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GIS in urban cultural studies: reflections from the project on Republican Beijing

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This is a reflective report of our historical GIS project on Beijing’s urban culture during a culturally transitional and transformative period when the city operated not under direct political and ideological control by a supreme sovereign authority as the capital of an empire or an effectively unified nation-state. It is between the fall of the imperial order and before the Japanese occupation, 12 years before the establishment of the People’s Republic of China. In this article, we will report what the project is about but we also have an underlying concern of what more GIS can tell us about historical Beijing as a city. This question will be addressed by drawing from the experience of our project. The article discusses the benefits gained and difficulties we encountered and our reflections upon a number of more fundamental theoretical issues. The scholarship contexts pertaining to the application of historical GIS to modern Chinese history and urban history are provided, against which a case of legal cultural development, especially that of the newly emergent legal profession, is discussed to illustrate in a spatial perspective the complex interplay between the legal heritage and transplants in Republican Beijing.

Keywords: Republican Beijing; historical GIS; urban culture; lawyer

1. Introduction

This is a reflective report that summarizes our historical GIS project on Beijing’s urban culture during the early Republican Period. This culturally transformative period took place during a transition from the fall of the imperial order, when the city was no longer operating under direct political and ideological control of the sovereign authority and no longer acting as the capital of an empire. Nor was Beijing yet established as the capital of an effectively unified nation-state, a situation which lasted through the Japanese occupation period and up to the establishment of the People’s Republic of China. Although Republican Beijing has been studied from various aspects – from the ethnographic approach to the tension between tradition and modernity – little empirical data have been collected about the locations of culturally important institutions, such as schools, temples, courts, police stations, and markets. The purpose of the present study is to collect and digitize this historical information using GIS, to prepare the groundwork for exploring spatial patterns in a more systematic way, and to test the assumptions and conclusions of the existing work on urban culture for that time and space. The project was completed and the output dataset is open to the public online, allowing users to download our data free insofar as the downloaded dataset will not be used for commercial or illegal purpose. Apart from providing data for downloading, our website will also provide basic functions of displaying data, overlaying chosen data, and exporting user-generated maps. We also plan to allow users to provide feedbacks, which hopefully in the long run, help to enrich the contents of the dataset and enhance its quality and reliability. In this article, we will report what the project is about but we also have an underlying concern of what more GIS can tell us about historical Beijing as a city. This question will be addressed by drawing from the experience of our project. The final section will provide a brief account of the development pattern of the legal profession to illustrate what a GIS-based spatial perspective may suggest.

2. Overview of the GIS project on Republican Beijing

2.1. Project description

Project Title – Beijing in Transition: A Historical GIS Study of Urban Cultures, 1912–1937; Subject – Modern Chinese urban history; Creators/ownership – Billy K.L. So (principal investigator; HKUST) and Hui Lin (co-investigator; Chinese University of Hong Kong (CUHK)); CUHK project manager – Peiyao Zhang (CUHK); CUHK participant – Michael Hoi-kit Ng; Spatial location –
Beijing city (not including suburban districts and countryside); Temporal coverage – 1912–1937; Contributors – Peking University (Center for Historical Geography and Center for Medical History), Peking Union University (College of Arts and Science), Shandong University (Law School); Funding – Research Grant Council, Hong Kong (Project no. 450407).

2.2. Base maps

We have found three large-scale maps of 1914, 1918, and 1937 to form the core of our base map with temporal sequence over the 25 years period of our project. The scale of these maps ranges between 1:5000 and 1:8000. The 1937 one (1:5000) has been georeferenced and incorporated into the GIS system as part of its data. This one was the base map of the project. The map is detailed enough to show most of the street names but not the numbers of houses on the streets. We learned that higher-resolution maps are stored in Beijing Municipal Government, some of which were used in the urban redevelopment in the early 1950s. A small portion of those maps could be found in published form. However, we could not secure access to those maps without running into unknown regulatory obstacles and decided not to seek those ‘state-owned’ sources of information. We could therefore only use information that is already made public by the data owners. Since their resolutions are lower, the 1914 and 1918 maps were georeferenced by rubber-sheeting method to fit into the 1937 base map for viewing and reference purpose only. They cannot be overlaid comfortably with the 1937 map.

