Signal Architectures of US Public Libraries: Resolving Legitimacy between Public and Private Spheres

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ABSTRACT
Public library systems intersect with both public and private spheres of social life, but how they do so remains a mystery. Many believe private influences distort the public sphere in public libraries, and if so, then library legitimacy suffers, raising normative and material concerns for library systems. To better understand how libraries negotiate public legitimacy and private influence, we approached the problem using a communications system framework. We used qualitative content analysis to examine data from three US public library systems: Carnegie Library of Pittsburgh, New York Public Library, and Cary Memorial Library in Lexington, Massachusetts. We recorded the many ways private actors communicate with and through public library systems. Then, we analyzed the signals in terms of their components: transmitter, receiver, medium, and message. We found two dimensions: in the Public Sphere dimension, private actors govern, legitimate, and use the library, and in the Private Sphere dimension, private actors exchange personal services and exert economic power. We describe the communication channels shared by private actors and public library systems, identify signals associated with governance, influence, and legitimacy, and consider how these signals relate. This study explores the signal architectures of social life in public libraries.

Keywords
Private sphere, public sphere, public libraries, theory development, qualitative content analysis.

INTRODUCTION
Public libraries mediate between public and private spheres of sociality. On the one hand, public libraries reflect the interests and values of their constituents—their publics. Public libraries act as meeting places and as spaces for debate and dialogue. They are often tax-supported, and they often receive public legitimation in the form of referenda votes and community rallies. On the other hand, public libraries serve private information needs. Many libraries draw funding from for-profit businesses, sell merchandise, and sponsor programming related to job-seeking. In some cases, the distinction between public and private spheres seems clear and distinct, but in other cases, the two sides blur. This imbricated nature might suggest that private influence weakens the legitimacy afforded to public libraries by their constituents. That is, library systems may reflect limited, private influences rather than shared, public ones. How do public libraries maintain their publicness despite private influence?

Ambivalence about the publicness of public library systems has been expressed in library literature over the past 20 years (see Widdersheim and Koizumi (2015) for a detailed review). For instance, Webster (1995) suggested that, owing to their public funding and accessibility, “the public library network is arguably the nearest thing we have in Britain to an achieved public sphere” (pp. 111-112); yet, he also expressed concerns about pay-per services and their effects on public participation and access. Similarly, in their ethnographic accounts of public spaces in Toronto and Vancouver central libraries, Leckie and Hopkins (2002) claimed that the public sphere in public libraries was “co-opted” by private interests, including corporate business practices (p. 357). Likewise, Buschman (2003) argued that as “democratic public spheres,” libraries are “disseminators of rational, reasoned, and organized discourse,” “sources of verifying or disputing claims,” and “spaces for the inclusion of alternative views of society” (pp. 120-121). He also famously claimed that private influences “dismantle” the public sphere in libraries (Buschman, 2003, 2012). Moreover, Stevenson (2012) argued that Ontario public libraries’ partnerships with and emulation of private sector entities threaten the democratic roles of public libraries.

These authors all question how library systems negotiate public governance and private influence. If it is the case that public library systems privilege private interests over public values and concerns, and if they do not support an
undistorted, non-biased intellectual commons, then the public legitimacy of public library systems is in doubt.

Existing literature has not yet explained how public libraries negotiate public and private spheres of life. Buschman (2003) claimed that private influences corrode the public sphere but offered no solutions. Without a theory or model of the public sphere in public libraries, it is not clear why the problem exists or how it might be resolved. Previous literature frames public/private as a false dilemma, suggesting that public and private spheres share an inverse relationship without explaining why, and seems to conflate the public sphere with public, tax-based funding. Empirical studies of public and private spheres are few. The survey results of Aabø, Audunson, and Vårheim (2010) found that public libraries support public sphere meeting places in public libraries, but these results did not explain how library systems maintain legitimacy. While Widdersheim and Koizumi (2015) constructed a model of the public sphere in public libraries, they did not explain the role of the private sphere. More theoretical work based on empirical analyses is needed to describe how private influence potentially distorts public library systems. Simultaneously, an approach is needed that clarifies how public library systems maintain legitimacy. A new sociological perspective is needed that describes both public and private spheres in interaction.

**RESEARCH PURPOSE**
The purpose of this study is to describe how public library systems maintain public legitimacy despite private influence. To do this, we develop a conceptual model of the public and private spheres in public libraries using a communications system framework. We use qualitative content analysis to examine documents from three US public library systems. The results of our study offer scholarly value by clarifying the roles of public and private spheres in public libraries. While our work is largely theoretical, we also consider implications for organizational practices in public libraries.

**THEORETICAL FRAMEWORK**
Public legitimacy and private influence both originate from private actors. By legitimacy, we mean political power derived from deliberation and governance by those affected by the system. By influence, we mean social or economic power derived through control of capital, broadly defined. Legitimacy and influence must be transferred. They are granted to institutions by private actors. Public governance ensures that library systems reflect public values and interests—that the system will be legitimated. Influence ensures the library’s material survival.

