

Institutional Sources of Change in the Formal Structure of Organizations: The Diffusion of Civil Service Reform, 1880–1935

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**This paper investigates the diffusion and institutionalization of change in formal organization structure, using data on the adoption of civil service reform by cities. It is shown that when civil service procedures are required by the state, they diffuse rapidly and directly from the state to each city. When the procedures are not so legitimated, they diffuse gradually and the underlying sources of adoption change over time. In the latter case, early adoption of civil service by cities is related to internal organizational requirements, with city characteristics predicting adoption, while late adoption is related to institutional definitions of legitimate structural form, so that city characteristics no longer predict the adoption decision. Overall, the findings provide strong support for the argument that the adoption of a policy or program by an organization is importantly determined by the extent to which the measure is institutionalized — whether by law or by gradual legitimation.\***

Explanations of formal structure in organizations are as divergent as the current approaches to organization theory. Two approaches in particular have generated strong debate: one views organizations as rational actors, albeit in a complex environment (Thompson, 1967; Blau and Schoenherr, 1971), while the other views organizations as captives of the institutional environment in which they exist (Meyer and Rowan, 1977; Zucker, 1982, 1983). Both approaches have important implications for the processes underlying diffusion of an innovation in the formal structure of organizations, the first pointing to the need for effectiveness or efficiency that may follow adoption, the latter pointing to the need for legitimacy of the organization in the wider social structure. Though these two approaches are not necessarily incompatible, since organizations may adopt innovations for different reasons, they are seldom both investigated in the same empirical study.

Here, one important point of convergence is explored by using both perspectives to explain the adoption of civil service procedures by municipal governments from 1880 to 1935. Adoption of formal structure can be investigated in diverse organizational contexts; here we examine the process in cities, often used as the context for such research (e.g., Schnore and Alford, 1963; Knoke, 1982). Early adoption of civil service reform — before 1915 — appears to reflect efforts to resolve specific problems confronting municipal administrations, while later adoption is rooted instead in the growing legitimacy of civil service procedures, with the diffusion of societal norms serving to define local structure (Parsons, 1951). We first turn to a brief history of civil service reform, leading to a discussion of the institutionalization of reform. We then examine basic assumptions in the organization literature about the sources of change in formal structure to establish the basis for the analysis of adoption patterns of civil service procedures.

## HISTORY OF MUNICIPAL CIVIL SERVICE

Civil service reform represents one of the earliest attempts to “rationalize” local administration by instituting a system of written examinations for municipal appointees and by insulating administrative personnel from political influence through tenure (White, 1949; Griffith, 1974). This entailed legally invest-

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ing responsibility for personnel appointments in a central agency or commission. For the most part, civil service procedures were not required by law or other regulation from the wider environment. The only piece of national civil service legislation during this period, the Pendleton Act of 1882, dealt exclusively with federal government organizations and did not mention local or state government (Thelen, 1972). It was also a relatively "weak law that effectively allowed each administration to classify public offices as it chose" (Wiebe, 1967: 61). Only three states — New York, Massachusetts, and Ohio — adopted statewide measures for civil service reform during the time period considered here. Most city governments were not required to adopt civil service reform because they were relatively autonomous of higher level organizations, state or federal (Griffith, 1974; Gelfand, 1975).

Why, then, did cities adopt civil service procedures? Depending on the particular historian consulted, there are a number of different answers to this question. The most common answer identifies both the rampant corruption in the political machines common during this period and dissatisfaction with governmental performance, especially in service delivery (Wiebe, 1967: 4–5): "Corrupt bargains, crude force, and extralegal expedients had become the new standard. . . . The inability of city government to provide even minimum services . . . added its measure to the chaos." Other historians have stressed the role of political cleavage, in which dominant social groups maintained, or won, their position (Hays, 1964; Weinstein, 1968). In some cases, civil service reform provided the basis on which these groups could reassert their dominance over immigrant-run machines (Hofstadter, 1956; Wolfinger and Field, 1966).

With growth of the Progressive Movement, and its emphasis on scientific management (Griffith, 1974: 15), came a basis for government reform. Basically, the reform movement attempted to change the conception of the city from that of a political body to that of a business corporation, with the city "a joint stock affair in which the taxpayers are the stockholders" (Clinton, 1886; Crandon, 1886–1887: 524). Reformers engaged in a series of highly publicized struggles to promote municipal reforms in almost every major city (Wiebe, 1967: 168). The first city passed legislation requiring civil service in 1884; by 1935, over 450 cities across the United States had enacted some type of civil service legislation (Van Riper, 1951). Thus, by 1935 the transformation of city government from a politically based system to a bureaucratically based system was well underway (Hays, 1972: 9).

## **INSTITUTIONALIZATION OF REFORM**

Civil service reform thus took place during a period of general ferment over the role and shape of government organizations. Some of the reforms proposed during this period were adopted by very few governments; other reforms, such as the commission form of government, were widely adopted but were rapidly eclipsed by new innovations. Such reforms are more typical of those previously investigated in diffusion studies; these traditional explanations rest largely on investigation of innovations that failed to be institutionalized. Two principal characteristics that indicate the relatively high degree of institutionalization of civil service reform set it apart from the other reforms proposed

and implemented during this period: (1) its most rapid spread occurred after the initial ferment subsided, indicating that it was taken for granted, and (2) it is the most permanent and widespread of all reforms accomplished during this period. Both of these characteristics are independent of the major dependent variable, adoption, which we used in our analysis.