2.3. Thematic information: location and input

Our data were mainly collected from the collection of the Beijing Municipal Archive and other online materials made available by major libraries in Beijing like the Capital Library and National Library. Unfortunately, just as we began to collect data, the collection at the Second Historical Archive in Nanjing was closed to users. We only had a chance to screen through its catalogue and found that for Beijing municipal administration documents during the period of Beiyang and Nanjing regimes, its holdings were not very substantial and in fact most in that collection might overlap with that in the Beijing Municipal Archive. This, however, will not be confirmed until the Nanjing archive reopens to the users. We also had a chance to visit archives of the Institute of Modern History in Academia Sinica, the Library of Congress and Rockefeller Archive Center near New York City. Useful data were found there too.

There are tens of thousands of pieces of information to be processed in the database. These data include, for example, organization names, addresses, facilities, statistics, census, capital investment of shops, numbers of bed and patients in hospitals, names of doctors and their qualifications, names of lawyers and law firms, streetcar lines and stations, and even public toilets. These were digitized. Although the GIS system facilitates the input of multimedia materials like video and interviews, we had not included such materials except graphic ones. But GIS can handle only information that comes with a spatial character like a spot (an address or a location), a line (a street), or a confined area of regular or irregular shapes, called polygon (a district or a building block). With this limit, we were able to create around 300 layers of information in our dataset. Some contain information that may be further broken down into even more layers of information.

In order to organize our urban cultural data, our project has identified six cultural spheres for data collection, which constitute the main contents of our database. These are listed in Table 1 below.

These six cultural spheres are selected due to the (1) fact that data are relatively accessible; (2) fact that each sphere represents an important aspect of the urban cultural transformation in Republican China, for example, the introduction of Western laws and medicine and their interaction with the traditional legal culture and medicine; (3) potential interrelatedness of these spheres. For instance, Western medicine and education were implanted through missionarizes; new legal frameworks and municipal administration reform based on Western models affected market institutions, behaviors, and performance; urban morphology changed following new mentalities in healthcare, law and order, education, religious beliefs, and so on.

The object of observation in this study is the spatial phenomena of cultural transformation in the above six cultural spheres amid the unprecedented cultural diversification in a Beijing liberated from the dominating imperial ideological control. The main theme of inquiry is how such cultural changes over time can be systematically observed in spatial patterns and be further elucidated through the GIS analysis. This objective has to be subject to the constraint of availability of information. As of today, it is clear that the information available to us cannot constitute a clear time-line of changes through these 25 years for many of the subject matters. It is only in some cases like medical service and legal culture where certain inquiries on changes over time are possible. Notwithstanding, the gap of information may still be filled in by later researchers and in particular the users of this dataset.

2.4. An open GIS platform for specified common purpose

Unlike recent efforts in building common-purpose historical GIS dataset like the Historical GIS Project at Harvard and Fudan to be mentioned below, which intends to cover the whole country and 2000 years, our final product is going to be an open GIS platform but for specified common
Table 1. The six cultural spheres.

<table>
<thead>
<tr>
<th>Cultural Sphere</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban morphology</td>
<td>For instance, city planning and structure, major government buildings, major landmarks, urban population patterns, transportation patterns, and so on.</td>
</tr>
<tr>
<td>Legal cultures</td>
<td>For instance, police forces, military police, crime rates, mediation, courts, lawyers and law firms, and so on.</td>
</tr>
<tr>
<td>Medical cultures</td>
<td>For instance, traditional healthcare providers, modern hospitals and clinics, public health services, Chinese and western drugstores, patterns of common and infectious diseases, hygienic facilities, and so on.</td>
</tr>
<tr>
<td>Market cultures</td>
<td>For instance, firms and shops of major businesses, banking and pawnshops, manufacturing enterprises, guilds, temple markets, land price, poverty patterns, and so on.</td>
</tr>
<tr>
<td>Religious cultures</td>
<td>For instance, temples, churches, properties, membership, leadership, welfare services, and so on.</td>
</tr>
<tr>
<td>Education cultures</td>
<td>For instance, schools, universities, professional education organizations, traditional education providers, literacy providers, and so on.</td>
</tr>
</tbody>
</table>

Purpose. It is specific to Beijing city for the period of 1912–1937, hence with very limited time and space, but it can be common for all purpose regarding that time and space. In other words, any specific topic of Republican Beijing may benefit from this dataset of multiple variables. As it is open to the public, online, and free of charge, any such researchers will benefit from the accessibility of data, which they otherwise would have to spend enormous amount of time to collect. This open dataset may facilitate new research initiatives by a large number of researchers and PhD students who may not have the opportunity to sit in the Beijing archives to collect the data themselves, due to time or resource constraints.