How are legitimacy and influence transmitted to library systems? How might these transmissions conflict?

To answer these questions, we first establish a working definition of private actors to distinguish them from the library system. We then develop a framework to analyze the signals that private actors and libraries exchange.

Our definition of private actors borrows from Habermas’s (1989a, p. 30) traditional formulation of bourgeois society (see Table 1). Private actors constitute a private realm that is separate from the public authority of the state. Within the private realm, the private sphere of commodity exchange and social labor is distinguished from the public sphere, where private actors engage in discourse regarding politics, economics, art, and literature. On this view, public and private spheres are “the preserve of private people” (p. 30), and politics is at the heart of the “public sphere constituted by private people” (Habermas, 1989a, p. 30).

We define private actors according to this model. We include several kinds of actors within our category: civil society individuals and groups; voluntary associations; local clubs and club members; third-sector organizations; charities; and foundations. In line with the meaning of Gessellschaft, or civil society, we also include private sector corporations, businesses, and businesspeople.

For the purposes of this study, actors such as library workers and public officials are not considered private actors. Library workers, as well as any library-related infrastructure, services, and programs, are considered part of library systems. Actors formally associated with the state administration are largely excluded from this study.

We must also be able to describe the types of communications that private actors exhibit. To do this, we describe communicative interactions in terms of their components. We creatively adapt a five-component framework developed by Shannon (1948) and Weaver (1949), adopted by Shera (1970), and implicit in Habermas (1989a, 1989b, 1996). In this framework, the five

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<tr>
<th>Private Realm</th>
<th>Sphere of Public Authority</th>
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<td>Civil society (realm of commodity exchange and social labor)</td>
<td>State (realm of the “police”)</td>
</tr>
<tr>
<td>Conjugal family’s internal space (bourgeois intellectuals)</td>
<td>Court (courtey-noble society)</td>
</tr>
<tr>
<td>Public sphere in the political realm</td>
<td>Public sphere in the world of letters (clubs, press)</td>
</tr>
<tr>
<td>(market of culture products) “Town”</td>
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*Table 1. A schema of bourgeois society. The private sphere on the left consists of civil society, commodity exchange, and families (reproduced from Habermas, 1989a, p. 30).*
components of communication are signal, transmitter/modulator, receiver/demodulator, medium/channel, and message. Using this framework, we classify the communicative interactions of private actors in terms of who transmitted what to whom, using what means, and to what effect.

Importantly, this framework allows us to differentiate by communication medium. Based on Habermas (1989a), Widdersheim and Koizumi (2015) stated three necessary and sufficient conditions for public sphere communication: openness, common concern, and debate. We adopt these three conditions for this study. In cases where the communicative medium approximates these conditions, we classify the communicative transaction as public sphere discourse. By contrast, we classify relatively closed, non-discursive, or personal transactions as private sphere communication. Drawing from Parsons (1967), Luhmann (1976), and Habermas (1989b), we recognize money and power as non-linguistic communication media. These kinds of non-linguistic transactions are classified as non-public sphere communication because they bypass at least one condition of openness, debate, and common concern.

The five-component framework has been used before to describe communication at different levels of abstraction (see Table 2, column 2). We borrow elements from previous studies and apply the framework in a new way. We analyze communication between private actors and library systems at a meso level of society. We distinguish between medium and channel, and we add channel as an additional component. In the end, our framework uses six components: signal, channel, transmitter, receiver, medium, and message (see Table 3). The unknown elements in Table 3 are what we hope to identify in our study.

**METHODOLOGY**

We used qualitative content analysis to examine the annual reports of three public library systems in the US: New York Public Library, Carnegie Library of Pittsburgh, and Cary Memorial Library in Lexington, Massachusetts. The annual reports range in date from 1900 to 2010. We used 12 annual reports from each library system for a total of 36 annual reports. In total, we analyzed 1,412 pages and 3,964 paragraphs (see Table 4).

We chose this sample of public libraries to represent public libraries of different sizes. New York Public Library (NYPL) is currently the largest library system in the US after the Library of Congress. NYPL has both research division and branch division libraries that total 92 locations throughout Manhattan, the Bronx, and Staten Island. NYPL’s total service population is almost 3.5 million and its total operating revenues are about $280 million (New...
York Public Library, 2014). Carnegie Library of Pittsburgh (CLP) is an urban public library system that currently has 19 branches, a total service population of 2.6 million, and total operating revenues of almost $30 million (Carnegie Library of Pittsburgh, 2014). Cary Memorial Library (Cary) is one of the oldest tax-supported libraries in the US. It is currently a single-location library system with a total service population of about 33,000 and a total operating budget of about $2 million (Town of Lexington Massachusetts, 2014).

We also chose these libraries due to the availability of consistently-published annual reports dating back to 1900. In the case of NYPL where only a statistical report was available for 1950, we used the most recent annual report from 1948 to supplement the statistical report. The data from this sample of libraries taken over a shared 110-year span provided a representative, historical account of US public libraries.