Turning to the first point, the most acrimonious debates over civil service procedures occurred before 1900; after 1910 the procedures were generally discussed without much conflict, and by 1920 civil service procedures were accepted as the proper way to conduct city business (Schiesl, 1977: 187). Table 1 summarizes data coded from the major publication of the National Municipal League, a federation of local organizations active in the promotion of civil service reform. A content analysis of the proceedings of the League's annual meeting and of papers delivered at each meeting was carried out for five years – 1894, 1900, 1905, 1909, and 1915. These records were coded in two ways. First, the total number of times a topic related to civil service reform was mentioned was counted in each yearly report. Such mentions were divided into two categories: criticisms of existing arrangements (e.g., references to spoils, machines, or political patronage), and procedures for implementing the reform (e.g., merit systems, promotion systems, and performance evaluation). Second, the total amount of space devoted to discussing any of the topics was measured, yielding a summary number of pages for each year. In order to control for the length of each report, which varied considerably from year to year, each summary measure was divided by the total number of pages in the report for that year.

Table 1

**Content Analysis of Civil Service Discussion over Time, 1894–1915\***

Publication date	Stimulus for reform† Mean (S.D.)	Implementation‡ Mean (S.D.)	Space devoted to civil service reform
1894	5.77 (1.08)	1.43 (2.23)	.041
1900	9.87 (2.99)	3.87 (1.70)	.060
1905	2.60 (1.45)	2.77 (2.80)	.020
1909	2.07 (0.67)	1.97 (2.00)	.016
1915	.20 (0.17)	.60 (0.60)	.018

\*See Appendix for sources. All data taken as a proportion of the total number of pages.

†Coded as mentions of spoils system, patronage, machine politics.

‡Coded as mentions of merit system, promotion system, performance evaluation.

Exhortations concerning the evils of the former governmental systems, providing the stimulus for reform, showed a dramatic decrease between 1900 and 1905. Discussion of the more technical aspects of implementation (merit systems, promotion, and performance evaluation) followed a similar pattern, though neither the rise from 1894 to 1900 nor the decline from 1900 to 1905 was as sharp. The proportion of pages devoted to general discussion of civil service reform showed a similar, though less marked, decline after 1900. These data indicate, then, that direct agitation for civil service adoption peaked in 1900 and declined considerably thereafter. Since the rapid rise

in adoption occurred after 1915, it appears to have occurred in the context of the recognized need for new procedures, rather than as a result of extensive direct pressure (or of regional diffusion, which had only a weak effect).<sup>1</sup> In general, then, the reduction in the amount of debate and discussion of the stimulus and implementation of the reforms in the League's proceedings indicates that the reforms had increasing legitimacy and were more taken for granted.

Turning now to the question of permanence, regardless of whether the procedures were transmitted through state regulation or gradual adoption by municipal governments, civil service reform caused changes in city government organization that became enduring elements of structure. Cities seldom discarded civil service once it was adopted, and federal and state legislation after 1935 increasingly required the use of local civil service procedures. The rapid institutionalization of the reform rested on the assumed isomorphism between it and the ideal rational bureaucratic form (Zucker, 1983). Government organizations, increasingly oriented to service delivery, were modeled after the business corporation, where personnel selection and promotion were presumably based on merit, not familial or other personal ties. Other municipal reforms promoted during this period, such as the city manager form of government, nonpartisan ballots, and city-wide elections, also reflected the drive to "rationalize" municipal administration.

A hundred years after their initial introduction, civil service structure and procedures are nearly universal. Hence, one of the key defining elements of institutions — "establishment of relative permanence of a distinctly social sort" (Hughes, 1936: 180) — is present in the case of the civil service. Local government structure became clearly patterned by the wider culture over time; civil service procedures became ubiquitous.

### CHANGE IN THE FORMAL STRUCTURE OF ORGANIZATIONS

Institutionalization refers to the process through which components of formal structure become widely accepted, as both appropriate and necessary, and serve to legitimate organizations. Most fundamentally, the process is one of social change. This process may occur in different ways (Hernes, 1976): (1) initial endogenous change may take place when the process is gradual and not required and/or (2) exogenous change may take place later in the process or when the process is required. That the different processes of change are not incompatible can be seen in their mutual influences over the course of civil service reform. Before examining this in more detail, some general perspectives on sources of organizational structure need to be considered.

For the most part, organizational theorists have analyzed formal structure as if it were static, focusing on its sources at one point in time. Radically different views of these sources have emerged. In one view, formal structure arises from internal sources, either directly (Scott, 1975) through problems of coordination and control (e.g., Anderson and Warkov, 1961; Woodward, 1965; Blau, 1970) or indirectly (Aldrich and Pfeffer, 1976) through power, leadership, and socialization to specific organizational roles, often mediating environmental effects

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Of course, not all variables related to adoption can be explored here. We focus on those identified by historians of this period as most significant. Unlike most other studies of reform processes (e.g., Knoke, 1982), regional differences were nonsignificant except in the case of the South which, as expected from prior research, lagged behind the other regions. Tables showing this data are available from Pamela S. Tolbert. Although the southern states were tardy in adopting civil service reform, excluding them from the analysis below had virtually no impact on the results; they were therefore included.

