# What Development Regulatory Variables Say—or Don't Say—About A Municipality

Author Thomas A. Musil

Abstract

Little is known about how regulatory development variables reflect and define a community. This paper explores the correlation of development regulatory variables with broader community measures in 68 municipalities in the Twin Cities area of Minnesota. Coefficients of determination, correlation coefficients, principal component analysis, and factor analysis were used to compare development regulatory data with broader municipal measures. The hypothesis tested is overarching: that a municipality's development regulations and processes correlate to general measures of community composition. The strongest and only significant correlations found were in the municipal use of tax increment financing and commercial/industrial property values, non-residential construction activity, population, and multi-family building permit activity.

Land use regulations and regulatory processes are often the most critical variables affecting the success and profitability of commercial and industrial real estate development projects. The real estate development process involves three major groups: a consumer group, a production group, and a public infrastructure group (Graaskamp, 1981). Real estate development students learn early on in their education that the public sector is the developer's partner (Miles, Berens, and Weiss, 2003) in all transactions. Peiser and Frej (2003) concluded that land development regulation is so complicated that a book would be required to describe the multiple forms of public sector control encountered by developers.

Municipal land use regulations represent the most significant market intervention undertaken by state and local government (Hanushek and Quigley, 1990), yet our knowledge and understanding of how local government regulatory processes influence development and the communities in which they are built are limited and are rarely investigated. Evenson and Wheaton (2003) report the difficulty of obtaining consistent information across multiple jurisdictions as a primary reason that there has not been greater study of zoning regulation. Similarly, Sheppard (1988) noted that several studies on land use regulation and zoning have found that development controls are rarely applied with the uniformity upon which they have been modeled. The study of comparative local development regulatory

practices is complicated by differences among communities and by the unique nature of each development project and political jurisdiction.

This paper evaluates development regulatory processes and community attributes across 68 jurisdictions in the Twin Cities Metropolitan Area of Minnesota. The research tests and examines what correlations exist between commercial and industrial development activity and community characteristics. To accomplish this task, the research compares commercial and industrial development data with broader community measures. Community measures include the level of tax increment financing, amount of municipal commercial and industrial property value, value of non-residential construction, household income, population, and population change.

## Commercial/Industrial Land Use Regulation and Project Approval Timeframes

The private sector real estate development community has continually raised questions regarding development regulatory processes and fee structure for municipal development approvals. Project delays resulting from land use approvals can be costly for developers and can undermine a project's competitive marketplace advantage. The Vancouver Canada Chapter of the National Association of Industrial and Office Properties (NAIOP) started a Municipal Report Card Study (Vancouver NAIOP, 2004) to measure the development costs and project approval timeframes among 20 municipal jurisdictions in the Vancouver metropolitan area. The survey presents each municipality with a proposal to construct a 50,000 square foot commercial/industrial building on a 2.5-acre site. Each municipality completes the survey by supplying project cost data and approval timelines. This annual study evaluates the development fees charged for water and sewer connections, security deposits, letters of credit, permits, subdivision fees, rezoning fees, and taxes. Questions on approval timelines address the number of days required for design review, rezoning, processing permits, subdivision approval, and building permit approvals.

The Minnesota Chapter of NAIOP started a similar city survey in 2004 that seeks comparative information on municipal development approval timeframes and fees. The Minnesota survey measured the costs associated with a development project in 78 municipalities in the greater Twin Cities Metropolitan Area. The survey identified locally imposed costs and processing timeframes for the planning, development, and construction of a $2,750,000 pre-cast concrete office warehouse building on an unplatted 8.2-acre residential site. The survey obtains information from each municipality on the timeframes for pre-application design review, the rezoning process, the preliminary and final plat review process, and several permitting processes. The following are examples of the type of fees collected from each city for the proposed project: rezoning, preliminary plat review, final plat review, grading and utility charges, building permits, plan review fees, utility permits, and park fees.