Together, researchers analyzed signal types using a 6-step process (see Figure 1). First, we identified signal exchanges by private actors or the library system. We did this using our definition of private actor developed above. Second, we analyzed the signal direction by identifying the transmitter and receiver. Third, we identified the type of message sent, for example, whether the message pertained to health or global politics. Fourth, we distinguished public from private sphere signals. For this, we identified whether the signal was linguistic or non-linguistic and whether linguistic signals met the three conditions of public sphere communication. Fifth, we grouped like signals together

| Year | # Pages NYPL | # Paragraph NYPL | # Pictures NYPL | # Tables NYPL | # Charts/Graphs NYPL | # Lists NYPL | # Pages CLP | # Paragraph CLP | # Pictures CLP | # Tables CLP | # Charts/Graphs CLP | # Lists CLP | # Pages Cary | # Paragraph Cary | # Pictures Cary | # Tables Cary | # Charts/Graphs Cary | # Lists Cary |
|------|--------------|------------------|----------------|--------------|---------------------|-------------|--------------|----------------|----------------|--------------|-------------------|-------------|----------------|------------------|----------------|-----------------|----------------|
| 1900 | 31           | 72               | 3              | 67           | 82                  | 4           | 0            | 1              | 0              | 11           | 24                | 0            | 0              | 0                | 1              | 19              | 0              |
| 1910 | 100          | 80               | 8              | 299          | 131                 | 10          | 3            | 5              | 0              | 48           | 46                | 4            | 0              | 0                | 23             | 15              | 1              |
| 1920 | 98           | 98               | 8              | 285          | 239                 | 14          | 0            | 4              | 0              | 33           | 3                 | 4            | 0              | 0                | 6              | 13              | 1              |
| 1930 | 118          | 37               | 9              | 331          | 86                  | 16          | 4            | 5              | 0              | 33           | 18                | 7            | 0              | 0                | 3              | 4               | 2              |
| 1940 | 155          | 17               | 8              | 712          | 43                  | 9           | 4            | 2              | 0              | 34           | 12                | 17           | 0              | 1                | 9              | 0               | 0              |
| 1950 | 56           | 24               | 8              | 65           | 80                  | 29          | 0            | 0              | 0              | 31           | 14                | 13           | 0              | 0                | 7              | 2               | 0              |
| 1960 | 36           | 28               | 7              | 92           | 87                  | 24          | 4            | 0              | 0              | 9            | 10                | 7           | 0              | 0                | 2              | 2               | 3              |
| 1970 | 39           | 40               | 3              | 42           | 133                 | 10          | 0            | 0              | 2              | 10           | 14                | 1           | 0              | 0                | 5              | 4               | 0              |
| 1980 | 11           | 18               | 3              | 30           | 107                 | 11          | 3            | 18             | 1              | 0            | 0                 | 3           | 0              | 1                | 1              | 5               | 0              |
| 1990 | 84           | 27               | 4              | 361          | 108                 | 16          | 34           | 25             | 1              | 4            | 10                | 3           | 0              | 0                | 1              | 7               | 2              |
| 2000 | 65           | 16               | 3              | 222          | 18                  | 34          | 38           | 4              | 0              | 3            | 1                 | 5           | 5              | 2                | 7              | 2               | 0              |
| 2010 | 65           | 31               | 2              | 79           | 59                  | 29          | 9            | 31             | 0              | 12           | 4                 | 2           | 20             | 2                | 9              | 13              | 1              |
| Total| 858          | 488              | 66             | 2,585        | 1,173               | 206         | 99           | 95             | 4              | 228          | 156               | 66          | 25             | 6                | 7              | 82              | 10             |

Table 4. Scope of the analysis of NYPL, CLP, and Cary annual reports.

Figure 1. Signal analysis process.
The annual reports were organized and coded using NVivo research software. Base nodes were used from a previous study on the public sphere (Widdersheim & Koizumi, 2015) and new nodes were created for the private sphere. Both researchers coded the Cary annual reports as a pilot. While coding the Cary reports, researchers collaboratively developed a coding manual to ensure reliability. At the end of the Cary coding, the average Kappa score for both coders for all Cary reports was .914. For the NYPL and CLP annual reports, the two researchers split each of the 12 reports into 2 sets of 6 and coded each set separately. The researchers communicated regularly throughout the coding process and checked each other’s NYPL and CLP codings for discrepancies. The coding process emphasized discussion, mindstorming, and theory development.

While coding, we were aware that annual reports may present biased library perspectives. Therefore, we did not always take the reports at face value, and we considered the possible views of non-library actors. However, while triangulation and use of alternative sources might enhance our study’s validity, we believe the reports are the best single source for identifying the various kinds of communicative interactions between public library systems and private actors.

RESULTS OVERVIEW
We constructed 2 dimensions, 6 channels, and 18 signal types (see Figure 2). The first dimension is the Public Sphere and second is the Private Sphere. Private actors constitute both the Public and Private Sphere dimensions together with the library system.