(e.g., Child, 1972; Thornton and Nardi, 1975; Pfeffer and Salancik, 1978). From the other viewpoint, formal structure arises from external sources, from the direct effects of the institutional environment. In order to survive, organizations conform to what is societally defined as appropriate and efficient, largely disregarding the actual impact on organizational performance (Meyer and Rowan, 1977: 353; Zucker, 1982).

These perspectives are not incompatible, but rather point to conditions under which changes in the formal structure of organizations will derive from internal or institutional sources. Before changes in formal structure become societally legitimated and/or required, they are adopted — much as is any other innovation — through a process of diffusion depending in large part on the value of the changes for the internal functioning of the organization (Utterback, 1971; Aldrich, 1979). It is not always easy to assess this, of course, especially when the outputs of the organization are difficult to evaluate. Under these conditions, the need for changes will often be determined by the lack of consensus, or degree of conflict, within the organization (Cyert and March, 1963; March and Olsen, 1976; Pfeffer, 1981). Fundamentally, existing structure comes to be viewed as problematic, and the “logic of good faith” (Meyer and Rowan, 1977) is disrupted. Therefore, to the extent that an organization is an early adopter of an innovation in formal structure, its decision to adopt will depend on the degree to which the change improves internal process (for example, by streamlining procedures or reducing conflict).

In contrast, once historical continuity has established their importance (Berger and Luckmann, 1967; Zucker, 1977), changes in formal structure are adopted because of their societal legitimacy, regardless of their value for the internal functioning of the organization. When some organizational elements become institutionalized, that is, when they are widely understood to be appropriate and necessary components of efficient, rational organizations, organizations are under considerable pressure to incorporate these elements into their formal structure in order to maintain their legitimacy. By doing so, “an organization demonstrates that it is acting on collectively valued purposes in a proper and adequate manner” (Meyer and Rowan, 1977: 319). This may be necessary to ensure access to various resources that the organization needs for survival (in the case of cities, favorable bond ratings, membership in some national organizations, state or federal funding, etc.). It is assumed that the adoption of an innovative measure may have little or no effect on the actual efficiency of organizational operations; its adoption fulfills symbolic rather than task-related requirements. Hence, to the extent that an organization is a late adopter of an innovation in formal structure, its decision to adopt will depend on the degree to which there is a common understanding that the change is necessary for efficient organizational performance (Walker, 1969).

Two basic problems are confronted here: What is the effect of explicit hierarchical legitimation of a reform, and what is the effect of rapid and widespread legitimation of a reform on its subsequent adoption? The first analysis compares the effect of hierarchical control by the state with the effect of nonmandated spread of reform on the rate of adoption. In the second

analysis, changes in the ability to predict adoption on the basis of particular organizational characteristics from the early periods to the later periods are explored in detail. It is expected that when innovations are rapidly institutionalized, early adoption can rest on either the force of the hierarchical structure that requires the reform or on particular characteristics that make it appropriate to adopt the reform; however, while particular characteristics may predict early adoption, they lose their explanatory power rapidly.<sup>2</sup> In contrast, if the adoption fails to become legitimated, the same characteristics that predict early adoption continue to predict which units are more likely to adopt throughout the time period (Hamblin, Jacobsen, and Miller, 1973: Ch. 7). In such cases, regional effects and particular sets of characteristics, such as high status, that identify a set of "innovators" emerge as central predictors of adoption (Rogers, 1962).

### LAW AND HIERARCHICAL LEGITIMATION

In organizational networks in which the control of resources and authority is centralized in a few powerful organizations, the institutionalization of an element of formal structure is largely dependent on its legitimation by those organizations (Benson, 1975). Once legitimated by higher level organizations, through legal mandate or other formal means, dependent organizations generally respond by rapidly incorporating the element into their formal structure. This adoption is seldom problematic when the elements have high face validity and there is common agreement concerning their overall utility. However, under certain conditions, strong resistance can develop. For example, lack of consensus on the value of an innovation, such as curriculum reform in public schools (Rowan, 1982), can lead to failure to adopt or to early rejection of the innovation. In addition, strong coalitions or interest groups can block a hierarchically mandated change, as happened with busing to integrate schools.

We do not explore the conditions underlying such resistance; it is important simply to note that legal requirements do not always ensure adoption. In the case of civil service, states, such as Wisconsin, with strong interest groups that opposed adoption failed to pass statewide measures. However, in states where there was little organized opposition, and consensus concerning the potential value of the innovation was high, the speed and pattern of diffusion among cities under state mandate are expected to reflect the degree of hierarchical legitimation; diffusion will occur from the state to each city, rather than among cities. When states pass laws requiring municipal civil service, it is expected that there will be a landslide effect in the first year of implementation of the law, with the state influencing the remaining cities to adopt in subsequent years. These effects should be apparent in the three states adopting such laws during the time period investigated here.

