative party unification, eventually forming the Progressive Party through the merger of three conservative parties. In society formation, the Chinese Agricultural Society (now CAASS) was founded in January 1917 by returned students Wang Shuncheng, Guo Tanxian, and Chen Rong, with Zhang Jian as honorary president. Subsequent presidents included Chen Rong, Wang Shunchen, Xu Xuan, Liang Xi, and Zou Bingwen. Internal factional divisions and educational background differences gradually caused member cohesion to diverge.

**(2) 1924–1935: Society Disintegration and Reorganization Due to Internal Factions and External Political Turmoil**

During Xu Xuan's presidency (1924–1935), members with Japanese academic backgrounds became extremely active, while the American-educated faction represented by Chen Rong was marginalized. Previously active American-educated scholars like Zou Bingwen gradually fell silent. This intensified factionalism within the Chinese Agricultural Society prompted the American-educated faction to seek independent development. In August 1928, American-educated forestry scholars Chen Rong and Yao Chuanfa founded the Chinese Forestry Society (now Chinese Society of Forestry) to implement "forestry for national salvation." Additionally, with Dai Fanglan's support, Zou Bingwen established the Chinese Society of Plant Pathology in 1929. These developments reflected how internal factions and external political instability drove society reorganization.

**(3) Post-1935: Scientific Societies Stabilized While Political Societies Continued Developing**

After years of reorganization, scientific societies stabilized, while societies pursuing political democracy continued to evolve. The Chinese Forestry Society experienced three phases (Chinese Forest Society, Chinese Forestry Society, and current Chinese Society of Forestry) until its 1951 reconstruction under Liang Xi's leadership. Liang Xi was also an early initiator of the Jiusan Society (originally the Democratic Science Forum), which carried forward May Fourth Movement ideals and made pioneering contributions that laid foundations for modern disciplinary research. Other notable Jiusan Society members included Qi Kaizhi, Tu Changwang, Chen Jie, Lu Yudao, Zhu Fucheng, Xu Deheng, Pan Shuzhi, Li Jinxi, and Shui Xiheng.

Recent scholarship has shown excessive praise without sufficient analysis, exaggerating the limited, relative academic freedom of the period. The above analysis reveals the close relationship between Republic of China academia and politics. Political factors consistently constrained and maintained academic development directions and even the closeness of relationships among scholars. Therefore, studying Republic of China academia requires placing it within broader intellectual-cultural and socio-political contexts rather than limiting analysis to individual schools or disciplines.

### 4.2 Academic Community Presented through Co-authorship and Citation Data

Co-authorship represents the most direct form of academic collaboration, explicitly indicating scholarly exchange, while citation relationships provide implicit connections. Citations include direct citation, co-citation, and bibliographic coupling. Direct citation and being cited reflect knowledge transmission with directionality and temporality [32]. Co-citation measures the coupling degree of scholars citing the same works—higher coupling suggests similar research fields and implicit academic community relationships. Bibliographic coupling is more passive and incidental, often linking thematically dissimilar works, and is excluded from this study's data collection.

Based on these principles, the database collects book and journal article data with co-authorship, citation, direct citation, and co-citation relationships, excluding non-academic works like biographies and meeting minutes. Using Zou Bingwen as an example, 27 works meeting these criteria were collected .

**Table 2 Collection of Zou Bingwen's Works**

| Work Title | Publication | Year |
|---|---|---|
| Plant Pathology Outline | Science Magazine | 1919 |
| International Botanical Nomenclature Examples | Encyclopedia of China | 1950–1990 |
| Science and Agriculture | Science Magazine | 1919 |
| … | … | … |

After identifying scholars' works, corresponding citation data was collected. Due to the massive volume of co-authorship and co-citation relationships causing graphical overlap, Zou Bingwen serves as a representative node. Among his 27 works, 164 citation records were collected with no direct citation or co-citation data .