The Public Sphere dimension has three channels. These channels correspond to the three discourse levels of the public sphere identified by Widdersheim and Koizumi (2015). Governance corresponds to the Intra-Library Public Sphere; Legitimation corresponds to the Inter-Library Public Sphere; and Commons corresponds to the External Library Public Sphere. The Private Sphere dimension has three channels, Partnership, Service and Influence. These channels are newly-constructed.

Each channel has at least 2 signal types. Governance has 2 signal types: Prompt and Modulate. Legitimation has 2 signal types: Activate and Advocate. Commons has 4 signal types: Facilitate, Assemble, Engage, and Promote. Partnership has 2 signal types, Demand and Contract. Service has 4 signal types: Inform, Gather, Educate, and Query. Influence has 4 signal types: Sanction, Donate, Contribute, and Condition.

A detailed breakdown of each signal type’s components is summarized in Table 5. The following sections explain each dimension, channel, and signal type in detail.

**Figure 2. Dimensions, channels, and signal types of private actor and library system communication.**

**DIMENSION 1: PUBLIC SPHERE**
The Public Sphere dimension is characterized by interactions that take place through the medium of language and meet the conditions of openness, debate, and common concern. There are three channels in the Public Sphere: Governance, Legitimation, and Commons. Each of these channels is characterized by distinct functions and signal types, explained below with examples.

**Governance Channel**
Within the Governance channel, private sphere actors and the library system communicate about library collections, services, programs, and policies. Linguistic signals are transmitted back and forth between private actors and libraries using two signal types, Prompt and Modulate.

**Prompt Signals**
Using Prompt signals, the library system asks private actors for input and feedback regarding collections and services. The library system acts as the transmitter and private sphere actors act as receivers.

For example, in 1970 at the CLP Homewood Branch, the Library invited a group of residents to form an Advisory Board to work with the staff in providing the...
kind of service which will be meaningful to the residents of the area. The Advisory Board was asked to study present services and programs including hours of opening, book collection, and staffing to determine changes which could be made to better serve the needs of the community. A series of informational meetings of the Advisory Board and staff were held and the proposals of the Advisory Board were expected early in 1971. (p. 14)

This example shows how public libraries actively prompt their publics with a view towards incorporating community feedback into library governance.

Modulate Signals
The corollary of Prompt signals are Modulate signals. Using Modulate signals, private actors of library publics transmit interests and values to the library system. These signals affect library programming and allow libraries to act as “dynamic,” “open-ended systems” according to Shera’s (1970, pp. 91-92) vision. For instance, in 1970 CLP noted how the system successfully transformed in response to Modulate signals:

The success of the Reading Center and the "Books by Bus" programs are directly the result of an eager, interested and appreciative public Advisory Board, and a truly dedicated staff headed by Miss Elizabeth McCombs, Coordinator of Project Outreach. (p. 14)

These examples illustrate how public library systems create new features in response to Modulate signals.

Legitimation Channel
Like Governance, the Legitimation channel is characterized by open, discursive, and cooperative communication. Unlike Governance, however, Legitimation channel discourse pertains to the maintenance and preservation of the system itself. There are two signal types in the Legitimation channel, Activate signals and Support signals.

Activate Signals
Using Activate signals, the library system rouses public backing in times of crisis. For example, the CLP system in 1990 sponsored a series of rallies and community meetings to stimulate public awareness of decreased library funding:

The release of The Report of the President's Advisory Committee on the Library in April began an education process which has changed the way Pittsburgh sees and understands its public library system. Followed by community meetings in each branch library

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<tr>
<th>Dimension</th>
<th>Channel</th>
<th>Signal Type</th>
<th>Transmitter(s)</th>
<th>Receiver(s)</th>
<th>Medium</th>
<th>Message</th>
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<td>Library System</td>
<td>Private Actors</td>
<td>Language</td>
<td>Library Policy</td>
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<td>Private Actors</td>
<td>Library System</td>
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<td>Library System</td>
<td>Private Actors</td>
<td>Language</td>
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<td>Private Actors</td>
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<td>Private Actors</td>
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<td>Library</td>
<td>Language</td>
<td>Library Policy</td>
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<td>Private Actors</td>
<td>Library System</td>
<td>Money</td>
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<td>Money</td>
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Table 5. Dimensions, channels, signals, and signal components of private actor/library system communication.
neighborhood, the Report and its attendant publicity to dispel the myth that Andrew Carnegie left an endowment to support the library. The citizens of Pittsburgh and Allegheny County, after learning the details of the library's budget crisis, gave their time, energy, and ideas in support of increased funding. (p. 3)

This example from CLP illustrates how library systems broadcast Activate signals to stimulate public intervention on behalf of the library.

Advocate Signals
Within the Legitimation channel, private actors also act as transmitters to stimulate library system support. Private actors target a number of societal receivers with Advocate signals, including state and municipal decision-making entities, civil society groups such as charities, private individuals and philanthropists, third sector non-profits and foundations, and private sector businesses.