To recap, the objectives of our projects in broader term are for (1) advancement in fields of GIS in history, in Chinese history, modern Chinese history, Chinese urban history, geography, multidisciplinary history, among others; (2) reflection of broader methodological and theoretical issues; and (3) promotion of participatory and collaborative scholarship. There are three main deliverable objectives: (1) to develop a GIS dataset of historical information on six selected urban cultural spheres; (2) to document the spatial patterns and changes in each of these urban cultural spheres; and (3) to explore possible relationship among these patterns. The scholarship context of these objectives will be discussed further below.

2.5. Immediate benefits

Immediate benefits include visualization of data. This is the ready function of GIS software that makes historical imagination much more effective as we can freely overlay the information layers as we like and test a great variety of possibilities in terms of correlations among variables. These data are organized in map form and can immediately provide the spatial images to grasp our attention to issues and factors that we may otherwise ignore. More importantly, these visualized data on map-form can suggest ways to verify or strengthen the current discourse of the subject matters. The spatial statistical tools that come with the GIS software also permit spatial analyses that would otherwise have been impossible. As our dataset was just complete not long ago, this great potential is still not tested so much. In this article, preliminary application of the spatial statistical methods is made to explore the cultural sphere of law as an example.

2.6. Difficulties and limitations

There are admittedly many problems arising in due course. Data from the archives did not come into being for GIS purpose. One of the major requirements of GIS data is its precision. It may be easier in the application of weather and earth information science relying on scientifically generated information like remote sensing. For historical data, there is no such luxury. Some problems resulting from the quality of data could lead to distortions of patterns on the larger scale and problems in matching one set of data with another. For instance, we have a whole list of Chinese temples from the registry of a particular year, which comes with the address of each temple. Yet we did not have the information of the street detailed enough for us to match these addresses. Another article in this special issue also gives an example of this problem.

The most difficult problem is indeed the availability and accessibility of data. Unlike Britain, America, and Japan, historical information dated back to even early twentieth century in China has been held so secretive and inaccessible to researchers down to this day. As a reflection, a project likes ours should and can only be maintained by the data owner, that is, the Beijing Municipal Archive. The project investigator have tried to convince them to explore this possibility and met positive responses initially. It is hoped that they can eventually make a decision and obtain the resource to pick up what we finish and continue the project.
The problem of reliability of information is always there for anyone who cares about evidence. Our data are necessarily derived from other people’s efforts. They may be lying in the archives as the original report in a particular police station that gives us the statistical information of how crimes were reported within a span of time. These data may come to us as the original documents, or in a published form as compiled and edited by later or current researchers. Either way, we cannot assume that the data at their present face values are necessarily reflecting the reality in the past. The police report not only may not reflect how many crimes actually took place but also may not match the knowledge of the police officers who reported them due to deliberate underreporting. Data that were compiled, processed, and published may contain typo and other errors that diminish their reliability. I was informed by a scholar in Beijing that the temple registry data published by the Municipal Archive do contain errors. For this kind of limitations, we can only await detailed examination and verification of the data by serious scholarship that come into the academic public domain one day. But before that happens, our approach is to rely on these published materials until they are proven unworthy at all.

Even if reliable data are available and collected, we cannot avoid problems like human errors. There are so many steps in the labor-intensive process, from data input into Access files, to georeferencing, to setting up of the dataset. Technical problems often arose that required creative solutions. Our hope is that as we recorded all these processes, later users may eventually accumulate enough experience and be able to seek improved solutions.

