

Real Property Assessment Systems Background Materials

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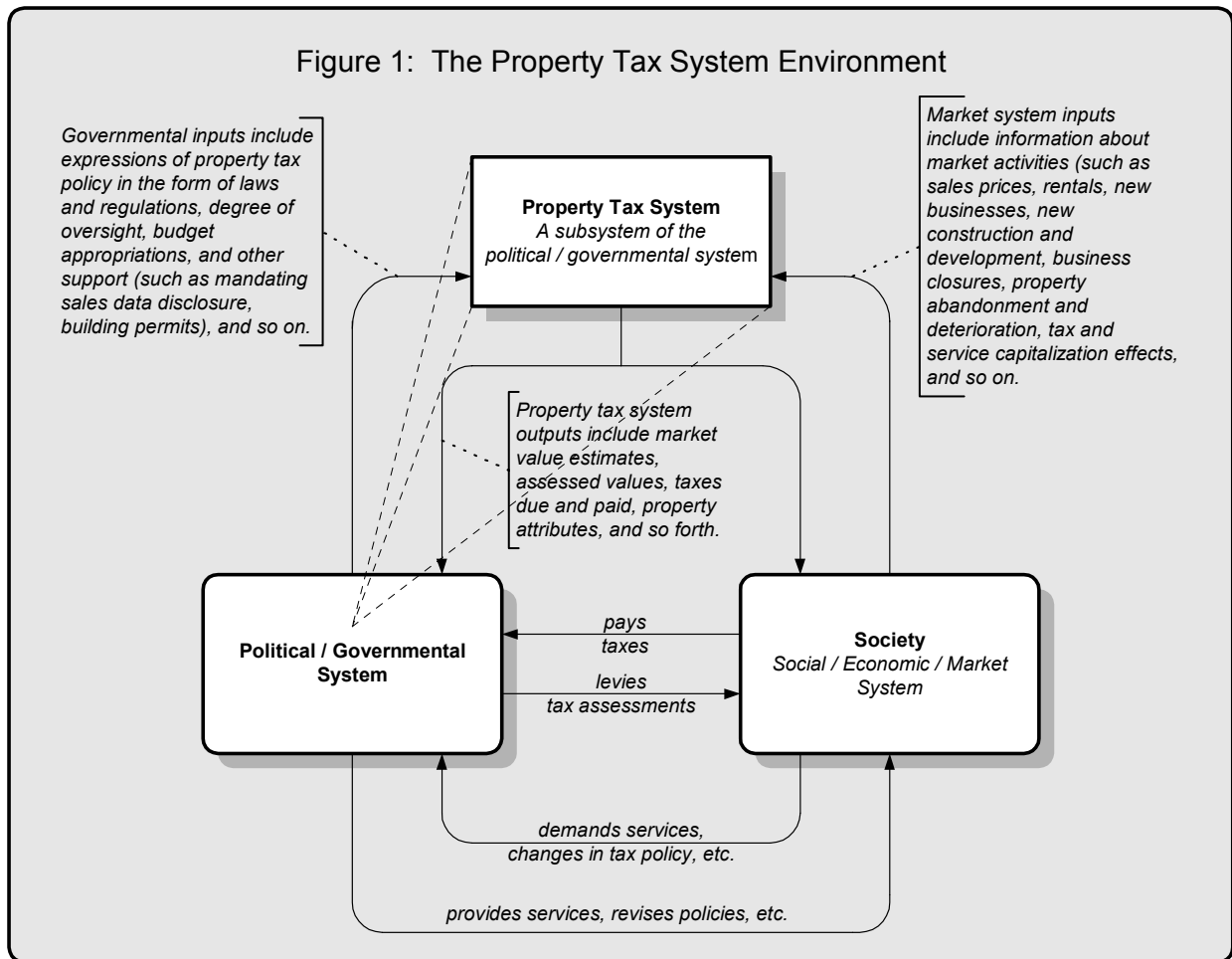
1. Introduction

This paper defines real property assessment systems and describes them from an international perspective. The focus is on developing a system that matches the requirements of a nation's property tax system.

A real property assessment system is a major administrative component of a property tax system. Reflecting the dynamic and complex environment in which they operate (see figure 1), property tax systems generally are complex. However, all are composed of elements, functions, phases, and linkages.

Elements. Property tax systems comprise people, policies, technology, data, and processes (figure 2). Policies and processes acquire legitimacy through legislation. The legislative framework (the subject of a Thursday session) of a property tax system should set out policy

choices clearly, provide the environment for their achievement, and assign responsibilities. Laws, regulations, and court decisions establish the legal framework. Matters requiring legal support include organizational responsibilities, power to tax, liability for tax, property subject to tax, basis of tax, taxpayer rights and responsibilities, and so forth.

