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# GIS-Based Spatial Reconstruction of Government Institutions, Churches and Playhouses in Jacobean London, with a Discussion of the Geographical Drivers of the Jacobean Dramatic Censorship

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**Abstract**

This study examines how spatial differentiation and overlap among playhouses, churches and government institutions shaped the territorial and institutional mechanisms of dramatic censorship. Focusing on London during the reign of James I, the study draws on a spatial reconstruction of institutional locations in 1625. Within a "physical space-power space" analytical framework, it uses georeferenced location data to compare the spatial distributions of the three institutional types. Kernel density estimation, standard deviational ellipse analysis, and global and local spatial autocorrelation analyses are combined with historical evidence concerning territorial jurisdictions, urban governance, playing-company organization, royal authorization and censorship practices. The comparative analysis reveals distinct patterns of spatial concentration and dispersion among the three institutional types. Localized overlaps between playhouses and parish or community spaces linked theatrical activity to municipal governance and neighbourhood negotiation. Meanwhile, company affiliation, script examination and performance licencing provided mechanisms for regulating theatrical activity across venues in different jurisdictions. Official orders and documentary networks further connected geographically separated administrative centres and performance sites, enabling regulatory authority to operate across territorial boundaries. The study's methodological contribution lies in applying a common set of quantitative GIS measures to playhouses, churches and government institutions, allowing direct comparison of their spatial concentration and geographical extent. Its interpretive contribution lies in demonstrating how dramatic censorship combined local oversight of performance conditions at individual venues with licencing decisions concerning playing companies and scripts that extended across jurisdictional boundaries.

**Keywords:** early modern London; Jacobean dramatic censorship; territorial regulation; relational regulation; urban cultural governance; sustainable human settlements

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## 1. Introduction

From the late fifteenth to the early seventeenth century, European transoceanic exploration and the opening of global sea routes not only promoted the development of navigational surveying techniques, cartographic systems and latitude-longitude coordinate regimes, but also profoundly transformed early modern conceptions of space. In the

medieval period, spatial perception was primarily grounded in local experience, religious symbolism and social relations. Space was not regarded as a homogeneous, precisely measurable physical container; rather, it was understood as a form of "place" invested with sacred order, social hierarchy and local meaning [1]. With the Age of Discovery, space increasingly came to be understood as an extended field that could be measured, calculated and abstractly organized [2]. Studies in historical and cultural geography have shown that changes in spatial perception were manifested not only in advances in cartographic techniques and geographical knowledge, but also in the gradual incorporation of space into the core mechanisms of power and social organization [3]. The expansion of capitalism and the centralization of modern state power further accelerated the abstraction and institutionalization of space, transforming it into an organizational structure that could be planned, divided, and integrated into systems of governance [4]. At the same time, maps, visual representation and global geographical imagination gradually constituted a form of power through which world order was organized [5]. Space, therefore, was no longer merely a geographical background; it became an important medium of state governance and social order.

In Jacobean London, the relationship between space and governance took shape within a differentiated institutional landscape. The courtly and administrative activities concentrated around Whitehall connected Westminster to the operation of royal authority [6], while parishes, civic institutions, and judicial bodies organized religious life, communal affairs, and public administration across the metropolis [7]. The City of London, Westminster, and the surrounding suburbs consequently formed a composite urban space characterized by differences in institutional function and jurisdiction [8]. Parish, ward and guild organizations participated in local governance, while relations among the court, civic authorities, and commercial playing companies extended across these territorial divisions [9,10]. Playhouses, churches and government institutions occupied different positions within this configuration, bringing the geographical distribution of urban activities into contact with overlapping structures of authority.

Commercial theatre made these overlapping relations particularly visible. Playhouses occupied fixed sites within particular neighbourhoods and jurisdictions, while the companies that used them maintained connections through patronage, touring, and court service. Their concentration in suburban and riverside locations placed theatrical activity within several distinct environments of local regulation [11–13]. Contemporary writing and administrative records reveal continuing disputes over the conditions of performance. Stephen Gosson's *The Schoole of Abuse* associated theatrical entertainment with moral disorder and social confusion [14], while civic ordinances sought to restrict unauthorized performances within the City's jurisdiction [15]. At the same time, the performances and business transactions recorded in *Henslowe's Diary* document an extensive network of commercial theatrical activity [16]. The operation of this network involved continuing interaction among local restrictions, commercial interests, and forms of institutional support that extended beyond individual venues. Dramatic censorship connected these territorial conditions to the regulation of theatrical expression. During James I's reign, the Master of the Revels continued and adapted established practices of script examination and performance licencing, linking the requirements of the court to the activities of commercial companies. Political, religious, and diplomatic concerns entered the approval of plays, while the application of censorship was shaped by companies' institutional identities, court connections, and particular performances [17,18]. A playhouse's jurisdictional position governed aspects of its local operation, while authorization directed at companies and scripts could apply across different performance locations. Censorship therefore operated through relationships among

reviewing officials, playing companies, and venues, bringing locally situated performances into wider networks of supervision and intervention.

Existing scholarship has established the principal locations and institutional settings of playhouses, churches and governmental institutions in early modern London. Royal administrative activities were concentrated around Westminster and Whitehall, parish churches formed an extensive network within the City, and commercial playhouses were distributed across Southwark, the northern suburbs, and areas such as Blackfriars. Sturgess's examination of Jacobean private theatre, for example, provides a detailed account of theatrical buildings, audiences, playing companies, and their connections to court performance [19]. Historical GIS research has further extended the study of urban space beyond the documentation of individual locations. Colson demonstrated how historical descriptions of urban places could be geocoded to reconstruct spatial relationships and social networks [20], while his subsequent study examined the development of digital mapping and spatial technologies in the historical study of London [21]. These studies provide an important foundation for understanding London's institutional geography and demonstrate the potential of GIS for historical spatial analysis. However, the spatial distributions of government institutions, churches, and playhouses have received limited attention within a unified quantitative comparative framework, leaving their relative concentration, dispersion, and spatial relationships insufficiently examined. In particular, how spatial differentiation and overlap among these institutions shaped the territorial and institutional operation of dramatic censorship remains underexplored.

To address this gap, this study develops a "physical space-power space" analytical framework that integrates quantitative GIS-based comparisons of the three institutional types with historical evidence on territorial jurisdictions, institutional affiliations, and censorship practices. Drawing on historical and cultural geography, the study uses ArcGIS 10.8 to reconstruct the spatial distribution of these three categories of sites in London in 1625. Kernel density estimation, standard deviational ellipse analysis, and global and local spatial autocorrelation analyses are employed to compare their patterns of concentration, spatial extent, directional orientation, and spatial association. The quantitative findings are then interpreted alongside historical evidence concerning territorial jurisdictions, institutional functions, property arrangements, royal authorization and censorship practices. The 1625 reconstruction provides a common spatial reference for comparing institutional sites, while records from throughout James I's reign allow regulatory relationships to be traced across specific jurisdictions, institutions, playing companies, and performances. By integrating quantitative spatial comparisons with historical evidence, this study extends existing knowledge of institutional locations by explaining how spatial differentiation and overlap shaped the territorial and institutional operation of dramatic censorship across Jacobean London.