The annual reports of Cary, CLP, and NYPL all note the activities of their “Friends of the Library” or “Readers Association” groups. The groups, composed of non-library persons, often assisted the systems with fundraising events, capital campaigns, and general advocacy. For example, the 1940 NYPL annual report stated:

An encouraging evidence of public interest in the Library is The Readers' Association of The New York Public Library. This organization, developed from one of the "Library Round Tables," was organized May 22, 1940, "to create a proper interest in the activities sponsored by The New York Public Library, to assist in obtaining sufficient funds for the purchase of books, the building of new branch libraries or the rehabilitation of old buildings, and to aid in improving library service to the public." (p. 174)

Volunteers associated with NYPL continued to work on behalf of the library to legitimate the library financially and politically. These examples from NYPL illustrate how private actors send Advocate signals to stimulate library support and ensure system maintenance.

Commons Channel
Like Governance and Legitimation, the Commons channel of the Public Sphere is characterized by openness, debate, and common concern. Commons differs from the previous two channels because the themes of discourse concern aspects of society and culture beyond the library system. Commons is what previous library literature commonly associated with the library public sphere. Commons has four channels: Facilitate, Assemble, Engage, and Promote.

Facilitate Signals
Facilitate signals pass through the library. Library systems operate as communication media that carry messages from information producers to private actors. Library systems serve as the relay infrastructure unguirding literary and political discussions.

For example, an excerpt from Cary’s annual report from 1910 suggests that the library coordinated lectures and exhibitions in order to facilitate the transmission of works pertaining to art, travel, and industry:

The resources of our schools have been enhanced by placing in the library certain collections of stereographic views, which portray scenery of countries and cities, works of art, and processes of manufacture. These sets of views are loaned with a stereoscope, and already are so much sought after that undoubtedly additional sets will soon be purchased. This is an extension of the functions of the library similar to the exhibitions in the art room, which instruct and interest our people more generally every year. (p. 93)

In another example, the 1940 NYPL annual report features a photo from presidential campaign speeches that took place outside the library that year (p. 202). These examples from Cary and NYPL reports illustrate how library systems serve as media to facilitate the transmission of artistic, literary, political, and historical messages to library publics.

Assemble Signals
Assemble signals include cases where private actors utilize library resources to communicate with one another. In these cases, private actors are the transmitters and receivers and the library exists in the background as infrastructure. It is in this channel where the library is a public sphere meeting place.

For example, in 1910 the CLP West End Branch reported:

West End Study Club has a membership of thirty-one. This year the study has been on civic topics, such as Medical Inspection of Schools; Playgrounds; Child Labor; Women in Industry; Aldermanic Corruption, etc. The club members have taken a keen interest in the meetings and topics have been seriously prepared and vigorously discussed. (p. 33)

This example illustrates how private actors utilize library infrastructure to send Assemble signals.

Engage Signals
Engage signals include cases where private citizens undertake political action within the library or by using library resources. Utilization of political channels and signals to influence state policy is central to the public sphere concept.

For example, the 1920 CLP annual report noted:

The local members of the Allegheny County League of Women Voters held their meetings in the children's room, the object being to learn how to vote. (p. 44)

Using public library infrastructure, private actors transmit messages from the societal periphery to decision-making bodies at the political system core. Engage signals illustrate
how private actors transform communicative power into political power.

**Promote Signals**

Using Promote signals, library systems take an active community role in shaping public sphere discourse by raising or announcing topics for discussion.

For example, the CLP annual report from 1970 states:

In October, WQED initiated a month-long information and action project on the drug question reaching a nine-county audience. Mini town meetings were held on four consecutive Tuesdays in the Homewood Branch and on four Wednesdays in the East Liberty Branch. The Library provided multiple copies of circulating materials throughout the system and book lists were made available for distribution. (p. 24)

In another instance, the NYPL 1970 annual report lists exhibitions that occurred in the central building. One listing read:

**POLLUTION**

First Floor Corridor North

A timely exhibit of books, pictures, reports and abstracting services on air and water pollution. Through January 15. (p. 676)

These examples from CLP and NYPL illustrate how libraries actively structure public discourse.

**DIMENSION 2: PRIVATE SPHERE**

The Private Sphere dimension of library system and private actor communication includes cases of social interactions where communication is relatively closed, personal, and non-deliberative. There are three Private Sphere channels: Service, Partnership, and Influence.

**Service Channel**

Interactions in the Service channel take place through the medium of language, but these interactions do not fulfill at least one of the conditions of openness, debate, and common concern that characterize public sphere interactions. Within the Service channel are social interactions between private actors, the library system, and state agencies that are relatively limited in discursive participation, are unidirectional, or are focused on individual needs rather than community issues. It is in this channel that private actors exhibit personal information-seeking behaviors, act as more or less solitary clients and consumers of informational services, and conduct personal research. This channel includes private reading practices, private meetings, reference questions, and personal requests. Service has four signal types: Inform, Gather, Educate, and Query.