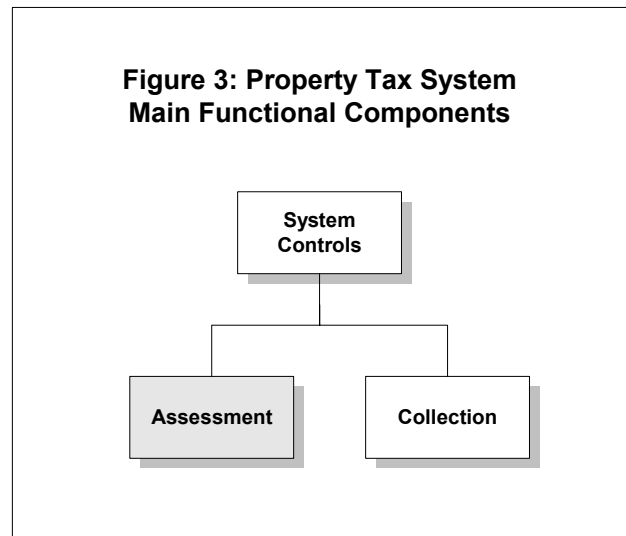
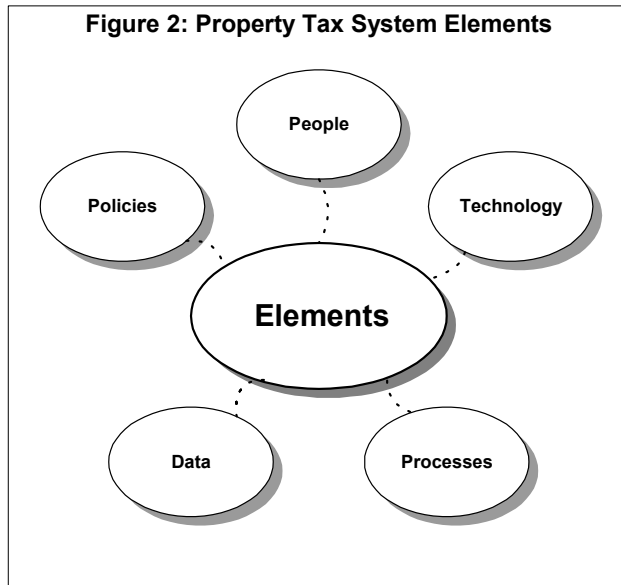


Source: *Improving Real Property Assessment*.

Functions. Functionally, a property tax system does three things. It identifies and links taxable subjects (taxpayers) and objects (taxable property). It produces tax assessments. It collects taxes. If any of these is done poorly, tax equity will suffer, revenue generation also may suffer, and public acceptance will erode. The achievement of the ultimate objective of a property tax system—an equitable, legal apportionment of property tax—requires careful planning and wise use of resources, sufficient data, and—in market value-based systems—a mass appraisal program capable of producing accurate, supportable valuations. But the process does not stop with valuation. Exemptions and other tax relief measures must be applied. Valuation or tax notices must be issued and delivered to taxpayers. Taxpayers must be allowed to review their assessments and appeal them if they desire. Appeals must be processed. Tax payments must be

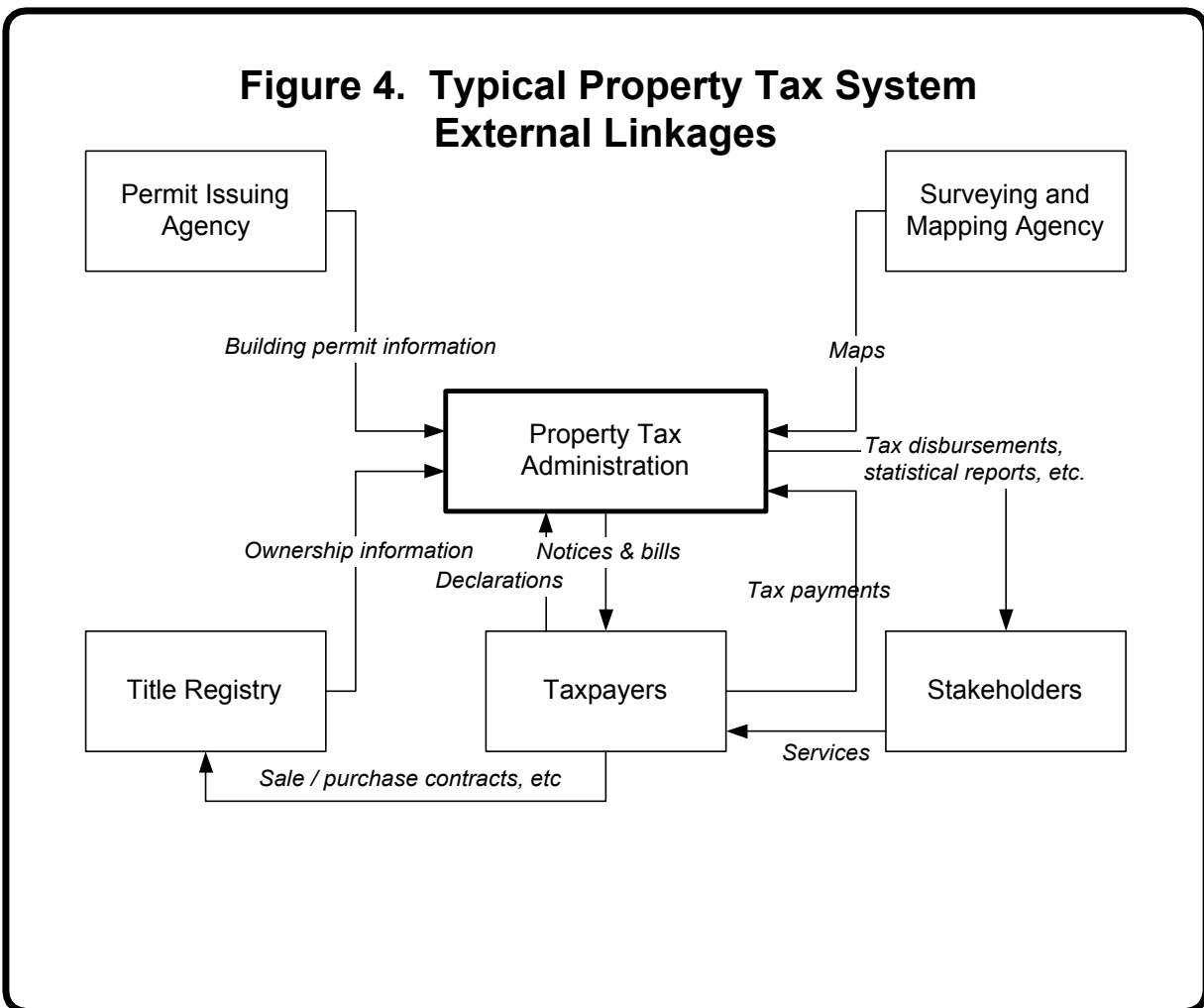
received, properly accounted for, and deposited in the appropriate treasury. Taxpayers must be provided with sufficient information to fulfil their obligations. Taxpayer questions must be answered and their acceptance of new property tax systems obtained.