Data organization is in fact a major problem to be solved. We can conceptually lay out the six cultural spheres, which we believe would be instrumental to researchers of any topics about Beijing during this period. To organize our unevenly distributed layers of data and make it more user-friendly to the users with open-ended inquiries turned out to be a challenge. Now we have 300 odd layers grouped into 6 categories. There should be much more user-friendly ways of managing these layers than what we may be able to achieve.

Finally, a major problem is the gap between a historical GIS dataset, given all its limitations and costs, and the meaningful research inquiries. The project can start with a research agenda, in our case the urban cultural change of Republican Beijing. Once the dataset is complete, the new task becomes how the dataset may help address inquiries and possibly generate meaningful outcomes to enrich discussions, which otherwise would not be made available. In short, if what our dataset can inform us is no more than what we already know even without a GIS exercise, we should not in the first place employ the GIS, which is time consuming to learn and resource demanding to operate. To address this problem, we can provide some reflections.

3. Some relevant theoretical issues
Our Beijing project experience gives us some inspiring food for thoughts and we may address a range of theoretical issues transcending the immediate concern of Republican Beijing. Examples are given below:

3.1. Qualitative versus quantitative?
Can the GIS data eventually support a qualitative research agenda by spatializing the cultural evidence in a way that it can generate empirical and spatially contextualized argument? The gap between qualitative and quantitative inquiries in social science has been closing up in recent decade but how quantitative approach may benefit cultural and interpretive inquiries remains a challenge. Will GIS be a new opportunity to bridge that gap by spatializing cultural data? It leads to the next issue.

3.2. Spatial versus aspatial?
Can all historical urban cultural data be in theory spatialized and hence handled by a GIS system, if such data exist at all? The term ‘urban’ helps confine our discussion to some spatial attributes rather than just about abstract cultural data. We cannot think of urban data, cultural or not, without any spatial elements. Whether we have the information is a different story but no urban cultural phenomenon can possibly be free from spatial implication. We may even think of such abstract cultural data like ‘conversation,’ ‘idea,’ or ‘value.’ No conversation among human beings can take place without a spatial implication. Even conversation on the Internet still has to take place in the cyberspace, still a form of space. In historical contexts, mostly we are dealing with conversation taking place in a physical spatial context. Insofar as information is available it can be spatialized. Equally, if any idea existed at all as we know it, it must come to our knowledge through some sort of vehicle (written or oral) that got to have a spatial implication, for instance, printing, circulation, and so on. Without using GIS, researchers need not take into account of the spatial dimension of their cultural data, unless they are historical geographers. The use of GIS actually can bring our attention to this dimension and may help us to see things we ignored before.

3.3. Two variables versus multiple variables?
To what extent can the GIS system help to analyze multivariate inquiry that involves more than two variables, like law and politics? For most relational studies, it is common to have two to three variables being examined at the same time. For complex historical phenomena like urban cultural changes, it would be a challenge if one wants to analyze them with more than two variables at the same time purely by imagination. GIS system as seen in this
project may be able to provide a functional platform for researchers to perceive and observe such complex and multivariate phenomena through visualization of data and spatial statistics.

3.4. Politics versus socioeconomic phenomenon?
Modern urban culture emerged essentially in modern cities only and modern cities are increasingly sharing certain nature of modernity in terms of their governance and role in their nation-state. Hence, the issue of politics in urbanism is important regarding modern cities, or more narrowly speaking the Chinese cities. If politics is an important factor closely defining or relating to other realms of urban culture, it may be instrumental to conceive framework that facilitates multivariate observation. In this sense, how much can the GIS approach help to bridge the research agenda between the political and cultural phenomena and between politics and those urban cultural aspects of social and economic nature? Our attempt to put together these six cultural spheres in the same spatial framework and allow it to be tested by researchers of different aspirations and agenda may provide one example for consideration.

3.5. Tradition versus modernity?
Our dataset may provide yet another empirical ground for the discussion of relationship between tradition and modernity in search of new approach. The interplay or conflict between tradition and modernity has been one of the key themes in the scholarship about China for almost a century. There are new approaches emerging in the past few decades following the shift in paradigms in the academia of the West. There are a great deal of reflective discussions and writings about modernity and what it means to a better and constructive understanding of China and its past. So far, such inspiring dialogs have been dominated more by qualitative and interpretive reasoning. The empirical and spatial dimension of GIS treatment of cultural phenomena may suggest a potential way of consolidating the qualitative reflections and generating from them stronger impact on policy.