**Inform Signals**

Inform signals include cases where the library acts as a medium of linguistic exchange to facilitate knowledge transfer between private actors and media producers. The diverse messages carried by these signals range from economic to health to family issues. Inform signals are on one pole of a continuum; at the opposite pole are Facilitate, Use, and Engage signals from the Commons channel of the Public Sphere dimension. Commons channel signals meet the conditions of openness, debate, and common concern, but Inform signals are relatively closed and non-discursive.

For example, NYPL reported uses of the library by researchers, engineers, and scientists in 1920:

There is a notable desire for mathematical knowledge and the new developments in physical science, prompted especially by the revolutionary theories of Einstein. Wireless telegraphy and automobile engineering are also unusually live subjects. As ever, patent records are eagerly sought…. Interest in patents is reflected in the fact that fully fifty per cent of the photostat work of the Library is confined to the copying of patent records. (p. 226)

This example from NYPL illustrates how Inform signals pass through public libraries. As an Inform signal infrastructure, public libraries meet private information needs.

**Gather Signals**

Gather signals include cases of closed or semi-closed meetings. They lie on a continuum opposite Assemble signals. For example, in 1910 CLP reported on its use of the music hall by members-only associations, clubs, and groups:

The Music Hall has been used 230 times during the year, and was closed in July, September and the most of August. There have been several conventions, the largest being the Centennial Convention of the Disciples of Christ in October, which lasted eight days. The others include the Eastern Art Teachers’ Convention, in May, and the Convention of the National Playground Association, also in May. In August the American Federation of Catholic Societies held a three days’ convention, and the Allegheny County Teachers’ Institute came as usual in the last week of August. (p. 73)

The above example from CLP illustrates how Gather signals are transmitted in the library in closed meetings.

**Educate Signals**

Libraries serve as carriers of Inform signals, but they actively transmit Educate signals. In Educate signal cases, library systems act as transmitters of knowledge. The contexts and messages of these signals are absent public sphere characteristics. Educate signals often relate to skill-
based workshops and personal skill training. For example, in Cary in 2010, the Technology Department

Worked with the Teen Advisory Board to present "Teen Tech Week" workshops, including classes on email skills and social networking options. (p. 38)

Skill-based workshops also occurred at the CLP Hazelwood Branch in 1990:

The WORKPLACE and JOBNET programs helped 220 people through workshops and counseling sessions concerned with job-seeking skills, career choices, and decision making. (p. 11)

These examples from Cary and CLP illustrate how library systems take an active role in transmitting Educate signals to private actors to meet private information needs.

Query Signals
Query signals include cases where private actors transmit personalized service needs to the library. These include reference questions. For example, the Cary report from 1920 described how new media technology affected references services. According to the report, the library is a clearing-house for general information and the librarians are always ready to help inquirers, and indeed every day give service in many small ways that extends the field of the library in new directions. By means of the telephone, the general usefulness of the library is constantly enlarged. (p. 89)

This example from Cary illustrates how private actors send Query signals to the library.

Partnership
The partnership channel includes two signal types: Demand and Contract. Both signal types travel via the non-linguistic medium of money.

Demand Signals
Demand signals include cases where private actors transfer money to the library for services, goods, or as investment returns. CLP and NYPL published and sold books; Cary operated a copy service. Private actors paid for these services, and implicit in their monetary transmission was the value they attributed to the services provided. Similarly, NYPL in 1990 reported sales earnings:

The Library Shop, constructed with the generous support of Marshall and Jill Rose, completed its third full year of business with sales exceeding $650,000. Materials related to Library exhibitions and collections accounted for nearly 50 percent of this amount. An expansion project to double the size of the shop was approved, with projected completion date of Fall 1990. (p. 46)

The above example illustrates how private actors send Demand signals through monetary media in order to receive services, goods, or investments from library systems.

Contract Signals
In Contract signal cases, library systems transmit value to private actors through monetary media in order to receive services or goods. These include outsourcing, purchases, rentals, investments, construction, and renovation. Cary, CLP, and NYPL all recorded expenses associated with outsourcing costs and utilities fees, and they all invested in stocks and bonds. For example, Cary listed architectural fees in 1950 (p. 122) and later described the beginnings of a redesign process:

The permanent building committee is now working with Architects' Design Group of Cambridge and the staff on preliminary plans for a complete renovation and expansion program. We look forward to an early realization of these plans. (pp. 14-15)

This example from Cary illustrates how libraries send Contract signals to private sector actors.

Influence Channel
The Influence channel includes four signal types: Sanction, Donate, Contribute, and Condition. Influence signal types are sent via the non-linguistic media of power and money.

Sanction Signals
Sanction signals are transmitted by the library to private actors via power media. Sanction signals enforce system policy and rules to ensure system maintenance.

For example, in the Cary report from 1950, the system sanctioned behaviors that breached the normative code:

Methods worked out for control of students using the stacks have not been wholly efficient as there have been several instances of malicious damage during the past year. There have also been numerous occasions in the evenings when attempts by members of the staff to maintain quiet and order have been met with insolence, rudeness, and a refusal of young people to obey. The trouble has come from the most part from groups of teenagers roaming the streets in the evening. Most libraries rely on the presence of a police officer in the library to curb those young people intent on doing damage or creating disturbances. (p. 29)

This Cary example illustrates how library systems send Sanction signals to ensure system maintenance.