### Sample

Adoption was defined as the passage of any legal requirement for the institution of civil service procedures. In most cases, civil service requirements affected only parts of city government; fire and police departments were frequently the first affected. Data on adoption of civil service procedures, 1880 to 1935, were collected for 167 cities. Of these 167 cities, 74 are located in the three states that adopted civil service reform requirements for all

#### 2

Work to date on the adoption process has been largely descriptive, providing few predictions that generalize beyond a particular case. In this paper we do not attempt to construct an explanation for all types of adoption processes but to specify a particular class of adoption situations to which our generalizations are expected to apply. There are a number of important relations that we do not consider here. First, different modes of gradual adoption are not considered. The innovation may produce a striking increase in effectiveness or efficiency and be rapidly adopted on "rational" grounds, or as in the case of a technological innovation, the value may be assessed as superior and the innovation may be rapidly adopted simply on the basis of professional opinion. Second, we do not explore sources of resistance. Some adoptions, even when supported by professional opinion, meet with much more resistance than others (e.g., computerized accounting systems in small businesses or fluoridation of city water supplies). Finally, we explore only a limited set of factors that may lead to adoption, though we have focused on those identified by historians as most significant.

cities prior to 1930 and 93 are in states that had no such requirement.

Statewide laws requiring municipal civil service were passed by New York in 1883 and by Massachusetts in 1884. Ohio made civil service mandatory for fire and police departments under its municipal code in 1902; this code was extended in 1908, and in 1912 municipal civil service was given constitutional status (Griffith, 1974). In the analysis of the three states mandating civil service, the 74 cities having a population of 50,000 or greater in 1930 were included. Data were aggregated for the three states requiring adoption both because of the small sample size and because initial analyses indicated no significant differences in the patterns of adoption between states.

The 93 cities located in states that did not mandate civil service were drawn from a sample of 150 cities randomly selected from a sampling frame of all cities having a population over 25,000 in 1930, stratified by size. The cities were selected from the 150 by using two criteria: (1) cities of less than 50,000 were excluded, because data on smaller cities proved extremely scanty, particularly in the earlier decades, and (2) cities in states mandating civil service were excluded.

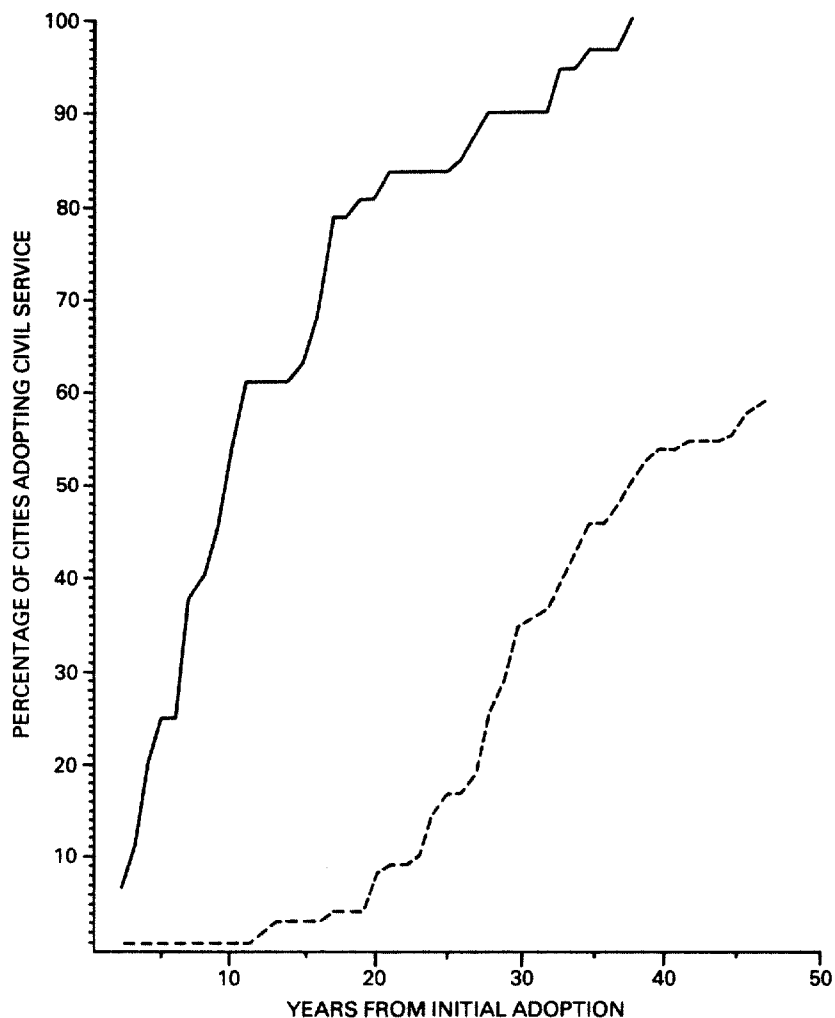
The data sources for all the analyses reported in this paper are listed in the Appendix. Charles N. Halaby and M. Craig Brown initially conceived of a longitudinal quantitative study of the adoption of civil service systems by American city governments. The Civil Service Reform League reports that make such a study possible were brought to our attention in 1977 by them.