3.6. What is urban cultural change?
Finally, what do we mean by urban cultural change after all? Does it mean an evidence-based and empirically tested observation of urban cultural change as a directional transition changing from an old form of existence to a newer one? Does it necessarily imply the value of progress such that older form is presupposed to be lesser in value? Does it mean in fact just a process of fusion of two forms of urban lives? Or does it reflect the evolving aggregate choices of the private individuals and the government? Is it an outcome of design defined and shaped by ideologies, ideals, technologies, or engineering? Or is it no more than a social and political (economic interests included) power struggle for dominance? While these issues can be subjected to a wide range of approaches, we are wondering if GIS may provide an alternative approach to enrich the discourse and facilitate better dialog among various views.

4. Scholarship on related historical inquiries
There are a number of different inquiries with which this project is related. They are briefly noted below to contextualize the project and its implication.

4.1. Modern Chinese history
Apart from these more theoretical issues, we may also see whether the product can eventually facilitate us to accomplish the following: (1) Can we acquire better understanding of each of these six cultural spheres in Republican Beijing? (2) Can we acquire better understanding of the interplay among these themes? (3) Can we acquire better understanding of a more holistic Beijing spatial pattern? (4) Can we make better comparison of Republican Beijing to other Republican cities? Or can the outcome of this project enrich the discourse of modern Chinese urbanism in general? (5) Can such outcome advance the methodologies, approaches, and application of GIS in historical study about China?

4.2. GIS in historical study and urban history
GIS has been widely applied in social science and for planning in government, services, industries, business, and politics. However, its application in the humanities like history started relatively late, perhaps no more than two decades or so. It is still a new and emerging subfield in history. There are a couple of centers taking a lead of which Harvard (USA), Academia Sinica (Taiwan), and Lancaster (UK), for example, are very much in the forefront.1 The state of the art of historical GIS is best captured in recent works by Anne Knowles (2002, 2008) and Ian Gregory and Paul Ell (2007). From these works, it is clear that (thanks to the rich information on local conditions preserved since the premodern times) we now have good historical GIS datasets available for researchers in Japan, Britain, and America, covering at least 200 years of GIS information or beyond.

4.3. GIS in Chinese historical studies
There has not been a great deal of enthusiasm in applying GIS to Chinese historical research up to about 10 years ago. Since then there is an increasing number of projects
using it by now. Among them, the project by Peter Bol and Ge Jianxiong (Harvard–Fudan) – China Historical GIS is a major initiative to build a common GIS platform through historical periods that can be used for different purposes by whoever is going to use it (Bol 2005a, b, 2007a, b). It contains information of changes in administrative boundaries from provincial level down to the county level for China. The dataset also provides selected information of major settlements scattered in each province. This gigantic dataset has been developed by phases and its homepage shows a range of applications of this dataset; and it promises to generate enthusiasm in the use of GIS in Chinese historical studies. Another major initiative of common historical GIS platform for China is from Academia Sinica, which has developed a Chinese Civilization in Time and Space database that captures historical atlas of different periods for over 2000 years.²

In a ‘GIS in Humanities Forum’ held at CUHK in 2009 over 30 GIS projects in humanities and social sciences were reported. Less than half of them were related to Chinese historical GIS. Most were still in progress at that time. Subsequently, a volume was compiled to present some of these outputs (Lin et al. 2010). It is certain that in the next decade or so more completed projects of historical GIS applied to China studies will emerge.

As for GIS use in the study of Republican Beijing, some papers have been presented at conferences and a few are submitted for publication. In this special issue, there is another article on the data quality of the project. Later in this article, an example of how the legal data may enhance our understanding of the legal culture in Republican Beijing will be discussed.