Commercial and industrial developers commenting on how to improve the city-developer relationship identified the need to make the development process more predictable and consistent, the need for city staff to provide accurate and timely information, and the desire for greater flexibility on the part of municipalities when evaluating concessions and subsidies. The major factors that Twin Cities' area developers identified in selecting a city in which to develop were: the cost of development, city attitudes towards developers, degree of business subsidies, and pre-construction scheduling and processing timeframes (Minnesota NAIOP, 2005).

The goal of the survey is "to assist its members, city governments and the general business community in understanding the importance and impact of these local costs on new business investment and economic development," (Minnesota NAIOP, 2004). This extensive data collection endeavor results in the collection and publication (in road map form) of 32 categories of development costs and timeframe data. For the 78 municipalities that responded to the 2004 survey, this represents about 2,500 spreadsheet cells not counting comments or footnotes.

The value and use of data on municipal development timeframes and fees is important in two ways. First, collection of this information allows the development community to compare approval practices among communities and second, the annual collection of this information enables industry groups to measure how municipal fees and processing timelines change over time. For municipalities wishing to increase their commercial and industrial tax base, industry surveys can be helpful in that pro-development cities can differentiate themselves from other municipalities. The information collected in the Minnesota NAIOP survey is valuable because it enables the comparison of multiple development costs and timelines among 78 municipalities.

A commercial development group has never undertaken data collection on development variables of this size—both in the number of cities surveyed and in the amount of data collected. Some data fields in the Minnesota NAIOP survey were collected using 30–60, 61–90, and 91–120 day timeframe reporting categories in the questionnaire completed by city officials. The 30-day incremental timeframe data collection categories were used in determining the number of days for rezoning, the preliminary plat process, the final plat process, the grading and utility process, and the building permit process. The 30-day increment as a measurement tool, while helpful in comparing one city with another, has limited applications to metropolitan region-wide analysis of regulatory patterns and processes because the approval timeframes are reported in 30-, 60-, or 90-day increments.

Exhibit 1 is a summary of the Minnesota NAIOP City Survey. The information provides an overall metropolitan regional comparison of the major fees and regulatory timeframes faced by commercial/industrial developers in the Twin Cities Metropolitan Area. It is important to note that for data analysis purposes, the sample size was reduced from 78 to 68 municipalities. The reason for this reduction was that some categories were not fully reported by the municipalities

**Exhibit 1** | Summary of Minnesota NAIOP City Survey

| Item | Average | Low | High | Std. Dev. |
|---|---|---|---|---|
| Rezoning Days | 55.7 | 45 | 75 | 16.3 |
| Preliminary Plat Processing Days | 56.5 | 45 | 105 | 17.3 |
| Final Plat Processing Days | 48.6 | 30 | 105 | 11.7 |
| Bldg. Permit Processing Days | 45.8 | 21 | 75 | 7.4 |
| Preliminary Plat Review Cost ($) | 580.8 | 100 | 2,740 | 464 |
| Final Plat Review Cost ($) | 353.3 | 100 | 1,850 | 332.6 |
| Building Permit Cost ($) | 12,276 | 6,020 | 27,500 | 2,669 |
| Plan Review Cost ($) | 7,563 | 500 | 10,194 | 1,258 |

surveyed or additional data on broader community characteristics were not consistent among all 78 municipalities.

## City Characteristics and Development Regulatory Processes

Similar to the city survey data compiled by Minnesota NAIOP, existing secondary data on several characteristics was reviewed to measure other components related to development at the municipal level. Data were collected, by city, for 68 cities in the following categories: commercial/industrial market value, value of non-residential construction, population, 1990–2000 population change, total tax increment financing revenue, and median household income. The data on community attributes came from several sources and were not always consistent in the timeframe measured. This data is reported in Exhibit 2, which identifies

**Exhibit 2** | Sources and Timeframe for City Measures of Development Activities

| Data | Year | Source |
|---|---|---|
| Commercial / Industrial Market Value | 2004 | Minnesota Dept. of Revenue |
| Value of Non-Residential Construction | 2002 | Metropolitan Council |
| Population | 2000 | U.S. Census |
| 1990–2000 Population Change | 2000 | U.S. Census |
| Tax Increment Financing Revenue | 2004 | Minnesota State Auditor |
| Median Household Income | 2000 | U.S. Census |

the data, its source, and year. Exhibit 3 provides an analysis of the overall city measures of development activities for the 68 cities surveyed.