## Findings

In the Figure, which plots the actual time of adoption of civil service procedures, 1880 to 1930, we can compare the differences in the rate of adoption of civil service reforms between cities in states that required it and those that had no requirements. When adoption was required by the state, the rate of adoption was rapid. Within the first ten years, over 60 percent of all cities adopted civil service procedures; then the rate slowed, but all cities have adopted within 37 years. In sharp contrast, cities with no such requirement initially adopted much more gradually. In the first fifteen years the rate of adoption was low. After this period, however, the rate of adoption progressively accelerated over time. At the end of the time period considered here, a little over 60 percent of these cities had adopted civil service procedures, their rate of adoption about equal to that reached after ten years by cities required to adopt.

There is also some evidence that the underlying process of adoption is different for these two groups of cities. Two models, incorporating different assumptions about the sources of diffusion, were estimated for both groups of cities (Coleman, 1964: 495–505). Both models were operationalized using algorithms developed in Zucker (1975). Cities that adopted civil service procedures when no statewide requirement existed can be treated as sets of small separate groups, with full communication between some but no communication between others. Using a diffusion model of decentralized influence, the overall fit was acceptable, though the estimated values diverged from

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—Adoption by cities in states mandating adoption ( $R^2 = .99$ , Error = .038)  
---Adoption by cities in states not mandating adoption ( $R^2 = .89$ , Error = .408)

**Figure.** Rate of adoption of civil service by cities over 50-year time period.

the actual values in both the initial adoption period (overestimated) and the adoption after 1912 (underestimated). In contrast, in those cities that adopted civil service procedures when the state required it, diffusion from the source was almost immediate, so that adoption by cities in the first year does not fit a diffusion model, even one that assumes centralized influence. In our case, over a third of the sample adopted procedures in that first year, creating a landslide rather than a diffusion effect. However, the remaining years showed a pattern of single source diffusion that yielded a close fit between the actual and estimated values. Hence, as these results demonstrate, two fundamentally different patterns of adoption, resting on different processes, occurred as cities adopted civil service procedures.<sup>3</sup>

### GRADUAL ADOPTION PROCESS

We argue that, when not mandated by state government, civil service was adopted at first in response to conflict generated by different conceptions of the appropriate role and function of



municipal government held by older, established groups and/or community business leaders, and those held by lower status groups in the community, particularly the politically organized immigrants. In line with work by historians on civil service adoption and by students of municipal structure, we expect early adopters of civil service reform to have a relatively larger foreign-born population, more middle class members (smaller proportion of manufacturing wage earners and illiterates), and a narrow scope of administration (lower municipal expenditures). It is also expected that they will tend to be larger and younger than nonadopters, although the overall effects of age and size are somewhat unclear since they are apt to be inversely related to adoption. These variables are discussed in more detail below.

Our prediction, in contrast to the earlier research, is that while these variables are important determinants of the adoption of an innovation early in the process of its diffusion, they become relatively poorer predictors as the reform measure becomes more institutionalized. Over time, adoption is expected to become independent of internal factors, as external definitions of modern municipal administration become more significant. In line with earlier empirical work on institutionalization (Zucker, 1977), it is expected that as a reform measure is increasingly taken for granted because of social legitimation, cities will begin to adopt it as a "social fact," regardless of any particular city characteristics. Hence, the ability of these city variables, taken as a whole, to differentiate between adopters and nonadopters should progressively decline. It is also possible that the effectiveness of a particular variable may change, such that it becomes a relatively better or poorer predictor at different points in time; our primary concern here, however, lies not in tracing the effects of specific city characteristics on adoption, but in assessing the effects of overall differences between adopters and nonadopters over time.

We do not assume that a particular set of characteristics is always or usually related to adoption of innovation, but rather that those characteristics that make it more "rational" to adopt will be important early in the diffusion process. This may explain why no consistent set of characteristics predisposing individuals or organizations to adopt innovations have been discovered, despite considerable research aimed specifically at characteristics as explanatory variables (Downs and Mohr, 1976). Each specific innovation should be related to a set of adopter characteristics, only some of which will overlap with other innovations unless they are linked to a common justification.

### **City Characteristics and Reform: Measures**

Before turning to the analysis, the characteristics that have previously been identified as predictors of adoption of civil service reform need to be more fully discussed. While civil service reform was promoted by the Progressive Movement as increasing the efficiency and effectiveness of the administration of local government (Woodruff, 1903; Thelen, 1972), some historians have argued that civil service reform was used as a political weapon by social groups (the industrialists or the middle class) to gain or maintain their political dominance (e.g., allowing them to define administrative positions in such a way as to virtually ensure the appointment of the group's members to municipal office).

**Immigrants and reform.** Local reform efforts have often been viewed as a response to the growth of machine politics associated with the tremendous influx of immigrants into American cities during the late nineteenth and early twentieth centuries (Hofstadter, 1956; Wolfinger and Field, 1966). Since civil service reform eliminated political patronage, it represented a particularly effective way for the traditional Anglo-American elites to attack immigrant-dominated machines by: (1) establishing criteria for appointment to office, including standards of education or literacy that were difficult for immigrants to meet, and (2) establishing rules governing tenure, to protect appointees from patronage-induced turnover in city government (Hays, 1964; Gordon, 1968). According to this argument, reform would be most common among cities with large foreign-born populations, where tensions between older Anglo-American groups and newly arrived immigrants would be highest. This is measured here as the percentage of the population that is foreign-born.