The central question of this study is how the spatial distribution of playhouses, churches, and government institutions in Jacobean London expressed relationships of power, how these relationships shaped the organization and implementation of dramatic censorship, and what this historical configuration contributes to contemporary understandings of cultural governance. The investigation proceeds from the geographical characteristics of institutional sites to their jurisdictional and organizational relationships, and then to the operation of censorship through territorial controls and cross-jurisdictional connections. Its contemporary implications concern the coordination of regulatory authority, the allocation of responsibility, and the institutional conditions under which cultural expression takes place.

The study is organized into five sections. The first introduces the historical background, establishes the relationship between urban space and dramatic regulation in Jacobean London, and defines the central research questions. The second develops the "physical space-

power space" analytical framework, defines the study area and temporal scope, explains the historical spatial reconstruction, and specifies the spatial analytical methods. The third presents the quantitative results of kernel density estimation, standard deviational ellipse analysis, and global and local spatial autocorrelation, comparing the concentration, spatial extent, directional orientation, and spatial association of playhouses, churches, and government institutions. The fourth brings these spatial findings into dialogue with historical evidence to examine how local spatial overlap generated regulatory demands, how the dispersion of playhouses shaped the cross-jurisdictional operation of censorship, and how the geographical separation between administrative centres and performance venues enabled central intervention through organizational and documentary connections. It also considers the historical implications of these differentiated but interconnected spatial systems for coordinated urban governance. The fifth summarizes the principal findings and clarifies how the interaction between urban spatial structure, territorial regulation, and relational regulation shaped the organization and implementation of Jacobean dramatic censorship.

The principal contribution of this study lies not in identifying previously unknown spatial distributions, but in quantitatively demonstrating how different institutional spatial logics coexisted in Jacobean London and in using this spatial structure to reinterpret Jacobean dramatic censorship as a regulatory system operating between territorial urban governance and relational forms of institutional authority. Although the study concerns an early modern urban context, it provides a historical perspective on coordinated governance by demonstrating how religious, administrative, and cultural activities were organized through partially overlapping but distinct spatial and institutional systems.

## 2. Theoretical Framework, Research Area and Research Design

### *2.1. Theoretical Framework*

The formation and transformation of urban space are closely intertwined with historical changes in social relations, institutional arrangements, and structures of power. Social hierarchies, access to resources, and the distribution of power acquire material expression through the location of buildings, spatial distance, and the possession and use of particular sites, thereby embedding specific forms of social order and institutional relations in the urban landscape [1]. At the same time, existing spatial configurations continue to shape social practices and relations among different actors and are themselves maintained and reconfigured through processes of use, management, and adjustment [2]. Foucault's discussion of the "art of distributions" in *Discipline and Punish* further elucidates the mechanisms through which spatial organization participates in the exercise of power: through partitioning, functional differentiation, and hierarchical ordering, disciplinary power situates individuals and their activities within relations that can be identified, supervised, and organized [22]. Space therefore both materializes existing social relations and provides an organizational condition through which power structures social activity. The spatial operation of power can consequently be understood through two interrelated mechanisms. On the one hand, territorial divisions, boundary making, and the control of particular sites enable administrative authority to be exercised within defined geographical areas. On the other, institutional authorization, organizational affiliation, and relations among actors allow power to extend across territorial boundaries and incorporate geographically dispersed sites into shared regulatory arrangements. Studies of territoriality accordingly conceptualize control over a defined geographical area as a strategy for organizing people, activities, and access to places, making territorial boundaries an important mechanism linking administrative authority to social practice [23]. Building on this perspective, urban scholarship has employed the concept of territorial regulation to examine how institutional rules, planning procedures, and resource allocation participate in the organization of space [24]. Research on relational

regulation extends this analysis beyond territorially bounded arrangements by examining how regulatory practices in different places are connected through actors and organizational relations, so that activities at particular sites are shaped simultaneously by local rules and trans-territorial institutional relations [25].

The multiple jurisdictions and organizational networks of Jacobean London provide a historical context in which these two modes of regulation intersected. Churches participated in religious life and local affairs through parish networks; administrative and judicial functions were exercised through institutions embedded in particular areas; and theatrical activity was shaped by performance markets, property relations, and local community governance. The use of these sites was therefore conditioned both by the regulatory arrangements of particular localities and by the institutional identities of the actors associated with them [9,26]. Playhouses, as fixed physical sites, were embedded within particular neighbourhoods and jurisdictions, whereas playing companies connected these venues to wider networks of power through patronage, performance privileges, and court service. Licencing procedures directed at companies and plays further subjected performances at geographically dispersed venues to common institutional requirements [17]. The relationship between fixed sites and trans-territorial organizations thus enabled regulatory power to operate across geographical distance through sustained organizational connections [27]. Regulatory arrangements situated in different places could interact through these connections and jointly shape the conditions under which particular venues operated [25]. Jacobean dramatic censorship provides a particularly revealing lens through which to examine this process. Through script examination and performance licencing, the Master of the Revels connected courtly requirements concerning dramatic content with the institutional status of playing companies and the conditions governing public performance. An approved script could, in turn, function as an institutional authorization on which a company relied both in staging a play and in responding to intervention by other regulatory actors [17,18]. Dramatic censorship therefore linked textual scrutiny, organizational identity, and the operation of performance venues, while its implementation reflected the interaction between local governance and trans-territorial authorization.

Building on this theoretical foundation, this study develops a "physical space-power space" analytical framework (Figure 1) that integrates the geographical configuration of playhouses, churches, and government institutions with the institutional relations in which they were embedded. At the level of physical space, Historical GIS is used to reconstruct the locations of the three categories of sites and to compare their degrees of concentration, spatial extent, directional orientation, and spatial autocorrelation, thereby identifying the urban configurations associated with different institutional activities. At the level of power space, historical jurisdictions, systems of urban governance, royal patents, property leases, censorship records, and performance documents are examined to identify the jurisdictional status of particular sites, their operational rights, and the authorized identities of the actors associated with them. The two levels are connected through the relationship between sites and the organizations that occupied and operated them, allowing spatial patterns identified through quantitative analysis to be interpreted alongside documentary evidence concerning jurisdiction, property, and authorization. Taking Jacobean dramatic censorship as a focal case, the study examines how royal affiliation, script licencing, and theatrical regulation connected geographically dispersed performance venues, and how these institutional relationships were formed, maintained, and adjusted under different conditions of local governance.