## Investigation of the Relationships among Development Activities and Community Characteristics

Certain data categories were also calculated on a per-person basis for each municipality to make the data and reporting consistent among municipalities. This enabled direct comparison of all of the 68 cities in the data set. The following categories were calculated on a per-person basis: non residential construction, commercial/industrial market value, residential market value, and the amount of tax increment financing. Additionally, the ratio of commercial and industrial market value to residential market value was also calculated for each of the 68 municipalities in the data set.

A correlation and covariance test was performed to find the relationships that existed between and among them. These variables are listed in Exhibit 4.

Initially, tests of the correlation between the community characteristics and common development efficiency measures were performed. Generally, little correlation was found in how the variables moved together. Examples of the tests for the coefficient of determination can be found in Exhibit 5. The random test of correlation in Exhibit 5 addresses factors of commercial and industrial property value against development and community measures. The assumption for correlation testing being that municipalities with high commercial and industrial

**Exhibit 3** | Community Characteristics

| Item | Average | Low | High | Std. Dev. |
|---|---|---|---|---|
| Commercial Industrial Market Value ($) | 496,666,286 | 1,400,000 | 1,432,775,300 | 868,044,816 |
| Commercial Industrial Value Per Person ($) | 12,862 | 43 | 267,045 | 9,700 |
| Value of Non-Residential Construction ($) | 14,693,347 | 2,473 | 192,063,826 | 25,444,290 |
| Non Residential Construction Per Person ($) | 522 | 15 | 32,731 | 536 |
| 2000 Population | 37,588 | 1,355 | 382,477 | 64,966 |
| 1990–2000 Population Change | 33.1 | −4.6 | 113 | 57.5 |
| Total TIF Revenue (2004) ($) | 41,545,687 | 42,632 | 1,005,139,054 | 128,268,973 |
| Median Household Income ($) | 60,259 | 37,974 | 90,000 | 13,212 |

**Exhibit 4** | Initial Development Variables Tested for Correlation

| |
|---|
| Concentric Ring Location (1–4) |
| Preliminary Plat Review Fee |
| Preliminary Plat Process Days |
| Rezoning Process Days |
| Building Permit Fee |
| Building Permit Process Days |
| Final Plat Review Fee |
| Final Plat Process Days |
| Number of Development Approvals Processed Together |
| Commercial / Industrial Market Value By City |
| Commercial / Industrial Market Value Per Capita By City |
| Residential Property Market Value By City |
| Residential Property Market Value Per Capita By City |
| Single-Family Building Permits Per Capita |
| Multi-Family Building Permits Per Capita |
| Ratio Of Commercial / Industrial Market Value To Residential Market Value By City |
| Ratio Of Commercial / Industrial Market Value To Residential Market Value Per Person By City |
| Non-Residential Construction Level By City |
| Non-Residential Construction Level Per Capita By City |
| Population |
| 1990–2000 Population Change |
| Total Tax Increment Financing By City |
| Tax Increment Financing Per Capita By City |
| Median Household Income By City |

property values would show a correlation to factors like development fast tracking, lower development approval costs, higher levels of tax increment financing revenues, and non-residential construction levels.