From the foregoing, it can be seen that the main functional components of a property tax system are an administrative or internal control component, an assessment component, and a collection component (figure 3). The administrative component controls the other two. It dictates powers and responsibilities (including the power to tax property). It provides resources and controls how they are used. The assessment component determines who is to pay a tax and the size of each taxpayer's share of total taxes. The assessment component may include a valuation system. The collection component bills, receives, accounts for, and distributes property tax payments. It also embraces efforts to ensure compliance.

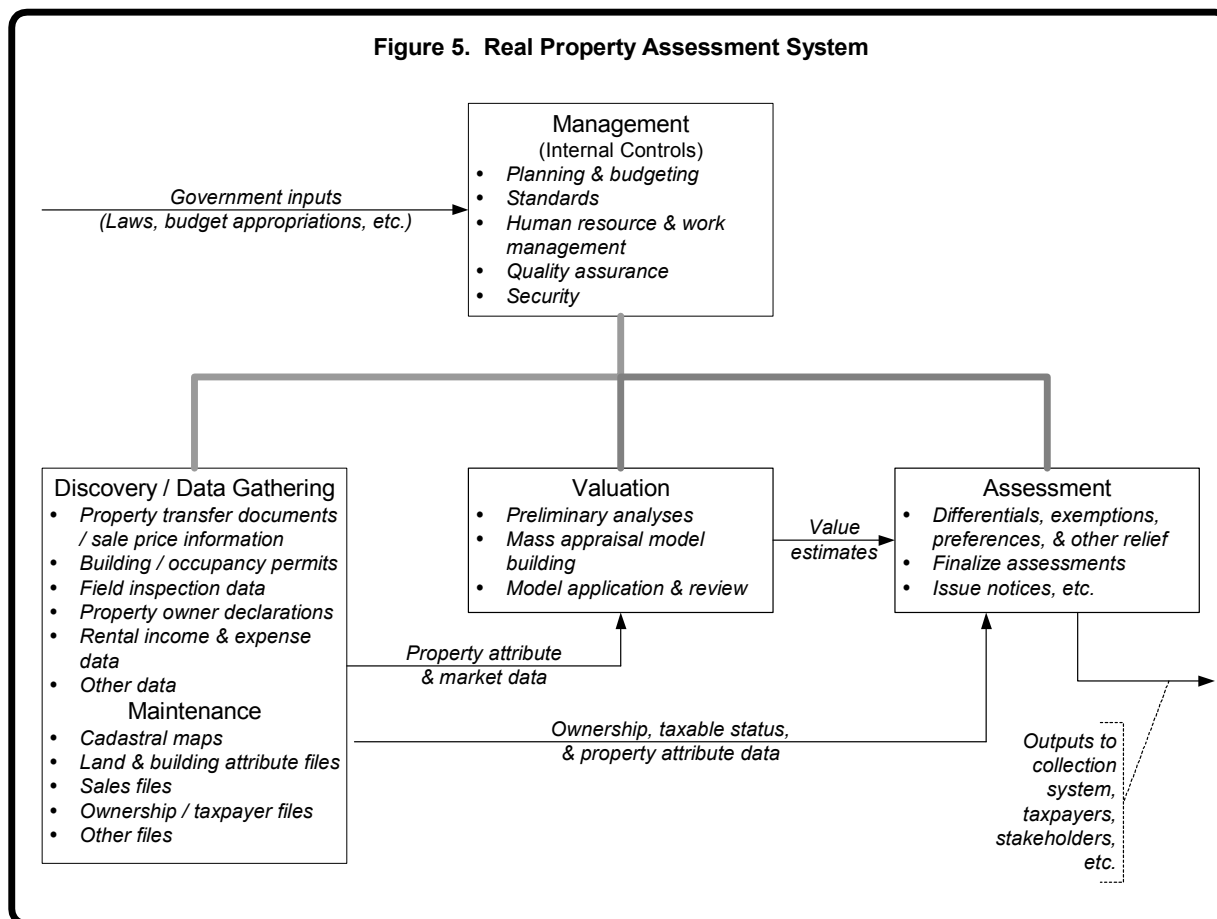


Phases. As the process framework implies, there is a time dimension as well. Tax systems always are dynamic, not static. Taxation occurs in annual cycles. Often there are longer intervals between reassessments.

Linkages. A property tax system does not exist in isolation of other systems. Consequently, there are the linkages among the property tax system, its clients or stakeholders, and other systems (figure 4). There are “internal” linkages when administrative responsibilities are divided among more than one agency or department. In a formal sense, the “clients” of the property tax system are the recipients of property tax revenues. At the same time, taxpayers should be satisfied that the system provides a legal, fair distribution of property tax burdens. At the process level, the main external linkages are with taxpayers, the land title system, building permit issuing authorities, and real estate professionals. Processes should be designed to facilitate common linkages.



Returning to real property assessment systems, their main function is to determine who must pay property taxes and the share of total property taxes that each taxpayer should pay, as noted above. Figure 5 depicts the management, data gathering and maintenance, market analysis and valuation, and assessment functions of a real property assessment system. The following sections discuss these functions, plus appeal and taxpayer and stakeholder relations. The focus is on market value-based system and mass appraisal. As will be seen, mass appraisal requires both effective managers and skilled valuers. Taxpayers must accept the value estimates as reasonable, because they form the basis of property tax assessments. Administration of the valuation program must be economical. Standardized procedures, quality control measures, effective public information programs, and attention to uniformity help achieve these goals. Producing a high quality, equitable valuation list can be a source of considerable professional satisfaction.



Source: *Improving Real Property Assessment*.

2. Management

Property tax systems need to be well managed. This section outlines some important management activities.