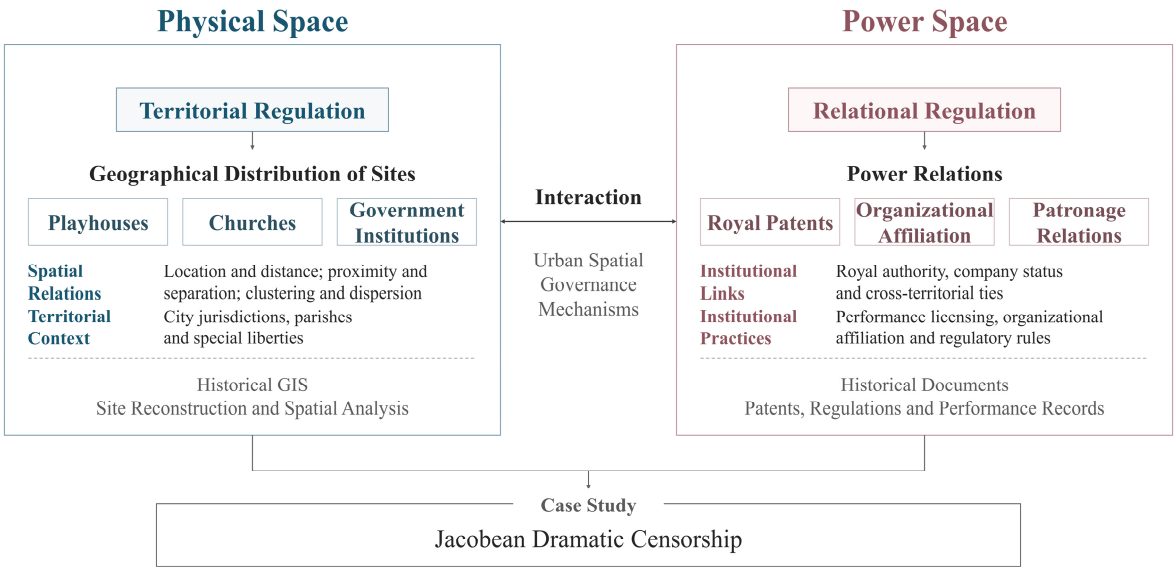



**Figure 1.** "Physical space-power space" analytical framework.

### *2.2. Research Area and Temporal Scope*

Defining early modern urban space according to modern administrative boundaries can obscure the transregional social practices and institutional networks through which urban life was organized [28]. During the reign of James I, London did not possess a single, stable urban boundary but instead constituted a composite urban space encompassing the City of London, Westminster, and the continually expanding suburbs. In *A Survey of London*, John Stow described London as comprising both the City within the walls and the daily increasing suburbs with the parish functioning as a fundamental unit of urban organization and local governance [29]. William Camden, in *Britannia*, likewise emphasized London's extension along the River Thames and the growing functional differentiation between the City and Westminster: the former was centred on commerce, civic administration, and parish organization, whereas the latter, organized around Whitehall, developed as a centre of courtly and administrative power [30]. Privy Council records and court documents further indicate that administrative and judicial activities were concentrated in and around Whitehall. Jacobean London therefore functioned as a polycentric and composite urban space in which the City, Westminster, and the suburbs performed differentiated institutional roles while remaining interconnected through riverine transport, population movement, and cross-jurisdictional networks. Political, religious, commercial and theatrical activities were consequently organized through spatial systems that were distinct yet partially overlapping.

Accordingly, the study area is defined by the historical extent of urban activity and institutional operation rather than by a fixed administrative boundary. It takes the walled City of London as its core, extends westward to the courtly and administrative district of Westminster centred on Whitehall Palace, crosses the Thames southward to include Southwark and its riverside playhouses, and incorporates the northern and northeastern suburbs associated with urban expansion. This spatial extent encompasses the principal areas of religious life, administrative and judicial activity, and commercial performance, as well as zones in which different systems of jurisdiction intersected. It therefore provides a common geographical framework for comparing the spatial configurations and institutional relationships of playhouses, churches, and government institutions. The principal historical and cartographic sources used to define and reconstruct this spatial framework are summarized in Table 1.

**Table 1.** Historical materials and technical reference maps related to London in the Jacobean period.

| Name | Date | Author/Imprinter |
|---|---|---|
| Civitas Londinum ("Agas Map") | 1561 | Anonymous; formerly attributed to Ralph Agas |
| Norden's Map of London | 1593 | John Norden |
| A Survey of London | 1598 | John Stow |
| The Map of London and its Environs | 1884 | Edward Stanford |
| Map of Early Modern London | 1999 | University of Victoria |
| London map showing Shakespearean Theatres | 2012 | C. W. Redwood |

Temporally, the study adopts 1625 as the cross-sectional point for spatial reconstruction. The spatial distribution of playhouses, churches and government institutions at this moment is examined alongside historical records from key earlier stages of the Jacobean period in order to trace how the institutional relations associated with dramatic censorship were established, maintained, and adjusted over time. This combination of spatial reconstruction and historical analysis makes it possible to examine how Jacobean dramatic censorship operated through the interaction between the territorial jurisdictions of individual performance venues and the wider institutional networks linking playing companies, licencing authorities, and political power.

The spatial reconstruction was based primarily on C. W. Redwood's map of London playhouses, reproduced in Joseph Quincy Adams's Shakespearean Playhouses (1917) [31] (Figure 2). The 1884 Stanford map was used only as a supplementary reference for checking relatively stable spatial relationships and was not treated as a direct representation of seventeenth-century London. To ensure the temporal consistency and positional reliability of the reconstructed dataset, sites were retained only when they were documented as existing and performing the relevant function in the 1625 cross-section and when their locations could be identified with sufficient confidence from the historical cartographic and documentary evidence described above. Individual locations were cross-checked, where possible, against multiple historical maps, textual records, archeological evidence, and historical databases, including Historic England and the Shakespearean London Theatres (ShaLT) project. Sites lacking sufficient locational evidence were excluded from the final dataset. Because these locations were reconstructed from historical evidence rather than geocoded from modern street addresses, positional uncertainty was assessed through the georeferencing accuracy test described below rather than through conventional exact/approximate geocode categories. Interpretations involving precise site-level distances were therefore treated with appropriate caution.

To establish correspondence between image locations and geographical coordinates, spatial reference data were obtained from Historic England's heritage records and the Shakespearean London Theatres (ShaLT) project at De Montfort University. Identifiable historical landmarks, including the Cockpit/Phoenix, Red Bull, The Theatre, Fortune, Globe, and White Tower, were selected as spatial reference points, with their locations determined from British National Grid coordinates provided in the relevant records. OSGB36/British National Grid (EPSG:27700) was adopted as the target projected coordinate reference system. This system uses OSGB36 as its geodetic datum, the Airy 1830 ellipsoid, and a Transverse Mercator projection, with metres as the planar unit [32]. EPSG:27700 thus provided a consistent metric reference system for reconstructing the historical urban landscape and for subsequent calculations of distance, area, spatial density, and directional patterns.