**Table 3 Co-authorship, Direct Citation, and Co-citation Data for Zou Bingwen's Works (Partial Examples)**

| Citing Work | Authors | Year |
|---|---|---|
| Agricultural Product Protection and Quarantine Technology | Gao Xiwu, Wang Dianxuan | 2009 |
| Invasive Alien Species Control | Chen Shuangji, Jiang Yonghou | 2009 |
| … | … | … |

Using this data, a multi-valued scholar network was constructed and imported into Ucinet software, treating 149 scholars as nodes with co-authorship and cita-

tion relationships as edges weighted by citation frequency. A complex network graph was generated [Figure 6: see original paper].

**Table 4 Scholar Relationship Multi-valued Network (Partial Examples)**

| Scholar 1 | Scholar 2 | Relationship Type | Weight |
|---|---|---|---|
| Zou Bingwen | Wang Qihua | Co-authorship | 1 |
| Zou Bingwen | Zhang Demin | Citation | 3 |
| … | … | … | … |

[Figure 6: see original paper] uses circles labeled with scholar names. Bidirectional arrows indicate co-authorship; unidirectional arrows indicate citation relationships, with the arrow pointing from citing to cited works. Thicker lines represent more frequent citations. To improve clarity, node positions were manually adjusted, with co-authorship relationships on the right and citation relationships on the left.

In-degree (arrows terminating at a node) indicates scholars with cooperative interest; out-degree (arrows originating from a node) indicates scholars whose works receive more attention. Zou Bingwen has an out-degree of 196 and in-degree of 1, indicating his tendency for independent research while his works attract considerable attention. Scholars like Bao Ping, Wu Qiang, Huo Yiping, and Wang Lihua frequently cite Zou Bingwen, primarily in research on Chinese agricultural history and modern agricultural education systems.

### 4.3 Time-Series Academic Community

Incorporating temporal dimensions, scholars were divided into 10-year intervals from 1919–2020 based on publication dates. Works spanning multiple intervals were assigned according to their primary publication period. These temporal attributes were imported into Ucinet as attributes for batch marking nodes with different shapes, enabling analysis of temporal changes in scholars' in-degree/out-degree and evolutionary characteristics [Figure 7: see original paper].

[Figure 7: see original paper] shows nodes arranged chronologically from center outward. The number of nodes gradually increases over time, with white circles (1999–2009) and black circles (2009–2020) being most dense. Most co-authorship behaviors in this local network occurred during 1999–2020, indicating growing contemporary scholarly interest in Republic of China research and more frequent modern collaborative research. Nodes with identical shapes represent small academic communities in specific periods focusing on particular themes: scholars publishing primarily in 1999–2009 focused on returned students' educational activities, plant quarantine technology, and agricultural education transformation;

those in 2009–2020 focused on social reform and rural reconstruction, agricultural extension, disciplinary development, and Chinese education movements.

## Conclusion

Integrating organization-based and co-authorship/citation-based academic communities reveals that Republic of China academic communities differed from contemporary research groups—they were spiritual communities where colleagues were also comrades. Their formation related not only to shared intellectual orientations but also to political contexts and internal organizational changes. Academic research exhibits continuity; through co-authorship and citation relationships, scholars across time and space can be connected into global academic communities, while period-specific constraints can identify small academic communities for analyzing research group characteristics.

The scholar-centered, academic community-oriented Republic of China Scholars Thematic Database breaks from traditional subject-based literature organization. Using multi-dimensional data on organizational affiliations, academic achievements, co-authorship, and citations, it reveals the evolution and characteristics of academic communities, improving research on the complex relationships between socio-political-economic development and scholarly development. It provides an effective tool for comprehensively examining scholar-scholar, organization-organization, and scholar-organization relationships, serving modern scholars' research on Republic of China history and culture.

Due to space and display limitations, this paper provides only an analytical framework using Zou Bingwen as an example. Integrating additional scholars' co-authorship and citation data can construct broader global academic community networks for multi-angle analysis: comparing scholars' in-degree/out-degree can identify consistently influential scholars in specific fields, providing more objective evaluation criteria; analyzing temporal patterns can reveal which research directions sustained attention, their relationship to scholars' historical contexts, and other valuable insights for deeper understanding of scholars' positioning and academic themes in Republic of China academic communities.

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