2.1 Planning

Planning is a key aspect of sound management. Property tax administrators should engage in three types of planning: (1) strategic planning (addressed separately in a Monday session), (2) annual work planning, and (3), when necessary, project planning. Plans are used to establish goals, objectives, and timetables. Plans lay the foundation for budget requests. Plans provide a basis for measuring progress.

Plans that affect more than one person should be written. Written plans should briefly address things like (1) why the work in question is to be performed; (2) the estimated quantity of work to be performed; (3) production standards for repetitive activities; (4) estimated personnel requirements; (5) estimates of other resource requirements; and (6) the schedule of tasks and

projects. After initial adoption, plans should be adjusted as needed to reflect changing circumstances, including limitations on available funding.

2.2 Estimating Resource Requirements and Budgeting

An important management responsibility is to obtain adequate resources. Budgets express resource requirements in monetary terms. Budgets should be linked to plans and be based on the results to be achieved, not the previous budget or merely the funds needed to maintain the existing staff and other customary expenditures. Budgets should provide the funds needed to acquire required resources. Results-oriented budgets strengthen accountability and protect against arbitrary reductions in funding.

Many factors affect funding requirements. Major factors include (1) workloads or required outputs; (2) inputs or resource requirements, including skills and technologies; and (3) the wage levels and the costs of other goods and services. Output estimates depend on workloads, standards of performance, and productivity rates.

Workload data (such as the number of properties to be valued) should be available from management records. However, changes in the economy can change current workloads. For example, high rates of population growth and new real estate development mean many new properties will be added to the fiscal cadastre each year. Inspecting new properties is more expensive than making routine maintenance inspections, because of the amount of detailed information to be obtained and because of travel time between parcels. Similarly, sparsely populated areas with large parcels are more expensive on a per-parcel basis than more densely developed areas. Concentrations of commercial and industrial property also imply greater per-parcel costs.

Property tax administrators generally operate under pronounced resource constraints. The costs of administering a property tax include the costs of maintaining the data in the fiscal cadastre (generally the largest component), the costs of valuations, the costs of property tax collection and general and administrative costs (such as training). Total annual expenditures for property tax administration generally are in the range of 5 to 10 percent of annual property tax revenues (although administrative costs can be as low as 1 to 2 percent in high property tax countries like the United Kingdom and the United States).

It should be noted that the data in the fiscal cadastre are valuable if they are kept current. Consequently, it may be possible to recover some of data collection and maintenance costs from other government agencies or from businesses through the sale of data products or through licenses to have access to non-confidential data.

2.3 Human Resource and Work Management

Management is the art of getting work done through people. Managers use their interpersonal skills to direct the talent and energy of employees to achieve the organization's goals. Managers do this by knowing their employees, recognizing the power of self-motivation, delegating

authority, encouraging teamwork and participation, expecting and rewarding excellence, and taking appropriate steps to correct unsatisfactory performance.

Organization. The staff of a property tax administration needs to be effectively organized. Organizational designs should consider the nature of activities, the volume of work, the skills required, and realistic production rates. Consideration also should be given to job enrichment and career paths. Effective organization of tasks and jobs increases efficiency. Efficiency is obtained when subordinates are accountable to only one superior and when gaps and overlaps in areas of authority are minimized. Efficiencies often can be obtained by specialization. Specialization can occur along functional and geographic lines (usually a combination of both).

There should be a written organization plan that documents with charts and statements of the responsibilities of each job and organizational unit. These formalize the agency head's delegation of work and depict lines of communication.

Managers should be alert to organizational problems, such as work bottlenecks, tasks that are not performed because everyone assumes someone else is responsible for them, and duplication of work (beyond that necessary for quality control). If problems occur, reorganization should be considered.

Employee Selection, Development, and Compensation. An important management responsibility is employee selection: Finding the right person for a job. Steps in the selection process may include reviewing the position or job description, identifying necessary and desirable skills and qualifications, announcing open positions, reviewing applications, testing, selecting applicants for further consideration, interviewing leading applicants, and selecting the best applicants for each position. The selection process should be guided by formal policies and procedures to ensure the process is fair.

Although most employees will improve their skills by their own efforts, managers have an organizational responsibility for employee development. They use education, training, counseling, and performance reviews to identify talents and help employees grow in their positions, and to become eligible for promotion.

A property tax administration should attempt to obtain levels of compensation commensurate with the responsibilities and skills required of each position. In order for an agency to compete successfully for qualified employees, pay levels should be commensurate with levels offered elsewhere.

Internal Communications and Control of Work. A major management challenge is to ensure effective internal communications and to foster an emotionally healthy work place. Good internal communications begin with statements of goals, objectives, and values. General rules and policies should be in writing. The work involved in any regularly performed complicated task should be documented; steps should be described and illustrated. Expectations should be clearly communicated. All should practice good listening skills.

Responsibility for enforcement of policies and procedures should be appropriately delegated to supervisors. Rules should be administered firmly but fairly. Lax compliance with rules reduces productivity and morale.

Efforts to achieve effective internal communications should be continuous and would include meetings, performance reports, progress reports on projects, and memoranda. Frequent staff meetings allow for clarification and consistent understanding of expectations. If well managed, they help build morale and motivation. They provide opportunities for people to voice their concerns.

When policies or procedures change, employees should be informed of the need and reason for the change.

Employees need frequent performance evaluations. To be fair and effective, formal evaluations should be related to specific duties and performance standards. Formal evaluations should be documented in writing. Frequent informal evaluations also are important. Problems should be identified and the employee counseled. Good performance should be acknowledged.

Discipline should promote behavior that achieves goals. It should be progressive, beginning with the least severe method for changing behavior, with dismissal being the ultimate step.

Managers should realize that no behavior takes place in isolation, that behavior can rarely be attributed to a single cause, and that every action sets off a chain of reactions.