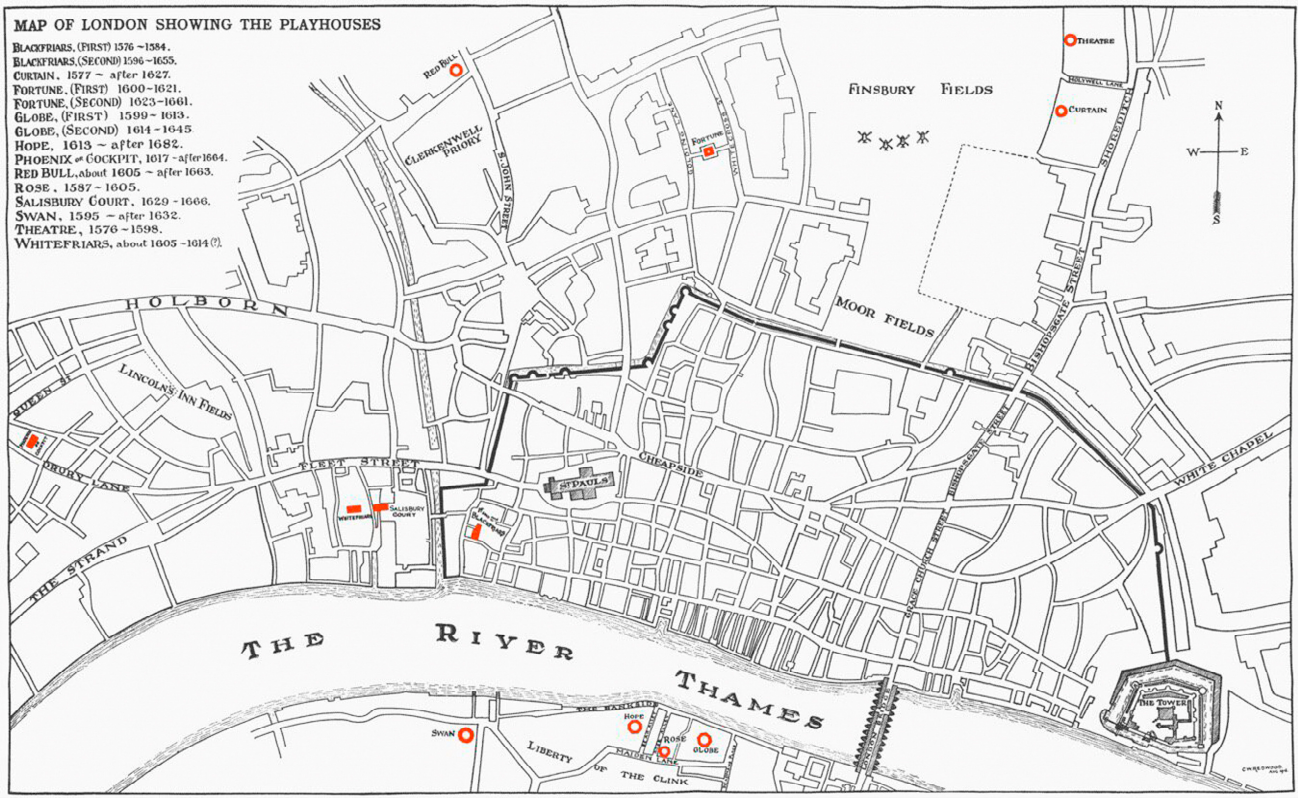



**Figure 2.** Map of London showing the playhouses. It served as the principal cartographic reference for identifying playhouse locations and their spatial relationships to the River Thames, roads, the city wall, and surrounding urban landmarks. The mapped locations were subsequently cross-checked against historical place names and other locational records before georeferencing.

Georeferencing was performed in ArcMap 10.8 using a first-order polynomial affine transformation, with bilinear resampling applied to generate the rectified raster [33]. Seven control points were used to estimate the transformation parameters, while six additional points were retained as independent check points for positional accuracy assessment. The seven control points produced a root mean square error (RMSE) of 29.49 m, whereas the six independent check points yielded an RMSE of 69.79 m. Positional accuracy in historical map georeferencing is affected by multiple factors, including the age and scale of the source map, the accuracy of the original cartography, geometric distortion, and the spatial scale of the intended analysis. The acceptability of georeferencing error must therefore be evaluated in relation to the analytical purpose rather than against a single universal threshold.

In their georeferencing of historical maps of Southampton dating from 1560 to 1866, Alvares-Sanches et al. [34] reported final RMS errors ranging from 9.9 to 46.8 m, with maximum residuals approaching 80 m for some control points on earlier maps, and subsequently used the reconstructed maps for urban-scale spatial analysis. Luft and Schiewe [35] likewise reported, in a study of historical topographic maps, that successfully georeferenced maps could exhibit RMSE values below 200 m, with a median registration error of 101 m across their sample. In comparison with these studies, the fitting RMSE of 29.49 m and independent validation RMSE of 69.79 m obtained in the present study fall within the range of positional uncertainty reported in previous historical cartographic research. The present analysis focuses on broad urban-scale patterns of concentration, dispersion, spatial association, and directional orientation rather than on precise site-level distances. The observed positional uncertainty is therefore considered appropriate for identifying and interpreting these larger spatial patterns. Interpretations involving precise distances or immediate proximity between individual sites are nevertheless treated with appropriate

caution. Point, line, and polygon features manually digitized in the original image coordinate system were subsequently subjected to the same affine transformation, producing projected coordinates consistent with the georeferenced base map. The resulting spatial database contains 157 sites, comprising 12 playhouses, 132 churches, and 13 government institutions (Figure 3).

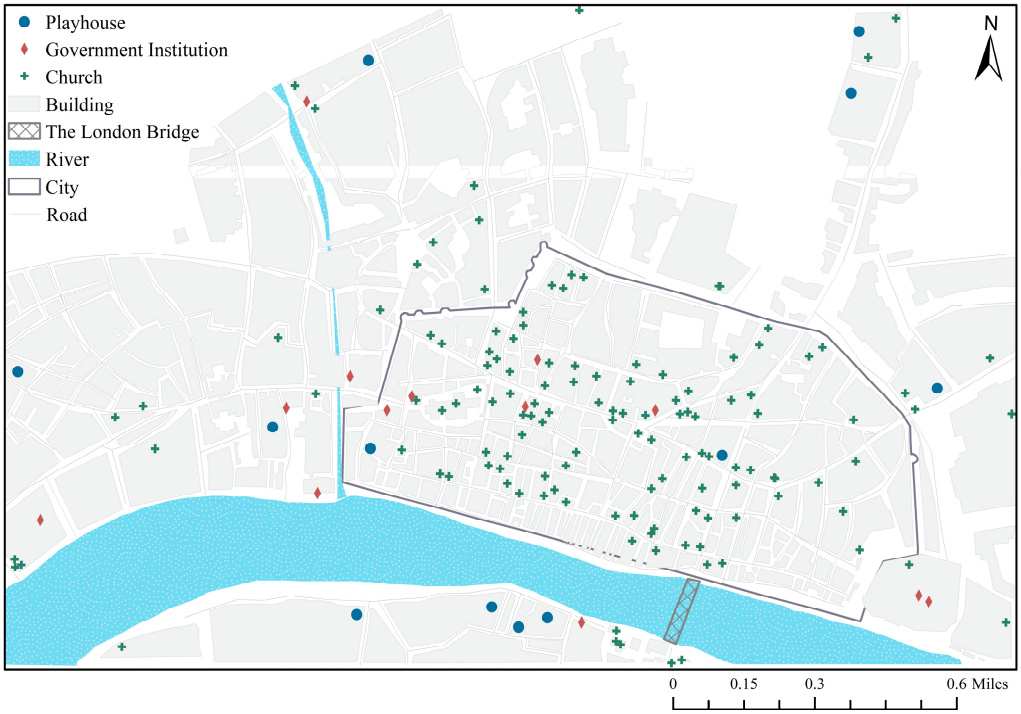



**Figure 3.** Reconstructed distribution of playhouses, churches and government institutions in London in 1625.

### *2.3. Spatial Analysis Methods*

Based on the "physical space-power space" analytical framework, this study jointly applies kernel density estimation (KDE), standard deviational ellipse (SDE) analysis, and spatial autocorrelation analysis to playhouses, churches and government institutions. Their combined application enables the three categories to be compared across multiple spatial dimensions, including concentration, dispersion, directional structure, and local spatial association [36,37]. Rather than treating these sites as separate distributions, this comparative approach reveals how theatrical, religious, and administrative-judicial activities formed distinct yet partially overlapping spatial logics within the same urban system, providing a quantitative basis for examining how differentiated institutional activities and relations of power were organized across Jacobean London.