**Socioeconomic bases of reform.** Receptivity to municipal reform has also been linked to the socioeconomic composition of a city, with the supporters of reform coming from the educated and professionalized middle class. Two different interpretations both suggest that municipal reform received its most enthusiastic support in cities with a large proportion of educated, white-collar citizens. On the one hand, the basic values of the newly emerging middle class — efficiency, impartiality, rationality — were most consistent with those underlying reform (Wiebe, 1967); on the other hand, however, middle class reformers were motivated by pragmatic concerns of securing representation of their political and economic interests in local government (Hays, 1964; Weinstein, 1968). The socioeconomic composition of a city was measured in two ways: the percentage of illiterates was used as a measure of the level of education in a city, and the number of manufacturing wage earners (residualized on city size)<sup>4</sup> was used as a rough index of the concentration of members in blue-collar occupations. Both were expected to be inversely related to the adoption of civil service reform.

**Scope.** A third factor that has been suggested to have affected the adoption of reform is scope, or the number of functions performed by local government (Liebert, 1976; Turk, 1977). According to this argument, cities with broader scopes encouraged the development of competing special interests and higher levels of political activity by offering greater opportunity for political influence. These cities tended to have higher resistance to reform, because reform measures frequently limited accessibility to formal leadership positions. In contrast, cities in which "narrow scope presumably limited the relevance of the government and of its leadership vis-à-vis many types of possible interests" had higher rates of reform (Liebert, 1976: 97). Total municipal expenditures (residualized on city size) were used as an indicator of governmental scope;<sup>5</sup> this variable was expected to be inversely related to the adoption of civil service reform.

**Age.** Another possible determinant of the adoption of reform is city age. According to Stinchcombe (1965) and several recent empirical studies (Kimberly, 1975; Liebert, 1976; Meyer and Brown, 1977), the formal structure of an organization tends to

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To reduce problems of multicollinearity, both the number of manufacturing wage earners and municipal expenditures (discussed under "Scope") were linearly regressed on the log of city size (Maddala, 1977).

5

Liebert's (1976: 33) research indicates that this measure is strongly correlated with the number of functions performed by municipal governments ( $r = .72$ ).

reflect the historical era in which it originated, since organizations generally adopt and retain the form that was predominant at that time. By this reasoning, it would be expected that younger cities, those that were just beginning to develop when the municipal reform movement swept the country, would be more likely to adopt reforms than older cities whose municipal structures were already well entrenched and often supported by vested interests (see Williamson and Swanson, 1966, on age of city and adoption of industrial innovations). Age was measured as the year in which a city became incorporated; age therefore remains the same for each city throughout all the time periods. Given this measurement, age is expected to be positively related to adoption of civil service reform.

**Size.** A final factor that has also been linked to the adoption of municipal reform is city size. Although studies of different types of reform measures have found size to have a varying impact on adoption (e.g., Kessel, 1962; Schnore and Alford, 1963), studies that have specifically examined civil service reform have found a simple positive relationship between the adoption of the reform and city size (cf., Wolfinger and Field, 1966). City size was logged to normalize its distribution.

### Data and Analysis

The effect of these variables on cities' adoption of civil service measures was analyzed using a proportional hazards regression model (Cox, 1972). First developed in the biological sciences, models of this type have been adopted by social scientists to explore a variety of phenomena (cf., Hannan, Tuma, and Groeneveld, 1978; DiPrete, 1981; Carroll and Delacroix, 1982). A central advantage of these models over other cross-sectional approaches, such as logit or probit, is the explicit incorporation of the timing of changes in a qualitative dependent variable (Carroll, 1982). Essentially, the objective is to model the instantaneous transition rate, or the transition probability of moving from one discrete state to another over an infinitesimally small unit of time. Thus, the transition rate between state  $j$  and state  $k$ , where  $p$  is the probability of such a transition, is defined as

$$h_{jk}(t) = \lim_{\Delta t \rightarrow 0} \frac{p_{jk}(t, t + \Delta t)}{\Delta t}$$

This hazard rate may depend both on time and on a set of exogenous variables.

Here we use partial likelihood estimation procedures, based on work by Cox (1972). This approach requires less information for estimation and makes weaker parametric assumption than full likelihood methods. With partial likelihood, the likelihood function has two components, one that rests on the order of events and another that rests on the exact timing of the events. Maximization of the likelihood function is based only on the first component; thus, correct ordering of the events is required. Estimators obtained with this procedure, like full likelihood estimators, have excellent asymptotic properties (Tuma, 1980).

The general form of the model is

$$h_{jk}(t | X) = h_0(t) \exp(\beta X)$$

or

$$\ln\{h_{jk}(t | X)/h_0(t)\} = \beta X.$$

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where  $h(t)$  is the hazard function, or the rate of leaving a particular state among a set of units, in this case, moving from nonadoption of reform (0) to adoption (1).  $X$  is a vector of covariates,  $\beta$  is a vector of regression coefficients and  $h_0(t)$  is a hazard function for a unit with  $X = 0$  (Hopkins, 1981).