2.4 Quality Assurance

Public acceptance of property taxes depends in large measure on a perception that the taxes are fair. A perception of fairness is reinforced when data are accurate, valuations appear accurate and uniform, and all taxpayers are treated without prejudice or favoritism. Quality assurance has to do with the practices, procedures, and systems that achieve these conditions.

The property tax administration should strive for the highest level of quality consistent with available resources. It should do this through planning, continuous review of work, and correction as needed. Good management builds into every task a concern for quality. An organizational culture of public service and excellence will ensure quality work. In short, public acceptance of the property tax will depend greatly on the performance of every member of the staff of the property tax administration.

An effective quality assurance program in property tax administration would include many of the following elements:

- Staff selection and training. Appropriately qualified staff should be hired, and they should be properly trained to establish a foundation for quality work.

- Professional ethics. Questionable or unethical conduct jeopardizes the integrity of property tax administration. Valuation and property tax administration can present situations in which ethical guidance may be needed. The property tax administration's managers would require all property tax officials to comply with formal ethical standards.
- Organization.
- Computer system design. (The subject of Wednesday sessions.)
- Standards of performance. Standards of performance include effectiveness targets and rules designed to ensure uniform treatment. Related work includes developing and maintaining procedural manuals, valuation manuals, and valuation standards, such as land unit values.

Efficiency targets or production standards are needed for planning and budgeting and for evaluating performance. Although experience from other property tax systems can provide useful information, it is better to develop standards locally to account for the factors that affect production. Statistics on how time is used and on work accomplishments are needed to develop production standards.

- Documented procedures. Property tax administration involves many complicated tasks. The proper way of doing any regularly performed task should be documented. Steps should be described and illustrated in a procedural manual. The manual should be used in training programs. Manuals should be continuously updated; outdated, ignored manuals are no better than none at all.

Perhaps the most important procedural document is a data collection manual. This manual explains how to measure structures and select the most appropriate choice from among the codes available for each property characteristic. The manual contains well-written and specific definitions of property characteristics, illustrated with examples and pictures.

- Data maintenance programs. Property inspection programs are a major quality assurance factor. Data collection responsibilities are assigned on the basis of the complexity of data elements and the experience of data collectors. For example, supervisors or senior data collectors may collect qualitative characteristics, and more junior data collectors may collect quantitative items.
- Data edits. The completeness and accuracy of recently collected data can be evaluated through (1) automated edits, (2) field data audits, and (3) data verification forms sent to taxpayers.
- Security procedures. Security procedures restrict access to manual and computerized records to protect confidentiality, prevent loss of records, and prevent unauthorized changes in records. They protect against disasters. They also minimize opportunities for

corruption (such as by rotating work assignments and by designing procedures that prevent an individual from making and concealing an error). They help fix responsibility for work by establishing "audit trails."

An audit trail is a record of changes made to a record. It identifies who made the change (or the computer terminal used to make the change), when the change was made, and what was changed. An audit trail makes it easier to recover from errors. It also makes it possible to isolate responsibility for errors or for failing to correct them. In turn, the cause of the problem can be identified. Mistakes will happen, but patterns of mistakes will identify more serious system problems.

Elements of an audit trail include computer sign-on and password procedures and requirements that paper forms be signed or initialed. Batches of forms should have transmittal sheets. At each successive stage of a process, work in the previous stage should be reviewed for completeness and accuracy before work is sent to the following stage.

- Reappraisals. (See section 4.5.)
- Value reviews. (Section 4.4.)
- Ratio studies. The property tax administration should make regular use of ratio studies, and the CAMA system would provide a facility for making them. A "ratio study" is the most effective means of evaluating the accuracy of appraisals. In a ratio study, ratios (R) of appraised values (A) to independent indicators of market value, preferably sales, (S) are calculated, as in the following formula:

$$R = A/S.$$

Statistics describing the general level of the ratios (such as the mean and median) and describing uniformity (such as the coefficient of dispersion and coefficient of variation) would be calculated for a variety of strata (groups of properties). For additional information, see chapter 5 of *Mass Appraisal of Real Property*.

- Effective communications.
- Corrective actions.
- Taxpayer feedback through objections and appeals. (See section 5.)
- Procedural audits. Procedures as well as results should be evaluated in a quality assurance program. While ratio studies and other examinations of results reveal the existence of problems, they provide little information about their causes. As the name implies, a procedure audit focuses on practices and procedures. If procedures do not comply with requirements and standards, the probable cause of substandard performance

is found. Conversely, results can be presumed to be acceptable if procedures and standards are followed, substandard ratio study statistics notwithstanding. The property tax administration should consider development of a small internal audit team or periodically commissioning an external audit by a qualified body. However, it should be noted that comprehensive performance audits are time-consuming and expensive, lessening their practicality.

3. Fiscal Cadastre

Property tax administration (including valuation) depends on data that are relevant, accurate, timely, and economical to maintain. Relevant data reflect what makes a property desirable or undesirable in the marketplace, are appropriate to the valuation methods in question, and necessary for tax administration and other governmental and private sector purposes.

The totality of maps and files containing data related to property taxation constitutes a “fiscal cadastre.” Building and maintaining the property inventory and attribute database are the most labor-intensive and, hence, most expensive aspects of property tax administration.

Consequently, these activities should be well designed and managed. Data management responsibilities encompass the determination of data needs, collection methods, and data storage and retrieval facilities. Work (or “business”) processes related to building and maintaining the real property database include:

- *Compilation of cadastral maps and assignment of parcel identifiers.* Newly compiled maps should be digital, as they are a major component of a geographic information system (GIS). A complete and up-to-date set of cadastral maps provides the most effective way to inventory real property holdings. The maps help ensure that the property tax administration has accounted for all land and that no land areas are taxed twice. The maps also detail the location, shape, and size of every parcel of land, as they are important determinants of land value. As is planned, building records should be keyed to land parcel records.