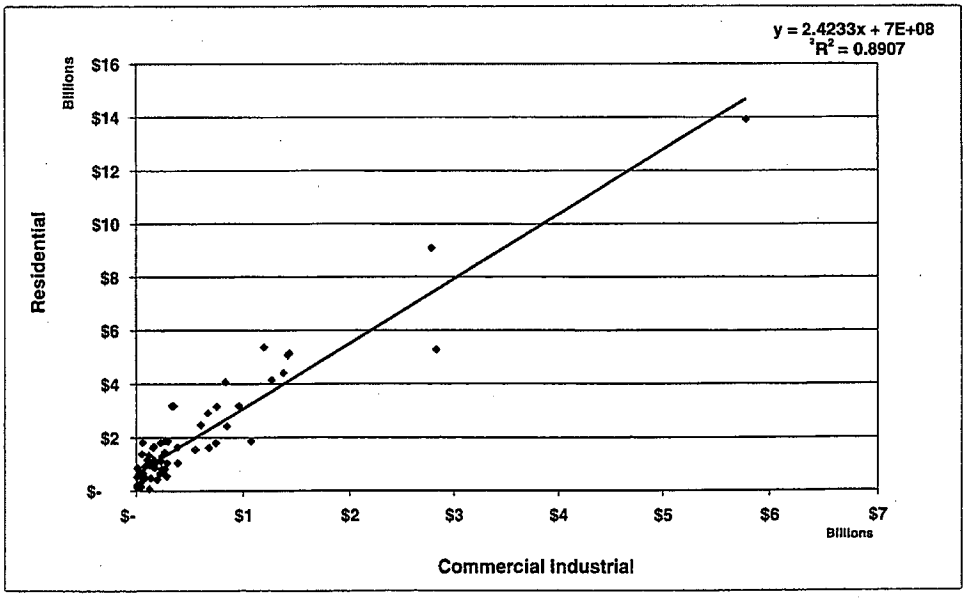
The most significant correlations found in the review of this data set were found in the overall activities and size of the cities surveyed and how the relationship of size influenced the development related activity levels for each city. This is not surprising.

Cities with large commercial and industrial property values displayed strong correlations with high residential property values. Indeed, the correlation coefficient between the commercial industrial market values and the residential market values for the cities in the survey was found to be .943. Exhibit 6 displays this relationship. Cities generally show a balance between commercial and

**Exhibit 5** | Movement of Selected Development and Community Variables

| Variable 1 | Variable 2 | Coefficient of Determination |
|---|---|---|
| C/I Market Value Per Capita | Number of Development Approvals Processed Together | .005 |
| C/I Market Value Per Capita | Preliminary Plat Review Cost | .003 |
| C/I Market Value Per Capita | Median Income | .06 |
| C/I Market Value Per Capita | Tax Increment Financing Revenue Per Capita | .25 |
| C/I Market Value Per Capita | Non Residential Construction Per Capita | .003 |
| Ratio of C/I Market Value to Residential Market Value | Number of Development Approvals Processed Together | .04 |
| Ratio of C/I Market Value to Residential Market Value | Tax Increment Financing Revenue | .03 |
| Ratio of C/I Market Value to Residential Market Value | Tax Increment Per Capita | .09 |

**Exhibit 6** | Residential Market Value and Commercial/Industrial Market Value



industrial property and residential property. Similarly, cities with high commercial industrial property values also had high levels of non-residential construction.

Perhaps the most valuable insight gained from this part of the analysis is the relationship of city size to the use of tax increment financing. Exhibit 7 provides the correlation coefficients for the tax increment financing revenue by city with other variables tested.

Much of the variation in a city's use of tax increment financing can also be explained or followed through variations in commercial industrial market value, non-residential construction, and residential market value. Exhibit 8 illustrates the relationship between commercial/industrial market value and tax increment financing revenue.

## Application of Factor Analysis

Factor analysis was used as an additional tool to explore the relationships that exist among the development and community variables in the 68 municipalities in this study. Factor analysis is most often used for simplifying complex data by identifying the smallest number of dimensions that can be used to describe the data without leaving a large amount of the variance unexplained (Sapsford and Jupp, 1998). This type of component or cluster analysis is useful in finding the groupings of a smaller number of variables that capture information (Lewis-Beck, Bryman, and Liao, 2004). In this study, clusters of commercial/industrial development and community variables that were linked or clustered together were investigated through a principal component analysis.