Kernel density estimation (KDE) was used to assess the spatial intensity and clustering of 12 playhouses, 132 churches and 13 government institutions. Following Silverman's quartic kernel function and the calculation principles of the ArcMap 10.8 Kernel Density tool, all datasets were processed consistently using Python 2.7.18 and NumPy 1.16.6 [38,39]. Spatial calculations were conducted in OSGB36/British National Grid (EPSG:27700) using planar Euclidean distance. Sensitivity tests were performed with bandwidths of 300, 400, 500, 600, and 800 m at a 25 m cell size, together with a 50 m cell size at a 500 m bandwidth. Comparison of clustering centres, density gradients, and overall spatial patterns supported the use of a 500 m bandwidth and 25 m cell size for the final analysis. No post hoc normalization to a common maximum was applied across the three KDE surfaces. Because the analysis focuses on the geographical configuration of concentration within each institutional category, the

density surfaces were classified and interpreted separately rather than treating equivalent colour classes as representing identical absolute density values across categories. No explicit edge correction was applied; all three datasets were analyzed over the same study extent, with interpretation focused on broad urban-scale concentration patterns.

Standard deviational ellipse (SDE) analysis was used to compare the geographical centres, spatial dispersion, and dominant directional patterns of the three site categories [40,41]. Based on projected coordinates, the analysis calculated the mean centre, semi-major and semi-minor axes, orientation, area, and perimeter of each ellipse. No additional weighting variable was applied in the calculation; each site contributed equally to the corresponding standard deviational ellipse. The resulting statistics are reported in Table 2.

**Table 2.** Standard deviational ellipse statistics for playhouses, churches and government institutions in Jacobean London.

| Metric | Playhouses | Churches | Government Institutions |
|---|---|---|---|
| Number of locations (N) | 12 | 132 | 13 |
| Centre X/Easting (m) | 532,240.86 | 532,475.87 | 532,092.05 |
| Centre Y/Northing (m) | 181,163.36 | 181,092.85 | 181,009.00 |
| Semi-major axis (m) | 1340.75 | 908.13 | 1204.78 |
| Semi-minor axis (m) | 914.12 | 561.78 | 544.42 |
| Orientation (°) | 60.33 | 90.77 | 104.79 |
| Ellipse area ($m^2$) | 3,850,119.99 | 1,602,616.91 | 2,060,360.89 |
| Ellipse perimeter (m) | 7147.29 | 4682.06 | 5692.63 |

Because the playhouse sample contains only 12 locations, the corresponding ellipse is interpreted primarily as a descriptive summary of the reconstructed sample rather than as a highly stable population estimate. Small differences in ellipse shape and orientation are therefore interpreted with appropriate caution.

To further examine the spatial association of the three categories of sites, this study employs both Global Moran's I and Local Moran's I statistics [36,37]. Global Moran's I is used to assess the overall degree of spatial autocorrelation across the study area, with statistical significance evaluated using the corresponding $p$-value. For the local spatial autocorrelation analysis, the reconstructed study area was divided into a common set of historical urban blocks, and the number of playhouses, churches, or government institutions within each spatial unit was used as the input variable. Spatial relationships were defined using first-order queen contiguity, whereby spatial units sharing either an edge or a vertex were treated as neighbours, and the resulting spatial weights matrix was row-standardized. Local Moran's $I$ was evaluated using 999 random permutations. Local associations with $p < 0.10$ were treated as statistically significant, with $p < 0.05$ and $p < 0.01$ indicating stronger levels of significance. Statistically significant local associations were classified as high-high (HH) clusters, low-low (LL) clusters, high-low (HL) spatial outliers, and low-high (LH) spatial outliers, whereas spatial units with $p \geq 0.10$ were classified as non-significant. No additional multiple-testing correction was applied because the Local Moran's $I$ analysis was used primarily to identify and compare exploratory local spatial configurations rather than to conduct confirmatory inference for individual spatial units. The local classifications are therefore interpreted cautiously in the subsequent analysis. These results provide a quantitative basis for examining how institutional sites were configured within the urban space and how their spatial organization related to contemporary practices of governance.

## 3. Results

Kernel density estimation, standard deviational ellipse analysis, and spatial autocorrelation analysis collectively reveal distinct patterns in the distribution of three types of institutional sites in Jacobean London. Playhouses were distributed across a wider geographical area, with several local clusters along the Thames and at the urban margins. Churches formed a relatively continuous concentration within the urban core; government institutions were centred farther west and exhibited a more fragmented pattern. These distributions reflected the combined influence of urban functions, geographical conditions, institutional roles, jurisdictional authority, and organizational networks. Patterns of concentration, separation, and proximity among institutional sites thus constituted a material expression of power relations within urban space [26]. At the same time, the differentiation and partial overlap among the three categories reveal distinct relationships between geographical location, territorial jurisdiction, and institutional affiliation, providing an empirical basis for examining the spatial organization of power in Jacobean London. The following analysis considers these patterns in terms of clustering structure, overall distributional form, and spatial association, bringing the quantitative findings into dialogue with historical evidence to examine how different forms of institutional power were spatially articulated. This analysis, in turn, establishes the basis for the subsequent discussion of how these spatial relations shaped the organization and implementation of dramatic censorship in Jacobean London.

### *3.1. Kernel Density Patterns and Spatial Differentiation*

The kernel density analysis (Figure 4) reveals marked differences in the spatial concentration of playhouses, churches, and government institutions in Jacobean London. Playhouses (0–0.581) formed discontinuous clusters along the Thames and at the urban margins, reflecting their connections to commercial networks and their operation across different neighbourhoods and territorial jurisdictions [42,43]. Churches (0–1.251) exhibited a more continuous high-density concentration within the old urban core, corresponding to the parish-based organization of religious life, communal affairs, poor relief, and local governance [44]. Government institutions (0–1.096) were concentrated primarily in western and central London, with a separate eastern node around the Tower of London, reflecting the differentiated spatial organization of administrative, judicial, and disciplinary functions [45]. These institutional geographies also intersected locally, as illustrated by the proximity of Blackfriars Playhouse to St Anne's Church, where theatrical activity and parish governance occupied the same neighbourhood [26]. While individual playhouses operated within local jurisdictions and community arrangements, the 1603 royal patent granted to the King's Men connected theatrical activity to royal authority extending beyond territorial boundaries. Taken together, these patterns of concentration, separation, and local overlap provide a spatial basis for understanding how religious, administrative, and theatrical activities coexisted within the city, and how territorial jurisdiction interacted with cross-jurisdictional institutional relationships in the organization of Jacobean theatrical activity.