Donate Signals
Donate signals are transmitted through the non-linguistic media of physical equipment or labor time. Defined and specific values are implicit in the donated material. By accepting the object or service time, the library subscribes to the values transmitted. Donate signals include cases of volunteerism, collections donations, or technology
donations. For example, Cary in 1960 reported on library donations:

The interesting exhibits in the Lexington Room arranged by the Curators of the Lexington Historical Society have been enjoyed by both residents and visitors. The flower arrangements provided by members of the Lexington Field and Garden Club have also been greatly admired and enjoyed. (p. 264)

Similarly, in 2010 Cary reported on volunteer activities by the Friends of Cary Memorial Library group:

Coordinated the efforts of over 125 volunteers who worked over 5,500 hours to help the library operate more smoothly and to deliver library materials to those who are unable to visit the library in person (239 visits in FY2010). (p. 2)

These examples illustrate how values are transmitted to library systems by Donate signals of objects and labor time.

**Contribute Signals**

Contribute signals are transmissions of value through money signals. The specific messages or values of the transmission are undefined, and the library system decides what values the money represents.

An example from Cary in 1990 illustrates how library systems receive Contribute signals from private actors, including businesses and individuals. These signals become part of the collective resources of the library without defining how the library system changes:

The New Century Fund received many gifts from local businesses, patrons, Friends of the Library, and the Town Meeting Members Association. It now has added over $45,000 to the Library's permanent endowment, the principle funding source for acquiring new books. A goal of $1,000,000 has been set to be reached by the year 2000. (p. 32)

In the following case from Cary in 1920, the system broadcasted Activate signals with the objective of receiving Contribute signals in response:

The use of the library is greater from year to year and more money is needed to procure new books and other equipment. A gift or bequest to the library will expand its usefulness and at the same time provide a suitable memorial to the donor or someone whom it is declared to honor. (p. 89)

Contribute signals carry unrestricted monetary messages.

**Condition Signals**

In contrast to Contribute signals, Condition signals have value conditions attached. Condition signals are received by the library for defined uses.

The following example from NYPL in 1990 illustrates how monetary messages can be defined and undefined.

Contribute signals are unrestricted receptions, Condition signals are restricted receptions:

Private gifts recognized in support of The Research Libraries and related operations totaled $22.4 million. Included in this were $2.5 million from bequests and $762,000 from unrestricted gifts to the Campaign for the Library; both amounts were subsequently transferred to quasi-endowment. The Annual Fund raised $8.7 million (including certain donor-restricted gifts), while another $10.4 million was recognized for other restricted purposes. (p. 50)

The above example from NYPL illustrates how monetary signals can contain both defined and undefined values.

**DISCUSSION**

Our analysis of private actors’ interactions with public library systems reveals that private actors and library systems co-constitute public and private spheres. Our findings challenge attempts to characterize libraries dichotomously as either public or private.

In coordination with library systems and other societal entities, private actors govern, legitimate, and use libraries in ways characteristic of the public sphere. It is in the communicative channels of Governance, Legitimation, and Commons where a “public sphere constituted by private people” (Habermas, 1989a, p. 30) can be found.

Within the private sphere dimension, private actors meet personal information needs, exchange services, and exhibit economic power. In private sphere contexts, library systems depend on private actors for material reproduction. Private sphere interactions take place through the channels of Partnership, Service, and Influence.

A composite picture of private actor and library system communication is visualized in Figure 3. In the figure, the library system is located in a private actor environment. Within the system boundary is a receptor/filter periphery, a ring of channels, and a decision-making core. Each signal type is represented in its appropriate channel by a vector that displays the signal’s transmission origin (dot) and reception site (arrow). Vectors that curve in and out of the library channel signify that the library serves as the carrier medium for that signal type. Media producers and the political system co-occupy the private actor environment with the library system.

We argue that Figure 3 represents the signal architecture of public and private spheres in public libraries. Signal architecture usually refers to a physical layer of communications systems where information-carrying signals are shaped and transceived with a view to efficiency, clarity, and power (Calhoun, 2003). In our model, however, signal architecture represents the modes of sociality promoted within public library systems. Signal architectures structure, limit, and funnel system/actor interactions. The available signal types situate actors’
relationship with the system. Engineering and design of the library system, then, especially with respect to communication media, become normative concerns. Library systems that privilege private sphere signal processing, for example, or that close off channels that promote openness, common concern, and debate, bias the system against publicly-generated values and interests. This is the point that concerned Webster (1995), Leckie and Hopkins (2002), Buschman (2003), and Stevenson (2012). Based on the architecture we described, we believe distorted, illegitimate systems arise in two main instances. In the first instance, public libraries do not respond to environmental inputs and fail to adapt to their environments. These cases may be due to insufficient system resources, competing inputs, or signal misinterpretation. For example, in 1920 NYPL attempted to balance system resources with competing environmental demands:

During the year a committee of branch librarians made a study of differing procedures in the various branches, with a view to recommending such changes as may seem advisable, looking towards uniformity of procedure. Neighborhood conditions differ so widely that complete uniformity is not possible, but any progress in that direction will be to the advantage of both staff and public. (p. 372)

These situations are resolved by reorganizing or reallocating internal system infrastructures. Similarly, in a 1980 CLP case, many Query signals caused the system to expand its capacity:

In 1979 the Library received approximately 10,000 requests for self-health care information. To help make such information more accessible to the layperson, a Health Information Center was established as a cooperative effort of the Library, Pittsburgh's Health Education Center and the Visiting Nurse Association of Allegheny County. In addition to a specialized collection of books, the Center contains hundreds of pamphlets gleaned from health-related agencies. (p. 10)

In this case from CLP, the system eventually increased its capacity to handle an influx of Query signals. System resources limit the speed and degree of change, and input signals must be broadcast strongly and repeatedly for

![Figure 3. Signal architecture of public and private spheres in public libraries.](image-url)
system modulation to occur.

Sometimes, library systems fail to correctly interpret environmental inputs due to closed channels. For example, Engage signals may be cut off or misinterpreted by the library system as Demand signals due to a narrow Commons channel bandwidth (see Figure 4). As a result, private actors are asked to pay for services, distorting the openness of the public sphere. We found an instance of such interference in a 1910 CLP report:

There is always a demand to give the Hall free or reduce the rates. Not a month passes that someone doesn’t want special privileges, from using the foyer for a reception to using the Hall for a woman’s suffrage meeting. The question of using the foyer and the floor made for it for dancing came up early in the season. It was decided that it should not be used except for affairs of the Institute. (p. 70)

Subsequent pages in the report suggest that the hall was not used for women’s suffrage meetings that year, possibly due to the associated fee. Today, non-profit groups and private clubs can use CLP meeting spaces free of charge. The above example, however, seems to illustrate how Engage signals were blocked by the system because they were received in the Partnership channel as Demand signals.

In the second instance of illegitimate library systems, private signals are transcibed by the library unregulated. It is this instance of illegitimacy that concerns Webster (1995), Leckie and Hopkins (2002), Buschman (2003), and Stevenson (2012). Because private signals bypass media of open deliberation, library systems must harmonize private signal exchanges with public values through other, internal means. Doing so enables public discourse to determine what signals pass through, are transmitted by, or are received by the library.

The closed channel cases above and unregulated private signal cases are filtering problems. Closed channels result from over-constriction or misalignment of public sphere filters; private distortion cases result from unregulated private sphere filters. By filters, we mean internal policy associated with infrastructure and resources. To resolve filtering problems, Modulate signals must overpower filter blocks in public channels to program the system to open or close filters in private channels (see Figure 5). Publicly-generated Modulate signals can then govern the filtering process by creating intra-system Policy signals.

Library systems wary of closed channels, misfiltering, and distortions could consider increasing Modulate signal receptor sites. These receptors could then act as channel “sluices” to carry public signals to the library core (Habermas, 1996; Peters, 2008). Examples of receptor sites we found in our study were: local advisory groups; librarian participation in community meetings; outreach services; surveys and polls; and general data collection.

A concluding example from CLP in 1990 illustrates how the library system approached the challenge of aligning private signals with the values of Modulate signals:

The basic question for the planning process is “what is the ideal library system for the City of Pittsburgh?” To answer this question we will involve staff, community organizations, patrons, and government officials. Using demographic and economic data, information about users, and staff experience, we will better understand our users and their needs. To answer those needs we will have to increase our funding substantially. Thus the planning process will lead to the establishment of a formal development component for the library, enabling us to seek private dollars to supplement our government funding sources. To this end, we will address the issue of what services or collections are appropriately supported by private rather than public funds. (p. 6)
This excerpt from CLP illustrates how the library system attempted to harmonize public and private spheres to ensure legitimacy.

**CONCLUSION**

This study described how private and public spheres coexist in public libraries. Public libraries use a complex array of channels, signals, and filters to balance their public and private dimensions in a shared signal architecture. Several kinds of signal problems arise in the system, but these distortions can be mitigated through signal management and filtering.

We used our model to address the question of legitimacy, but many new questions arose. For example, how do public signals inadvertently distort private ones? What kinds of signals are inaudible in library systems or go unrecognized within public and private architectures? Given the large number of signal transfers identified in this study, another issue is signal management. When and to whom should libraries send Activate and Prompt signals? How are competing Modulate signals resolved?

More work is needed to test and refine our model. It would be helpful to consider further how received signals are taken up and acted upon by the system core to create Policy signals. Future studies could consider how private and public spheres change over time in response to societal trends. Subsequent analyses might compare and contrast the signals in libraries of different sizes, types, and environments. Signals from past and present might be compared. The present study suggests that quantitative analyses of signal architectures are possible. Future work might complement this study’s perspective with descriptions of how public library systems negotiate political power and state authority.

**REFERENCES**