4.4. Classical scholarship on Republican Beijing

For the study of Republican Beijing, the most representative monographic publication is still that of Sidney Gamble (1921). Gamble’s book is more like an ethnographic account, in a sense also like a traditional Chinese gazetteer, which provides detailed information in different social aspects of the city, like government, population, health, education, commercial life, recreation, the social evil, poverty and philanthropy, prisons, church survey, religious work, as well as community service group. This is a set of very comprehensive factual social data with multifaceted coverage of urban conditions. As he himself stated clearly, the purpose of his book is to make available a factual reference to those who ran social programs in Beijing at his times, that is, the 1920s. Presumably his audiences were mainly the Western missionaries, social organizations, and government officials who were managing these social programs. However, there is little attempt on his part to explore the interrelationship among his thematic data. Nor did he concern very much either the spatial patterns or spatial dimension of his information.

4.5. Approaches to modernity versus tradition in Republican Beijing

For most modern scholarship on Republican Beijing over the past two decades, there are at least three identifiable approaches, which inform us what Republican Beijing as a case of urban history can mean to us.

4.5.1. Civil society approach (Strand)

The discourse of civil society in modern China was a hot discourse in the late 1980s through the 1990s. There was a strong interest in this literature to look into how Chinese cities, conceivably the most conducive environment for the emergence of a civil society, transformed themselves in particular in terms of political participation of the citizens outside of the government. David Strand’s study of the politics of the Chamber of Commerce and rickshaw pullers in Republican Beijing makes a good example (Strand 1989). In this and similar studies of other Republican cities, there is a popular tenet to see the inquiry as primarily a concern of the transition from traditional city to modern city. Underlying this tenet is the assumption of a Weberian dichotomy between traditional components of Chinese city and their modern counterparts. It is a zero-sum game and evolutionary narrative of free and autonomous citizenry (modernity) versus authoritarian state control (tradition).

4.5.2. Tradition in modernity approach (Novey)

The second approach that became more popular since the mid-1990s is to see tradition and modernity not as a mutually exclusive dichotomy but two traits of culture that can accommodate and complement each other and can evolve together into a mixed brand of new culture. An underlying assumption is the notion of multiple modernities. Hence, there can be culturally diverse paths of modernization largely shaped by many factors including the tradition. Alison Dray-Novey’s long-term study of the interrelationship between the modern police force and the traditional gendarmerie in Beijing is a good example (Dray-Novey 1993, 2007). Here the new and the old are found coexisted, mutually complemented, and intermingled in terms of membership, leadership, and operation.

4.5.3. Cultural studies approach (Dong)

In this third approach, urban culture was treated as image and symbolism, to be constructed and reinvented. Attention was given to the rewriting of Beijing in literature and film to project the tradition hence invented. Madeleine Dong’s Beijing histories present a Beijing’s image derived from the literary works and their authors’ imaginations (Dong 2003). She brilliantly uses a recurring metaphor of ‘recycling’ to capture Beijing’s urban culture in city planning (1934, Mayor Yuan Liang’s project), economic life, and literary imaginations. She highlights the Beijing urban
culture as a contemporary creative engagement with the reinvented past. Dong concluded that Beijing was intentionally reinvented as a traditional Chinese cultural city by the city officials, businessmen, and literary community for various reasons, but they shared the common goal of recycling of the past for a new city image. However, her histories of entertainment and commercial centers, highlighted by the Tianqiao Market as the empirical case, were primarily about the poor, the crowd, and the lower-income common mass. In contrast with the common tenet in the writing of economic aspect of modern urbanism, which often focuses on prosperity, growth, finance, and extravagance, Dong’s stories of the Beijing’s poor in the city’s commercial life ironically revealed the richest marketing cultural vitality of Beijing at that time. She convincingly claims that Tianqiao Market was critical even to ‘the for-cultural vitality of Beijing at that time. She convincingly claims that Tiaoqiao Market was critical even to ‘the for-cultural vitality of Beijing at that time. She convincingly claims that Tiaoqiao Market was critical even to ‘the formation of Republican Beijing’s identity.’ This approach therefore views tradition as something not in contradic-tion to modernity nor coexisting with it per se. It was the reinvented cultural product in modernity.