### *3.2. Standard Deviational Ellipse Patterns and Spatial Directionality*

The standard deviational ellipse analysis (Figure 5) further reveals marked differences among playhouses, churches, and government institutions in Jacobean London. In terms of spatial extent, playhouses exhibited the largest standard deviational ellipse, encompassing the urban margins and both banks of the River Thames and indicating a comparatively dispersed distribution. This broad geographical range was consistent with the operation of commercial theatre across multiple neighbourhoods and jurisdictions, situating theatrical activity within different local markets, transport networks, and territorial contexts.

Churches, by contrast, exhibited a more compact ellipse centred primarily on and around the old urban core, corresponding to the dense parish network embedded in everyday urban life and local social organization. The ellipse for government institutions was intermediate in size and extended markedly westward, consistent with the concentration of administrative, judicial, and disciplinary functions around particular institutional nodes. The three ellipses nevertheless overlapped in parts of the central and riverside city, indicating that these institutional activities maintained differentiated geographical distributions while intersecting within particular urban zones.

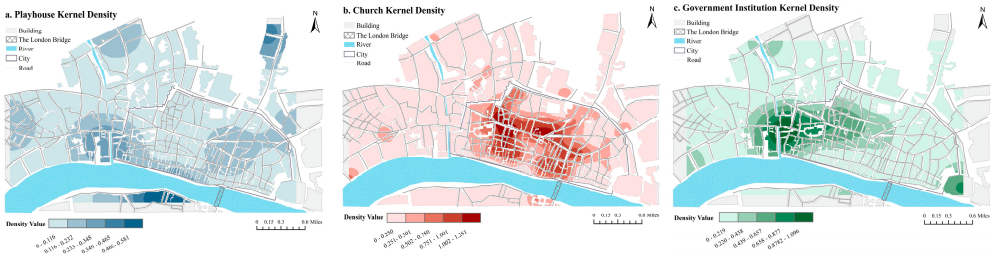



**Figure 4.** Kernel density distributions of playhouses, churches, and government institutions: (**a**) playhouses, showing a dispersed multi-nodal pattern along the Thames and urban margins; (**b**) churches, showing a predominantly core-concentrated pattern within the City of London; (**c**) government institutions, showing a principal western concentration with an additional eastern node around the Tower of London.

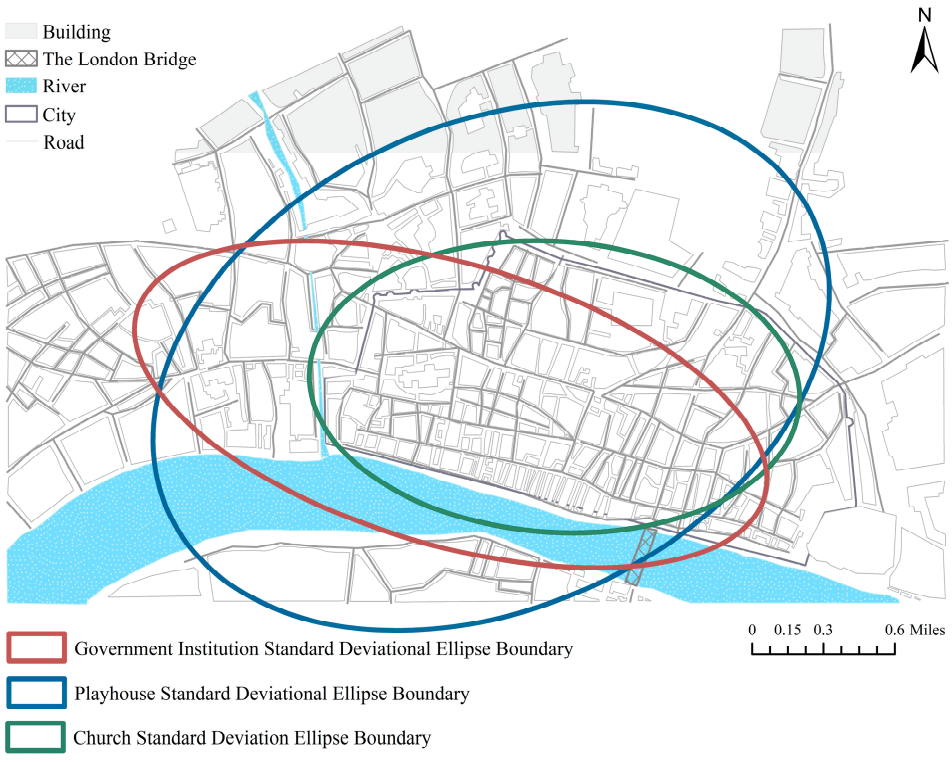



**Figure 5.** Standard deviational ellipses of playhouses, churches and government institutions.

The mean centres further demonstrate clear geographical displacement among the three categories. The mean centre of the playhouse distribution lay between those of churches and government institutions and was located farther north. It coincided neither with the densely concentrated ecclesiastical core of the old city nor with the principal concentration of government institutions. This position can be understood in relation to a theatrical geography shaped by riverine transport, commercial accessibility, local markets,

and jurisdictional boundaries. The mean centre of the church distribution lay farther east and closer to the old urban core on the north bank of the Thames, consistent with the concentration of the parish system in areas of dense population and communal activity. By contrast, the mean centre of government institutions was displaced markedly westward, corresponding to the concentration of administrative, judicial, and correctional institutions in western London.

The displacement and partial overlap revealed by the standard deviational ellipses therefore provide an overall-scale perspective on the geographical relationships among different institutional spheres and establish a quantitative basis for examining how these relationships contributed to the spatial organization of power in Jacobean London.

### *3.3. Local Spatial Autocorrelation Patterns and Spatial Association*

The global Moran's $I$ results (Table 3) indicate positive spatial autocorrelation for all three categories of sites, although the strength and statistical significance of the observed patterns vary substantially. Playhouses have a Moran's $I$ value of 0.0754 ($p = 0.0791$), indicating weak positive spatial autocorrelation with marginal statistical significance at the 10% level. Churches exhibit a substantially higher Moran's $I$ value of 0.4031 ($p = 0.0004$), demonstrating comparatively strong and highly significant positive spatial autocorrelation at the 1% level. Government institutions have a Moran's $I$ value of 0.0148 ($p = 0.0900$), indicating only very weak positive spatial autocorrelation, again with marginal significance at the 10% level. Overall, the results suggest that churches display the clearest tendency toward spatial clustering, whereas playhouses and government institutions exhibit much weaker levels of global spatial dependence.

**Table 3.** Global Moran's $I$ results for playhouses, churches and government institutions.

| Metric | Playhouse | Church | Government Institution |
|---|---|---|---|
| Moran's $I$ | 0.0754 * | 0.4031 *** | 0.0148 * |
| $p$-value | 0.0791 | 0.0004 | 0.0900 |

Note: * and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

The local spatial autocorrelation analysis (Figure 6) shows distinct patterns of clustering and spatial outliers among the three categories of sites. Playhouses are characterized primarily by low-low (LL) clusters in the central City of London, while localized high-high (HH) clusters occur on the South Bank and in the northeastern periphery. High-low (HL) spatial outliers are distributed across the South Bank and along the northern, eastern, and western margins, with several adjacent low-high (LH) outliers. Together, these patterns produce a multi-nodal spatial structure in which peripheral clustering coexists with pronounced local contrasts.