**Data.** The data sources for adoption have already been discussed and are fully presented in the Appendix. Also listed in the Appendix are the sources of data on city characteristics, gathered from the decennial censuses, from 1890 to 1930. Missing data were estimated using regression to generate predicted values (Maddala, 1977). Only in one case, the percentage of illiterates in the population in the first time period, was estimation unreliable; the variable was excluded from the analysis in that period.

Unfortunately, the definitions of some of the independent variables changed over time and were noncomparable. This problem is frequently encountered in the use of early census data. As a consequence, pooling of the data is not possible. When these data are treated as comparable, serious estimation errors undoubtedly occur, since some central measures, such as the basic definition of manufacturing industries, changed dramatically during the fifty-year period. While a single analysis can be used if the changed definitions are entered as new variables, interpretation is problematic. Therefore, four separate successive analyses of the adoption of municipal civil service reform were conducted (see Williamson, and Swanson, 1966, for a similar resolution of the problem).

In the first analysis, the effects of the independent variables, as measured in the 1890 Census, on the transition rates for cities adopting civil service measures between 1885 and 1904 were examined. During this timespan only a small proportion of cities (about 11 percent) formally contracted with a commission or board to set standardized personnel requirements for municipal employees. Similarly, in the second analysis, the effects of city characteristics (measured ten years later) on the rate of adoption between 1905 and 1914 were again examined; cities adopting the measure in the previous period were excluded from the analysis. This procedure was repeated for the third and fourth analyses, of rates of adoption between 1915 and 1924, and between 1925 and 1934. In each analysis, city characteristics as measured in the decade just preceding the adoption period were used as predictors. Our objective, then, was to assess the continued effectiveness of these characteristics in predicting the rate of adoption over time.

## Findings

The results of the analyses are presented in Table 2. For each independent variable, the top row shows the parameter estimates, the second row the standard errors of the coefficients, and the third row the exponential raised to the power of the coefficient. This last row indicates the proportion of change in the adoption rate induced by a change of the predictor variable by one unit. When a variable has no effect, this value is 1.0. A value greater than unity indicates a positive effect; less than unity indicates a negative effect. For example, 1.1 indicates a 10 percent increase in the adoption rate, while .9 indicates a 10 percent decrease per unit change.

Table 2

**Proportional Hazards Model of Civil Service Adoption over Time, 1885–1935**

Time period		Percentage foreign-born	Percentage illiterate	Manufacturing wage earner†	Municipal expenditures	Log size	Age	-2 log 1	Model chi-square	Model D
1885–1904 (N = 83)	B	.114***		-.406***	-1.657	.487*	.009	63.27	15.52	.51
	SE	.040	*	.888	.910	.326	.016		( $p < .008$ )	
	exp (B)	1.120		.666	.191	1.627	1.009			
1905–1914 (N = 74)	B	.056**	-.069	-.070	.034	.383*	.0001	175.67	15.77	.35
	SE	.027	.079	.550	.661	.249	.008		( $p < .02$ )	
	exp (B)	1.058	.933	.932	1.035	1.467	1.000			
1915–1924 (N = 52)	B	.029	-.279**	.569	.299	.325	.016	104.07	10.38	.35
	SE	.030	.127	.863	1.267	.428	.013		( $p < .11$ )	
	exp (B)	1.029	.757	1.766	1.349	1.384	1.016			
1925–1934 (N = 39)	B	.021	-.006	-.296	-1.361	-.766	-.010	57.25	2.04	.17
	SE	.040	.171	.742	1.734	.651	.016		( $p < .50$ )	
	exp (B)	1.020	.994	.744	.256	.465	.990			

\* $p < .01$ ; \*\* $p < .05$ ; \*\*\* $p < .10$ 

\*Excessive missing data; no reliable estimate possible.

†Residualized on city size.

However, we are less interested in the effects of specific variables than in the overall fit of the model containing the variables in combination, since historians generally identify these as a cluster and since they might be expected to interact with each other. Harrell (1979) has argued that the D statistic can be interpreted analogously as the more familiar  $R^2$ , but this interpretation is not widespread. Consequently, we focus on the chi-square statistic and its significance level; both statistics, however, lead to the same conclusion.

The data provide strong support for our predictions. In the first period, the overall model chi-square is significant beyond the .01 level ( $p < .008$ ). In the second period, the effects appear to be weaker, as the overall significance level is lower and fewer of the independent variables have significant coefficients. The predictive power of the variables as a group continues to weaken through the third period and drops very sharply in the fourth period. The initial good explanation and the steep decline in explanatory power in the last time period are consistent with our expectations. As the process of adoption continues, the characteristics of cities become increasingly less relevant to the adoption process.<sup>6</sup>

It is clear from the effects of the individual city variables reported in Table 2 that the decision to adopt in the early time periods was based to a significant degree on those characteristics historians have described as important predictors of adoption of civil service procedures, those related to reducing conflict and to streamlining the internal functioning of city government. In both the first and second time periods, the percentage of foreign-born and city size exerted significant influence on the adoption process in the expected direction. Also as predicted, in the first time period middle-class cities (those with a smaller proportion of blue-collar workers), were more likely to adopt the reform. However, as the process of adoption continued, the characteristics of cities were less frequently significant predictors of adoption. Only one variable, the percentage of illiterates, emerged as significant in the third time period; no variables were significant in the last time period.