Eigenvalue is a statistic used in factor analysis to indicate how much of the variation in the data set is accounted for by a particular factor (Vogt, 1999). Of the 24 variables collected for this study, two-thirds of the variance is common and can be explained by seven factors. To describe the seven factors, the terms were assigned to identify each of the seven clusters. The terms, the Eigenvalues, and the percentage of variance that can be explained are identified in Exhibit 9.

**Exhibit 7** | Correlation Coefficients for Level of Tax Increment Financing

| Variable 1 | Variable 2 | Correlation Coefficient |
|---|---|---|
| Level of TIF by City | C/I Market Value by City | .883 |
| Level of TIF by City | Non-Residential Construction by City | .838 |
| Level of TIF by City | Population by City | .782 |
| Level of TIF by City | Multifamily Permits by City | .734 |
| Level of TIF by City | Residential Market Value by City | .809 |

**Exhibit 8** | Commercial/Industrial Market Value and Tax Increment Financing Revenue

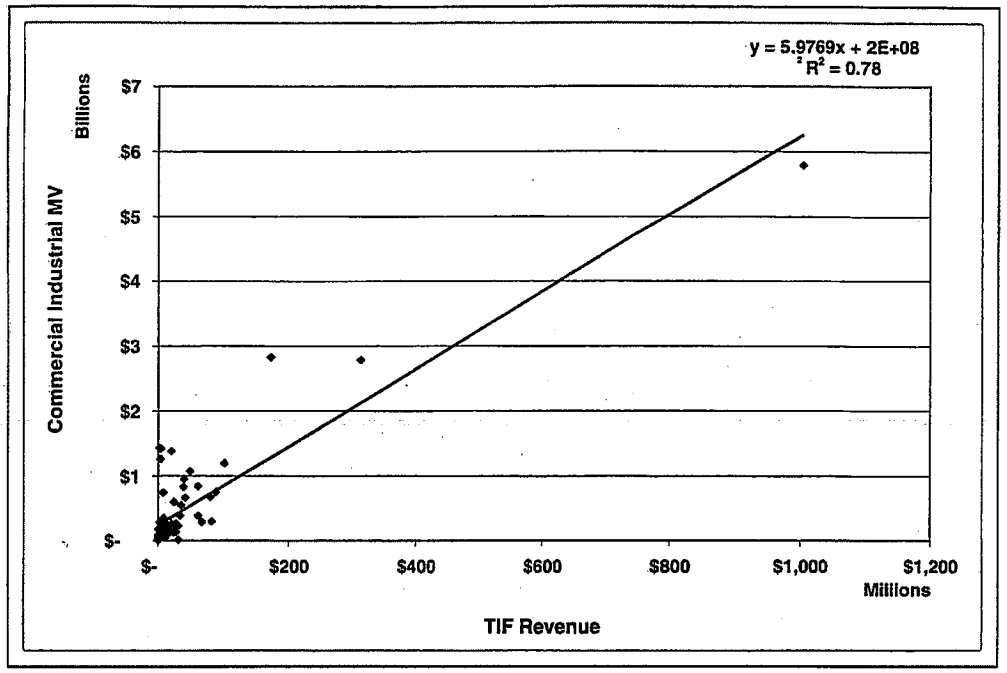



**Exhibit 9** | Total Variance Explained

| Factor | Eigenvalue | Percentage of Variance Explained |
|---|---|---|
| Growth Attributes | 3.457 | 17.287 |
| Commercial/Industrial Value/TIF | 2.373 | 11.864 |
| Construction Activity | 2.101 | 10.510 |
| Project Review Costs | 1.766 | 8.831 |
| Development Approval Processes | 1.371 | 6.857 |
| Development Review Processes | 1.263 | 6.317 |
| Development Processing Time | 1.123 | 5.613 |

Exhibit 10 shows the degree of correlation and identifies the community and regulatory variables that comprise each of the seven factors.

The factor analysis identifies 20 of the 24 variables that move together forming seven clusters. Municipal use of tax increment financing and the amount of commercial/industrial property value per capita again show a strong correlation.