The local spatial autocorrelation analysis further reveals how different forms of institutional authority were embedded in Jacobean London's urban space. Playhouses exhibited both local clusters and spatial outliers, reflecting the varied neighbourhood and jurisdictional settings in which commercial performance depended on local markets, communities, and regulatory arrangements [43]. The 1603 royal patent granted to the King's Men further connected theatrical activity to royal authority, extending beyond individual territorial jurisdictions. Churches, by contrast, formed relatively continuous high–high clusters within the urban core, consistent with the parish system through which religious life, poor relief, and community governance were organized [44]. Government institutions exhibited weaker spatial continuity, with administrative, judicial, and disciplinary functions concentrated around particular institutional nodes, including Bridewell and Newgate [45]. These dif-

ferences reveal contrasting spatial relationships between institutional activities and urban governance: parish authority operated through established territorial communities, governmental functions were concentrated in specific institutional centres, and theatrical activity extended across multiple local jurisdictions. Together with historical evidence of royal authorization and theatrical regulation, these patterns help explain how local territorial authority and cross-jurisdictional institutional relationships intersected in the governance of Jacobean theatre.

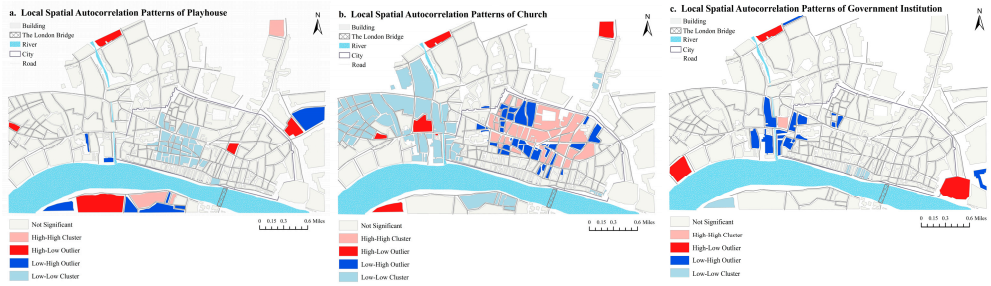



**Figure 6.** Spatial autocorrelation analysis of playhouses, churches and government institutions: (**a**) Local spatial autocorrelation patterns of playhouses; (**b**) Local spatial autocorrelation patterns of churches; (**c**) Local spatial autocorrelation patterns of government institutions.

## 4. Discussion

The preceding spatial analyses have demonstrated clear differences in the concentration, dispersion, and local overlap of churches, government institutions, and playhouses in Jacobean London, revealing the geographical relationships among different institutional spheres within the city. Building on these findings, this section examines how these spatial relationships conditioned the organization and implementation of dramatic censorship. Jacobean dramatic censorship operated through a multi-level regulatory structure that connected local jurisdictions, playing companies, and central political authority across geographically differentiated urban spaces. Three dimensions of this structure are particularly significant. First, the proximity of playhouses to parish and community spaces brought theatrical activity into local processes of governance, negotiation, and dispute. Second, the dispersion of playhouses across multiple jurisdictions increased the institutional importance of playing-company affiliation, script examination, and performance licencing as mechanisms for regulating theatrical activity across geographically separated venues. Third, the geographical separation between centres of administrative authority and many performance sites required regulatory decisions to circulate through documentary procedures, official orders, and institutional networks. The following discussion examines these three dimensions to show how the spatial organization of Jacobean London conditioned the practical operation of dramatic censorship.

### *4.1. Local Spatial Overlap and the Emergence of Local Regulatory Demands*

The preceding analysis shows that churches were concentrated primarily within the central City of London, whereas playhouses were more widely distributed along the river and at the urban margins. Despite this broader differentiation, the two categories overlapped locally in several areas. Such proximity situated commercial performance within neighbourhood environments where religious life, community affairs, and the use of shared urban space intersected. Parishes and other local urban divisions not only structured everyday life but also provided institutional channels through which residents could articulate concerns, negotiate interests, and seek regulatory intervention [9]. The proximity of playhouses to

parish and community spaces therefore enabled tensions arising from audience movement, traffic, access, and the use of shared space to become matters of local governance.

Blackfriars provides a particularly clear example of the institutional consequences of such spatial overlap. The playhouse and St Anne's Church occupied the same neighbourhood environment, in which religious practice, economic interests, and concerns about local order were continually negotiated [26]. In 1619, residents submitted complaints to the Lord Mayor concerning congestion caused by playgoers, coaches, and horses, while related municipal interventions addressed disruptions to commercial activity, residential access, and religious practice. The location of the playhouse therefore materially conditioned its regulatory environment: the use of shared streets, access routes, and public space brought theatrical activity into sustained interaction with local residents, parish institutions, and civic authorities.

These local spatial relations formed an important institutional context for the regulation of theatrical activity. Local authorities and communities could intervene in the practical conditions under which performance venues operated, while the licencing of playing companies and the examination of plays governed who was authorized to perform and what could be staged. These regulatory mechanisms operated at different institutional levels but converged at particular venues. A playhouse could therefore be subject simultaneously to local demands concerning access, order, and neighbourhood interests and to broader licencing and censorship procedures governing theatrical companies and dramatic texts. Local overlap among playhouses, parish spaces, and residential communities thus provided a territorial setting in which local interests could enter the wider regulatory environment of commercial theatre through petitions, complaints, and municipal intervention. In this sense, the spatial embedding of playhouses within particular neighbourhoods helped shape the local conditions under which the broader system of Jacobean dramatic regulation and censorship operated.

### *4.2. Spatial Dispersion of Playhouses and the Cross-Jurisdictional Operation of Censorship*

Compared with the relatively continuous distribution of churches, playhouses were more widely dispersed, with major concentrations on the South Bank, in western London, and at the urban periphery. Their location across different districts and jurisdictions meant that theatrical activity could not be governed solely through a single territorial authority. At the same time, playing companies provided an organizational framework capable of connecting geographically separated venues. Although the Globe and Blackfriars were situated in different urban environments and jurisdictional contexts, both formed part of the operational structure of the King's Men [19]. Royal authorization further enabled the company to perform at these venues and at other approved locations, linking geographically dispersed performance sites through a common organizational identity and institutional authorization.

This geographical dispersion increased the importance of company affiliation, script examination, and documentary authorization in the operation of dramatic censorship. The Master of the Revels exercised scrutiny and licencing primarily through playing companies and individual dramatic texts, while an approved script established the authorization under which a play could proceed to performance and could also provide evidence of legitimate performance when a company encountered intervention from other authorities [17]. Censorial requirements could therefore circulate from the licencing authority to geographically separated venues through the organizational structure of the playing company and the authorized status of the dramatic text. The territorial location of the playhouse, the institutional identity of the company, and the licencing of the script thus constituted interconnected

components of a regulatory system through which performances in different jurisdictions could be subjected to a common censorship procedure.