In short, the first approach takes tradition and modernity as a dichotomy; the second sees tradition and modernity as something divergent but mutually complementary and at times coexisting; the third approach takes tradition as constructed cultural product in modernity. With the spatio-ization of data on a GIS platform, we now may build on these approaches to explore further the spatial dimension of these issues and seek more convincing interpretation of the urban cultural change through empirical spatial patterns. In the following section, we will present example of GIS application to the analysis of the legal dimension of Republican Beijing city. (Ng 2011). The example suggests a spatial approach to the urban change where tradition and modernity evolved together to shape a new Beijing reality. Interestingly, the emerging spatial patterns can be accounted for by reasonable locational decisions of the historical players rather than being shaped by traditional or modern social norms.

5. Urban legal culture as seen through GIS

Legal reform in China at the turn of the last century was one of the most difficult areas of China’s modernization quest. The process began in late Qing and continued into the entire twentieth century crossing different regimes. Chinese legal reform was essentially a transplantation of Western legal system, and one of the major institutional changes was to develop a new legal profession whose professional knowledge and training could sustain the complex operation of an implanted modern court system. The cornerstone of this profession was the institution of Western-style lawyers. This was a new profession in early twentieth-century China. These lawyers were trained either overseas or by the new local law schools also transplanted from the West. They enjoyed good social status and handsome income. Their influence on public affairs and social life also elevated over time, resulting in a new elite identity in Chinese society. This is in sharp contrast with the litigation masters who helped people in litigation in traditional China. Those traditional legal practitioners were often despised by the scholar-official elite of the society and encountered very hostile legal framework regulating and restricting their operations so as not to create more lawsuits.

There has not been detailed study of the development of the legal profession in Republican Beijing city. From the legal sphere of this Republican Beijing GIS project, maps and useful data for the study of the spatial distribution of lawyers in Beijing were generated. These quantitative results provide useful spatio-temporal observations concerning the establishment, distribution, and process of expansion of the market of legal business in Beijing. To perform the analysis, we separate the data of 1007 lawyers registered in the first 20 years after the establishment of the Republic (1912–1931) recorded in the Beijing Bar Association Members Register into four 5-year periods to observe different stages of development over time (Beijing Municipal Archives File no. J65-3-539 to J65-3-547). We divided the city of Beijing into 20 districts as shown in Figure 1 (before 1928) or 11 districts as shown in Figure 2 (after 1928) according to the police districts during those periods. As shown in Figure 3a-d,
the first legal community in Beijing was located in the Outside No. 1 and 2 Districts, and expanded northward and eastward as time passed, as indicated by the spatial means shown in these maps. \(^3\) Within two decades, legal services reached over three quarters of the city, which was an unusual achievement in a place where lawsuits and the legal business were traditionally despised as explained.

Further research can be conducted on why the founding group of legal professionals preferred the Outside No. 1 and 2 Districts for setting up their business. Although the professional community eventually spread north-eastward, there were still highly concentrated clusters of law firms in these areas. The Outside No. 1 and 2 Districts used to be industrial and commercial centers with the highest concentration of guilds, temples, and shops. Guilds were meeting points for business travelers of the same origin, and also places where they could recruit, conduct important business discussions, witness trade deals, reside during their stay in Beijing, and even resolve business disputes (Beijingshi donganguan 1997, p. 1–17). On the other hand, temples in Beijing were venues for social gatherings, marketplaces, trade, and entertainment, in addition to possessing religious functions (Beijingshi donganguan 1997, Beijing shimao ziliao weiyuanhui 1997, p. 1–3). By referring to Figure 4, the distribution of guilds and that of lawyers can be overlaid and compared. It then becomes obvious why Beijing lawyers in the Republican era chose to settle down in the Outside No. 1 and 2 Districts, especially at the beginning of the development of the legal industry, as they were the most prosperous areas in Beijing with vibrant commercial activities and market trade.