**Exhibit 10** | Composition and Correlation of Factors

| Variables | Degree of Correlation |
|---|---|
| *Growth Attributes* | |
| *Residential Value/Per Capita* | .748 |
| *Location by Concentric Ring* | .721 |
| *2000 Population Change* | .639 |
| *2000 Population* | −.587 |
| *Ratio of C/I to Residential Per Cap.* | −.507 |
| *Commercial/Industrial Value/TIF* | |
| *C/I Value Per Capita* | .867 |
| *TIF Per Capita* | .783 |
| *Construction Activity* | |
| *Non-Res. Const. Per Capita* | .684 |
| *Multi Family Permits Per Capita* | .663 |
| *Single Family Permits Per Capita* | .573 |
| *Median Household Income* | −.473 |
| *Project Review Costs* | |
| *Preliminary Plat Review Cost* | .847 |
| *Final Plat Review Cost* | .696 |
| *Approval Items Processed Together* | .449 |
| *Dev. Approval Processes* | |
| *Preliminary Plat Review Time* | .894 |
| *Rezoning Process Days* | .710 |
| *Development Review Processes* | |
| *Building Permit Fees* | .780 |
| *Plan Review Fees* | .710 |
| *Development Processing Time* | |
| *Building Permit Processing Time* | .794 |
| *Final Plat Process Days* | .679 |

**Exhibit 11** | Factor Variable Category

| Factor | Variable Composition |
|---|---|
| Growth Attributes | Community Measures |
| Commercial/Industrial Value/TIF | Community Measures |
| Construction Activity | Community Measures |
| Project Review Costs | Regulatory Measures |
| Development Approval Processes | Regulatory Measures |
| Development Review Processes | Regulatory Measures |
| Development Processing Time | Regulatory Measures |

Similar to the correlations previously tested in Exhibit 7, tax increment financing showed a high degree of correlation to the value of the commercial/industrial property in a municipality. Otherwise the factors identified strong correlations among variables within the same general categories. Exhibit 11 summarizes this composition.

## Conclusion

The relationship of the commercial/industrial development community with the public sector regulator lies at the heart of the development process—a process that is critically important to better understand. This study investigated the relationships among development variables identified by the real estate development industry as important measures of municipal regulatory practices with measures of community composition and attributes. The overarching hypothesis tested the degree of correlation between a municipality's development processes and fees and common measures of community characteristics and composition. With the exception of the municipal use of tax increment financing, no significant correlations were identified. This is surprising given that 24 related community and development variables were compared.

Perhaps this lack of correlation in the variables can be dismissed as a result of the relatively low development fees and permitting costs in relation to the total development costs of a project. Clearly, the development and permitting fees are a minuscule cost for commercial/industrial development projects. Whatever the case, the data in this study presents a starting point for future research that considers municipal and community characteristics not yet examined. For example, additional analysis could be pursued that examines how the 68 municipalities align or could be indexed according to factors identified in this paper or other new measures. Similarly, additional research could be integrated into this data that may include transportation issues, municipal decision-making processes, and the roles of city managers, citizens, and elected officials. Or, alternatively, are municipal-level regulatory factors and community composition of limited importance in determining development site selection? If so, then development decisions are overwhelmingly based on the market and site factors (demand, site availability and size, subsidies, real estate market opportunity) that are a function of the site and the location—not the municipality. If so, then a correlation of development cost and process variables with community characteristics will only be present in the most and least troubled municipalities.

The information presented by this data set is a starting point to evaluate and measure community characteristics, development patterns, and municipal development regulatory processes. Further tests of correlation among the development, community, and regulatory variables are needed to gain a better understanding of how cities in the data set perform in the area of development. Additional factor analysis and municipal indexing may prove to be a tool to find

underlying variables that may be responsible for the covariation in the variables in the data set collected for this paper.

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*Thomas A. Musil, University of St. Thomas, Minneapolis, MN 55403 or tamusil@stthomas.edu.*

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