The surviving manuscript of *The Tragedy of Sir John van Olden Barnavelt* (1619) provides a concrete illustration of this process. The manuscript was submitted to the Master of the Revels for examination and also preserves evidence of its subsequent preparation for performance, including the production of actors' parts and the company's rehearsal practices. Censorial interventions recorded in the manuscript were therefore incorporated into the company's preparation of the play and ultimately carried into performance at a particular venue. The manuscript demonstrates how censorship operated through an institutional sequence connecting textual examination, company organization, theatrical preparation, and public performance. Within this sequence, the playing company functioned as the organizational intermediary through which censorial requirements were transmitted, the licenced script served as their documentary vehicle, and the playhouse constituted the physical site at which those requirements were realized in performance.

Jacobean dramatic censorship consequently functioned through a relational institutional structure in which geographically dispersed venues were connected by shared companies and licencing procedures. This arrangement enabled censorial authority to extend across local jurisdictions while remaining embedded in the organizational practices through which theatrical texts were prepared and transformed into performance.

### *4.3. Spatial Separation Between Playhouses and Administrative Centres and Central Intervention*

The relatively nodal concentration of government institutions, together with the riverside and peripheral distribution of playhouses, created a clear geographical separation between centres of administrative authority and many sites of theatrical performance. As the preceding spatial analysis demonstrates, government institutions and playhouses did not share a common geographical centre. This separation, however, did not limit the capacity of central political authorities to intervene in theatrical activity. Administrative orders, playing-company structures, and licencing documents enabled regulatory authority to operate across geographical distance and reach specific performance venues. The geographical separation between administrative centres and playhouses therefore increased the importance of organizational connections and documentary procedures in the implementation of dramatic censorship.

The intervention following the King's Men's performance of *A Game at Chess* at the Globe in 1624 provides a particularly clear example of this cross-spatial exercise of authority. When members of the company were summoned before the Privy Council, they produced the script licenced by Henry Herbert and maintained that the performance had not departed from the approved text. The licenced script thus served as documentary evidence of the textual authorization under which the production had been staged. The Privy Council nevertheless ordered the company to discontinue the play and suspend further performances pending the King's decision, while the script was subjected to further scrutiny as part of the investigation into the licencing process. A performance staged on the South Bank was thereby brought within the decision-making procedures of central political authority through the combined operation of company accountability, documentary authorization, and administrative command.

The episode also reveals the hierarchical character of Jacobean dramatic censorship. Licencing by the Master of the Revels provided the immediate institutional authorization for public performance, but that authority remained subordinate to the broader structures of royal and Privy Council power. When a licenced performance generated renewed political concern, the prior authorization itself could become an object of scrutiny, drawing both the playing company and the licencing official into further investigation. The licenced script

consequently performed a dual institutional function: it authorized the text for performance while also preserving documentary evidence through which the content of the play and the exercise of licencing authority could subsequently be examined. Dramatic censorship therefore did not conclude with the initial approval of a script but operated through a potentially recursive sequence of examination, authorization, performance, political response, and renewed intervention. In this way, central authority could be projected across urban space and brought to bear on performances staged at geographically distant venues.

Taken together, the three dimensions discussed above demonstrate that London's urban geography was not merely a backdrop to dramatic censorship but an important condition shaping its organization and operation. The local overlap of playhouses with parish and community spaces brought conflicts surrounding theatrical activity into processes of municipal governance; the dispersion of playhouses across multiple jurisdictions increased the importance of company affiliation and licenced scripts as mechanisms for regulating performances across different venues; and the geographical separation between administrative centres and peripheral playhouses was bridged through official orders, organizational networks and documentary transmission, enabling political authority to intervene across space and at multiple institutional levels. Jacobean dramatic censorship can therefore be understood as a relational form of regulation embedded within a differentiated urban environment. Territorial governance defined the local conditions under which theatrical activity took place, while organizational and documentary mechanisms connected playing companies, licencing authorities, and central political power across geographically dispersed sites of performance.

Although the study concerns an early modern urban context, it provides a historical perspective on coordinated governance by demonstrating how religious, administrative, and cultural activities were organized through partially overlapping but distinct spatial and institutional systems. Religious, administrative, and theatrical activities in Jacobean London were organized through distinct yet partially overlapping geographical and institutional structures, requiring continuing negotiation among local communities, territorial jurisdictions, and authorities operating across jurisdictional boundaries. The case therefore suggests that the coexistence of differentiated urban functions depends not only on their spatial distribution but also on mechanisms capable of coordinating institutions operating at different territorial and organizational scales. From this historical perspective, the analysis contributes to broader discussions of sustainable urban governance by highlighting the importance of coordinating diverse activities and institutional responsibilities within shared urban space.

## 5. Conclusions

This study examines London during the reign of James I through a "physical space-power space" analytical framework, combining historical GIS with evidence concerning territorial jurisdictions, urban governance, playing-company organization, royal authorization, and dramatic censorship. At the methodological level, this study contributes a unified, quantitative GIS-based approach to comparing government institutions, churches, and playhouses within a common spatial analytical framework. By integrating KDE, standard deviational ellipse analysis, and global and local spatial autocorrelation, it enables systematic comparisons of their spatial concentration, dispersion, directional orientation, and spatial associations. The principal interpretive contribution of this study lies in transforming spatial differentiation from a descriptive feature of historical urban geography into an analytical basis for explaining institutional operation. Through KDE, standard deviational ellipse analysis, and global and local spatial autocorrelation, the study quantitatively identifies the distinct spatial logics through which theatrical, religious, and administrative-judicial

activities were organized within the same city. These spatial relationships are then brought into dialogue with evidence concerning jurisdiction, organizational identity, licencing procedures, and political intervention, revealing how spatial differentiation participated in the practical operation of regulation. The resulting framework integrates physical location, territorial authority, and cross-jurisdictional institutional relations within a single analytical structure and reconceptualizes Jacobean dramatic censorship as a multi-scalar process in which territorial governance and relational authority were mutually embedded. The significance of spatial analysis therefore extends beyond establishing where institutions were located: it demonstrates how location, distance, overlap, organizational affiliation, and documentary connections together structured the relations through which power operated across urban space.

This historical case also provides a broader perspective on the relationship between spatial differentiation and institutional coordination. Theatrical, religious, and administrative activities in Jacobean London followed different spatial configurations while remaining connected through shared streets, neighbourhoods, commercial networks, jurisdictional arrangements, and institutional relationships. Their coexistence depended on continuing coordination among actors and authorities operating at different territorial and organizational scales. Early modern London can therefore be understood as an urban system produced through the ongoing negotiation of spatial differentiation, local interests, and cross-jurisdictional institutional relations. From this historical perspective, the study contributes to broader discussions of sustainable urban governance by highlighting the importance of coordinating diverse activities, jurisdictions, and institutional responsibilities within shared urban space.

The study is limited by the uneven survival and geographical precision of historical cartographic and archival records. Future research could integrate more detailed performance and mobility records with dynamic GIS and network analysis to examine more fully how theatrical activity and regulatory relationships changed over time.

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