Location quotients were also computed to compare the concentrations of guilds and lawyers. The location quotient is defined as

\[
L_{Qi} = \frac{p_i / P}{q_i / Q}
\]

where \(p_i\) and \(q_i\) are the counts of two groups in area unit \(i\), and \(P\) and \(Q\) are the total counts of the two groups in the entire study region. Therefore, if the \(L_{Qi}\) is larger than 1, then group \(p\) has a higher concentration than group \(q\) in unit \(i\), and vice versa. Location quotient was calculated to compare the concentrations of guilds and lawyers for each of the 20 police districts (Figure 4). Most location quotients have a value between 0.4 and 1.6, meaning that the concentration levels of guilds and lawyers were quite similar across the police districts. Districts with greater differences in concentration levels were shown in Figure 5. A scatter plot of the numbers of guilds and numbers of lawyers by police districts is also provided (Figure 6). In general, frequencies of guilds and lawyers are positively correlated. A formal correlation analysis is not performed here because the number of observations (areal units) is quite small. The result of this analysis reveals that the rise of modern legal culture in Beijing was separable neither from urbanization nor from the development of market culture.

As time passed, the legal community expanded to districts outside the commercial and industrial areas. So, how did lawyers choose a place to set up their business in the vast city of Beijing? Clues can be drawn by placing the locations of lawyers in the late 1920s to early 1930s over the geographical distribution of police stations. Through observation of the spatial distribution in Figure 7, we notice that when the legal community spread from the Outside No. 1 and 2 Districts northeastwardly, the new locations were generally in the vicinity of police stations. Similarly, the location quotients for the concentration levels between police stations and lawyers are shown in Figure 8. While districts with very low and high concentration levels were quite a few, more than one-half of the districts had concentration levels between 0.4 and 1.6. The scatter plot between the frequencies of police stations and lawyers is also shown in Figure 9. Although an overall positive correlation seems to exist, the strength of the relationship is not very strong.

These analyses reveal that when the commercial and industrial centers were no longer able to sustain the entire legal community, some lawyers chose to seek other business opportunities in the police stations. According to the regulations of the Bar Association and lawyers at that time, the key responsibilities of lawyers included litigation and
non-litigation services. Litigation services mainly included drafting plaints and attending trials, whereas non-litigation services mostly concerned commercial document preparation and personal estate management, such as will drafting and property transfer. Negotiating with police officers was not a lawyer’s service stated in the regulations of the Bar Association, but working things out with yamen officers such as clerks, runners, and secretaries was traditionally one of the major functions of litigation masters in the imperial period (Fuma 2007). Market forces meant modern lawyers in Beijing did not shy away from taking over this role. This was a reflection of the fact that consumers’ interpretation of the role of lawyers and how lawyers perceived their own functions were, to some extent, influenced by the legal traditions of hiring litigation masters.

6. Concluding remarks
We have completed a dataset on the Beijing city during the period from 1912 to 1937, which included six subsets of data on the areas of urban morphology, medical service, law, education, market, and religion. In this article, we showed some observations on the legal dimension of the urban culture in that city. These observations are intriguing yet preliminary. Notwithstanding, they serve the purpose
of illustrating the potential of applying the GIS technology to historical study in the case of Republican Beijing urban culture.

Finally, despite the promise of this GIS technology, we cannot emphasize more that the use of GIS in historical studies pertaining to China is still very much in an experimental stage. It is constrained by many factors like being biased against nonspatial data and the pace of technological development itself. It has yet come to age. And even as it grows up gradually, it is not likely to be able to stand alone as an independent paradigm or approach that will replace any of the existing approaches. There is a chance that the old conflict between qualitative and quantitative approaches in historical studies may not repeat in the case of GIS. The best contribution the GIS approach can offer to historical studies may well be its integrative function and spatial platform, which promise to enhance and strengthen other approaches rather than competing with and replacing them. The best development in historical GIS for the field of Chinese studies is therefore the emergence of a
A win-win outcome where different approaches can enrich one and the other for the advancement of our knowledge rather than the advent of a new hegemonic paradigm that suppresses diversity and creativity and, worse still, narrows down our horizon and imagination. In short, historical GIS can be an opportunity to historians rather than a new threat.

Notes
1. The list can go on to include more like University of Minnesota and Brown University in the United States. A more comprehensive list of these institutions can be found on http://www.hgis.org.uk/resources.htm.


3. A spatial mean is the center of a set of points or locations. It indicates the overall locations of the set of points, or the summary of the location, like statistical mean or average. Spatial means of points over time can show the overall geographical shift of a phenomenon. For details see Wong and Lee (2005, p. 464).

References


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