Although survey descriptions and addresses identify land parcels, parcel (cadastral) numbers provide a compact and uniform code for identifying land parcels in property tax and cadastral records. A cadastral number should uniquely identify a single parcel configuration. Whenever a parcel is divided or combined with another parcel, the original parcel identifier should not be used to describe the succeeding parcel or parcels. A new identifier or identifiers should be assigned and the prior identifiers retired. Alternatively, suffixes can be assigned to a “parent” identifier to indicate a change. Whenever parcel identifiers are not unique, market analyses may be confounded and tax liabilities confused.

- *Maintenance of land and building attribute records.* (See below.)
- *Maintenance of sales records and other evidence of market values.* (See section 3.2.)

- *Maintenance of records of taxpayers (usually owners), taxes assessed, and tax payments.* The fiscal cadastre also must contain current data on the persons liable for paying property taxes, the types (classes) of property that must be assessed, and the circumstances that make persons and properties eligible for exemptions from taxation and for other forms of property tax relief.

3.1 Land and Building Attribute Database

An important early real property assessment system design task is to determine the data needed for valuation, to support values, to determine liability for assessment or taxation, and to determine the extent of assessability or taxability. The data requirements suggested below are based on international experience. The data needs of others in the public and private sector users also should be taken into account. As previously noted, cadastral data management should include a concern for cost-effectiveness and provide an effective quality assurance program. Cost-effective data management will require a well-designed computer system.

Land Data Requirements. The following table provides a framework for assessing the availability of land data in the Czech Republic. If the data are now available, a “yes” would be recorded in the second column, and the investigation would proceed to an evaluation of the suitability of the data for computerized analysis. A “no” would imply that consideration should be given to how best to collect the data.

Attribute 7 and the attributes that would be needed under attribute 6 would vary with land use. This has implications for the structure of data tables in the computer system. Although not listed, having ready access to associated addresses would facilitate locating the property in the field and discussing it with taxpayers.

Attribute	Now Available?	Source, Means for Obtaining, or Other Comment
1. Cadastral number		
2. Parcel area		
3. Parcel shape and dimensions		
4. Actual land use		
5. Planned use		
6. Site characteristics that contribute to the desirability of the parcel		
7. Market area designator		

Building and Improvement Data Requirements. The following table provides a similar table for building and other improvement data requirements. A comparable data structure would be needed for separately assessed building units like apartments.

Attribute	Now Available?	Source, Means for Obtaining, or Other Comment
1. Cadastral number		
2. Building number		
3. Building area		Area by story would be desirable
4. Shape and dimensions of main building components		Most needed for cost approach
5. Number of stories		
6. Type of construction		
7. Quality of construction		
8. Year built or condition		
9. Other construction details		Significant building materials and features, such as wall and roof type, and story height for commercial and industrial structures may be needed.
10. Other components or features that contribute to the desirability of the building		
11. Actual use	No	

It is desirable that specialized record formats be created for major property types (such as residential, commercial, industrial, and agricultural). Appropriate codes should be developed for each qualitative and categorical attribute. The codes for an attribute should cover all possibilities and contain no overlaps.

Data Collection Methods. Another issue is how to acquire the necessary data. There are three main options: (1) use of data already gathered for other purposes (such as building inventory records), (2) field canvasses, and (3) reports submitted by property owners or taxpayers. Often it is possible to use each of the options for a part of the data collection effort. For example, existing records could be verified by sending data collectors to each property. They would view every property from the street and check visible attributes against the existing property record. They also would verify perimeter sketches of buildings. If changes have occurred or errors or omissions were evident, the data collector would do whatever is necessary to correct the record. When a building is discovered that is not already in the inventory, the data collector would create a new record. At the same time, any apparent discrepancies in parcel boundaries would be referred to the mapping agency for resolution.

3.2 Market Evidence Database

The three main approaches to valuation differ chiefly in the types of market evidence they rely upon. Data on arm's-length, open-market sales are required in all three approaches but are integral to the sales comparison approach, which is the generally preferred approach when there are sufficient sales. Sales data are crucial in land valuation, direct income capitalization methods, and estimating depreciation under the cost approach to value.

Real estate market data should be collected and evaluated continuously, even when revaluations are required only every five or so years.

Sales Data Collection and Processing. An effective sales data collection and processing system requires:

- Access to sales data. Ideally, the law would require buyers and sellers to disclose needed information to the property tax administration. A special return, filed when the transfer tax is paid could be used. In addition, it is advisable to develop alternative sources of sales information, such as from private-sector real estate professionals, such as valuers and brokers for purposes of confirmation and as sources of background information.
- Confirmation. Sales data confirmation requirements vary with the general validity of the primary source of sales data. When the source(s) cannot be regarded as authoritative (such as the return recommended above), confirmation is essential, particularly of sales of commercial, industrial, and unimproved (vacant) land plots. A questionnaire similar to the return should be used. Along with providing for confirmation, the questionnaire would ask for additional background information.
- Validation. An analyst should read each return or other sale document and decide whether the sale matches the criteria of an arm's-length, open-market sale, as only such sales provide reliable evidence of market values. Codes would indicate whether a sale meets usability criteria and, if not, why not. Sales not classified as unusable would be deemed to be usable. The coding system should differentiate between sales that are not usable in ratio studies but are usable in valuation. For example, the sale of part of a larger tract of land often cannot be used in a ratio study because there was no separate assessment on the part that sold. However, the sale could be used as a comparable in an appraisal.
- Verification of property attributes. Although it is permissible to transcribe property attribute data from the existing property record when building a sale record, each usable sale should be inspected to ensure key land and building attributes are current.
- Adjustments. As warranted, analysts should adjust sales prices for differences in price levels between valuation date and the date of the sale, chattels, non-market leases, and non-market financing. For further information, see chapter 6 of *Mass Appraisal of Real Property*.
- A sales file. The sales file constitutes a continuous record of sales and contains a record of every sale, including those deemed unusable in ratio studies and in valuation. Each sale record should contain (1) pertinent information about the transaction, especially the sale price and date of sale; (2) an analyst's opinion as to whether the sale was an arm's-length, open-market sale; (3) the identification of the property transferred; (4) salient property characteristics as of the date of sale; and (5) for ratio study purposes (discussed later), the

total assessment in effect on the sale date and a breakdown between land and buildings if applicable.