<sup>6</sup> Some suggestive results were obtained using a continuous version of the dependent variable (year of adoption) that showed an even more striking decrease over time in the proportion of variance explained after correction for sample size. For further information, contact Pamela S. Tolbert.

Table 3

**Means and Standard Deviations of City Characteristics over Time, 1885-1935\***

Time period	Percentage foreign-born	Percentage illiterate	Manufacturing wage earner†	Municipal expenditures†	Log size	Age	Proportion adopting
1885-1904 (N = 83)	.2172 (.1173)	‡	-.0075 (.4487)	-.0000 (.3818)	3.8581 (1.072)	1849.88 (29.1994)	.0968 (.2973)
1905-1914 (N = 74)	.1767 (.1066)	6.9025 (4.8043)	-.0096 (.4614)	-.0116 (.3968)	3.9973 (1.1049)	1849.71 (30.4510)	.2976 (.4600)
1915-1924 (N = 52)	.1577 (.1192)	5.4500 (3.2914)	.0399 (.5637)	-.0653 (.3165)	4.1660 (.9712)	1850.19 (31.4503)	.2881 (.4568)
1925-1934 (N = 39)	.1332 (.1216)	4.8809 (2.7061)	-.0288 (.6031)	-.0417 (.3085)	4.5989 (.6721)	1847.76 (33.1720)	.1905 (.3974)

\*Standard deviations in parentheses.

†Residualized on city size.

‡Missing data.

A major competing interpretation of the results can be eliminated by examining the changes in variance over time in city characteristics. It is clear from Table 3 that the variance does not decrease systematically over time.

### CONCLUSIONS AND IMPLICATIONS

Our hypotheses concerning the changing sources of formal structure received considerable support in all analyses carried out here. Civil service procedures were adopted much more rapidly by cities when the state mandated them and the process of adoption was directed by a single source. In contrast, when no state-level legitimation occurred, civil service procedures were adopted gradually, diffusing largely through social influence among cities. Most important for organizational theory, however, are the findings that internal organizational factors predicted adoption of civil service procedures at the beginning of the diffusion process, but did not predict adoption once the process was well underway. As an increasing number of organizations adopt a program or policy, it becomes progressively institutionalized, or widely understood to be a necessary component of rationalized organizational structure. The legitimacy of the procedures themselves serves as the impetus for the later adopters. These findings permit a partial integration of the generally conflicting approaches focusing on the internal or the institutional sources of formal structure. In addition, they reassert the critical role of history for understanding organizational structure and its change (Stinchcombe, 1965; Meyer and Brown, 1977).

The results reported here also have implications for two major areas of research that we did not directly address. First, treatment of the spread of innovation in a general theoretical framework permits the researcher both to gain more insights into the processes at work and to obtain more precise specification of expected differences in patterns, rates, and correlates of diffusion. The ad hoc quality of most diffusion studies (e.g., Brown and Philliber, 1977) has made cumulative development nearly impossible except when the substantive diffusion is exactly the same, like the diffusion of hybrid corn, as discussed by Feller (1967). In contrast, we expect that our model can be

applied to a wide range of phenomena. For example, when diffusion patterns are suddenly truncated early in the process, we expect that there was a failure to legitimize the change and the characteristics that initially predicted adoption will remain good predictors throughout the process. In fact, this may well explain the pattern of the diffusion of some innovations in education, though the available data are not sufficient for a test (Rowan, 1982).

Second, the results have implications for methodology. The use of cross-sectional data and the measurement of city characteristics with available data, not from the historical period under investigation, has been customary in research on the adoption of municipal reforms by city governments (cf., Sherbenou, 1961; Kessel, 1962; Schnore and Alford, 1963; Wolfinger and Field, 1966; Lineberry and Fowler, 1967). The results reported here should make it clear that such methodological shortcomings may introduce serious biases into the data: (1) these studies of municipal reform neglect the fact that contemporary data may not accurately reflect the city's standing on various characteristics at the time the reform was actually adopted and, thus, it is difficult to be certain whether present-day differences between "reformed" and "unreformed" cities are causally or consequentially related to the adoption of the reforms, and (2) these studies, by relying on cross-sectional designs, ignore the fact that adoption of reforms by cities occurred over time and that factors influencing adoption may have varied from one point in time to the next. A city characteristic important in predicting early adoption may be irrelevant twenty years later.

Thus, the approach and results presented here have implications, both theoretical and methodological, for studies of change in the formal structure of organizations, for studies of innovation and diffusion, and for studies of adoption of reforms by municipal governments. But, most significant in terms of the goals of our research, the boundaries between the rational and the institutional approaches to organizations have been more clearly specified and the central role of history in understanding organizations confirmed. An adoption process rooted in the internal needs of the organization can become over time a process rooted in conformity to institutional definition.

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