It is highly desirable that all sales files be computerized, but a computerized file is essential when the number of sales exceeds a few dozen. It also is highly desirable that there be a powerful comparable property selection routine used to identify comparable sales.

Rental Property Income and Expense Data Collection and Processing. Similarly, rental and operating expense data should be collected from property owners, managers, and tenants and analyze those data to determine current market levels. Income and expense records would contain:

- A “transaction” or record number
- The date the record was created or when the source data were transcribed
- The reporting period—the idea is to create a valuation date / assessment year reference
- Property identification—parcel identifier and applicable unit (occupancy) identifier(s)
- Important property characteristics—use type, location, size (in terms of relevant valuation units), condition/age
- Sale data (when available)—price, date (should be reasonably contemporaneous with income data), usability code, particulars of financing terms (if applicable)
- Lease data—for each lease, term of lease, renewal terms, landlord and tenant responsibilities, lease “type” (e.g., triple-net), unit of measure, rent reviews, etc.
- Rental data
- Operating expense data
- Derived data (include anything calculated (and stored) from basic data, such as market income and expense estimates and various benchmarks)

4. Market Analysis and Valuation

Since other sessions focus on mass appraisal and computer-assisted mass appraisal (CAMA) systems, this section merely presents a brief overview of those subjects. Because many properties must be appraised more-or-less simultaneously, methodical approaches to appraisal must be used, hence the term “mass appraisal.” Mass appraisal is the systematic appraisal of groups of properties as of a common date using standardized procedures and statistical testing. Mass appraisal may be contrasted with single-property appraisal, which is the valuation of a specified property as of a particular date, and in which each appraisal is a separate project. Both types of appraisal involve economic analysis.

Except for unusual properties, which require the use of single-property appraisal techniques, property tax administrators rely on mass appraisal. A modern mass appraisal program requires a number of linked procedures:

- Collection and maintenance of data on the attributes of the inventory of taxable properties (section 3.1, above);

- Collection of evidence of market values, such as sales, rents, construction costs, and so on (section 3.2);
- Market analysis;
- Development and application of valuation models; and
- Evaluation of valuation accuracy.

4.1 Preliminary Analyses

Valuation begins with a number of preliminary activities. Their purposes are to explore available market evidence to get an idea about valuation methods that likely will be successful, divide the overall valuation task into sub-tasks, and lay the foundation for valuation modeling. These activities include:

- Stratification. Stratification in mass appraisal is the delineation of properties into groups such as property types (classes) and market areas (neighborhoods) for descriptive purposes, statistical analysis, and implementation of any differentials in taxation. Stratification of properties into more homogeneous groups can improve the mass appraisal process provided there are adequate market data in each group. Overly small strata compromise statistical reliability.
- Profiles of the properties in each class. A “profile” describes the range of properties in each class and the characteristics of typical properties. It also includes counts of properties with various attributes.
- Price level patterns and trends. Valuers should continuously analyze sales data for trends and patterns. All vacant land sales should be expressed on an appropriate per-unit basis (e.g., square meter or hectare) and plotted on maps. If available, a geographic information system (GIS) can help automate the process. Similarly, buildings and apartment sales can be expressed on a per-square meter or per-unit basis as appropriate.

Valuers can then analyze per-unit values by strata and substrata, for example, by neighborhoods and age groups to discern typical values and patterns. Graphs can be particularly helpful in this regard. For example, a scatter plot can be used to show how price per meter relates to number of square meters or how price per square meter varies with effective age. Other graphs (e.g., “box” plots and bar charts) can depict the relationship between prices and qualitative characteristics like neighborhood, quality class, or design type.

- Base-line ratio study. Ratio studies are briefly described in the section on quality assurance.
- Depreciation. When the cost approach is used, sales data should be used to develop depreciation schedules or to verify the depreciation schedules in cost manuals. Separate schedules should be developed for major construction grades and market types (or areas).

- Comparable selection. The CAMA system should have an acceptable means of identifying comparable sales and comparable properties.

4.2 Valuation Modeling

A valuation model is a mathematical representation of the effects of property supply and demand factors on market prices. Valuation models vary with the type of market evidence used. Models based on sales prices often are called market models. They should be used whenever there are sufficient sales. Income models should be developed for properties that typically are rented. Cost models should be developed for use as a fallback approach when there are insufficient sales or rents of the type of property in question.

Mass valuation modeling involves model “specification” and “calibration.” Specification is theoretical and involves deciding which valuation approach to use, which property characteristics likely have a significant effect on property values, and how those characteristics are assumed to affect value. Calibration is the process of estimating the coefficients associated with the variables in a mass appraisal model. Calibration is the empirical, analytical work appraisers and analysts do in developing models. Specification and calibration may be repeated several times as a model is tested and refined.

A typical mass appraisal system comprises separate models for major types of property and for each approach to value.

- Land Values. Supportable estimates of land values are crucial in the valuation of vacant (unbuilt) land and to successful applications of the cost approach. Valuers would use recognized land valuation methods and rely primarily on sales data. In a typical mass appraisal system, market areas (or “zones”) are identified, base rates (per square meter or other unit of measure) are estimated, and adjustments to base rates are developed to reflect micro-locational and other factors. Market area codes are part of each property record, and base rates and adjustments are stored in tables in the CAMA system.
- Improved Properties. “Improved” properties are land plots with buildings on them. Mass appraisal models for valuing improved properties can range from simple average value per-unit models to multivariate models calibrated with multiple regression analysis (MRA) or another technique. For more information on sales comparison models, see chapters 14 and 15 of *Property Appraisal and Assessment Administration* (IAAO, 1990) and chapters 3 and 4 of *Mass Appraisal of Real Property* (IAAO, 1999).
- Mass Appraisal Applications of the Income Approach. The income approach develops a relationship between current market rents and value. It is applicable to properties that often lease or rent, such as apartments, retail stores, and office buildings. The income approach is particularly appropriate for such properties because it reflects the way investors analyze them in making buy, sell, and hold decisions.

Application of the income approach begins with an analysis of rent information. Conventional use of the income approach proceeds by (1) determining potential gross rent per unit, (2) multiplying by the number units to estimate potential gross rent for the property, (3) subtracting typical vacancy and collection (non-payment of rent) losses to estimate effective gross rent, (4) add any miscellaneous income, (5) subtract allowable expenses to arrive at net operating income, and (6) applying an appropriate capitalization rate. Two general approaches can be used to convert estimated net incomes into value. The preferred approach is *direct capitalization*, in which valuers determine the typical relationship between net income and value from sales analysis. Especially when there are insufficient sales for direct capitalization, yield capitalization may be used (there are many techniques, each with its own underlying assumptions, which must be understood by the valuer and appropriate in the circumstances). If the CAMA system does not have an adequate income and expense data analysis system (many do not), a spreadsheet or statistics package can be used.

- Use of the Cost Approach. The cost approach is based on the principle that, aside from time considerations, a buyer will pay no more for a property than the cost of acquiring a comparable site and constructing a building of like utility. Because the cost approach requires separate estimates of land and building values and uses cost rather than sales or income data, the cost approach is theoretically less preferred than the sales comparison and income approaches. However, the approach applies to most property types and is the most reasonable approach when sales or income data are inadequate. It is especially appropriate for valuing owner-occupied manufacturing and other properties that are seldom sold.

The cost approach begins with an estimation of the cost of replacing the building new. Next, an estimate is made of accrued depreciation from all causes (physical, functional, and economic or external). Subtracting depreciation from cost new yields depreciated cost new less depreciation (RCNLD). To this is added a separate estimate of land value. Finally, the resulting value must be checked against the market and any appropriate adjustments applied. Mass appraisal applications of the cost approach require the development of a cost-estimating manual (in North America, most assessors use commercially prepared manuals, although it is possible to develop locally by doing detailed cost research). Cost manuals provide specifications and base rates per square meter for various building types. They also contain adjustments to apply for departures from base specifications and costs of ancillary structures. In mass appraisal these costs are generally replacement (versus reproduction) costs. Regardless of source, cost manuals should reflect current, local costs for all property types. In mass appraisal, cost schedules should be computerized.

4.4 Model Application and Value Review

It is poor practice to adopt computer-generated value estimates as the basis for assessments without first reviewing the estimates for consistency and reasonableness. After the models have been applied, analysts would make a statistical review of preliminary value estimates using ratio

studies. If the values did not meet effectiveness targets, the analysts would recalibrate the models as necessary.

After statistical reviews have been made, each individual preliminary value estimate would be reviewed for reasonableness and consistency with the estimates of nearby and comparable properties. That is, the value estimates should be similar unless the differences can be justified. If more than one estimate of value has been produced for a property (a recommended practice), a choice would be made as to the most supportable estimate. Value reviews are facilitated by the preparation and use of review documents, which show basic property characteristics and new and existing values for each property in a stratum. Well-designed value review reports list properties in the order in which they would be viewed while traveling down a street. Reviewers also should be provided with guidelines on when and how to override computer-generated value estimates. Desirably, the reviews would be made in the field. However, when property characteristics data have been recently verified and when the reviewer is familiar with the properties in question, a field review is not essential.

In conjunction with their uses as a direct valuation approach or in value defense, comparable property selection routines can be used in quality assurance. It is particularly useful to compare the appraised value of each (subject) property with the adjusted sales prices of properties selected as most comparable to the subject property. (The adjustments to actual sales prices compensate for differences between the characteristics of each comparable and the subject property). When the comparables are similar to the subject property and when estimated value of the subject property and the adjusted sales prices of the comparables are similar, one can be confident the appraised value of the subject property is supportable.

4.5 Keeping Values Current through Indexing and Revaluations

The fairness of value-based property taxes is increased when value estimates are in line with current market values. Consequently, the property tax administration should attempt to develop the capacity to keep values current.

There basically are three value update options: (1) indexing or trending existing valuations, (2) re-calibrating or updating existing models, and (3) calibrating new valuation models. The property tax administration can select the strategy most appropriate for the type of property in question. Trending (indexing) can be used as long as uniformity standards for the class of property or area continue to be met. Cost, income, and sales comparison models can be re-calibrated using updated market data. However, a full revaluation is required when there have been fundamental changes in the economy. For example, trending may produce satisfactory results in recently developed housing areas, but it may be necessary to do a full revaluation of property in the commercial core. In other words, it is not always necessary to revalue every property every year; assessments only need to be changed when there is a clear indication based on market evidence that valuations no longer meet standards.

As previously mentioned, valuers should monitor sale price trends, monitor rent and operating expense levels, and monitor construction costs. They also would conduct ratio studies at least

annually. As needed, they would build new valuation models or recalibrate existing models. They would continue to review revised value estimates.

5. Notice and Appeal

Property tax ratepayers have a fundamental legal right to appeal their assessments. For this right to be meaningful, there must be sufficient notice and there must be an independent and responsive appeal procedure. From a system perspective, the appeal procedure provides a final, independent quality assurance procedure. In this sense, the appeal procedure makes a positive contribution to improving valuation results.

Appeals systems establish who may appeal a property tax assessment and the time, place, and manner of filing an appeal. They specify the allowable grounds for an appeal. Over-valuation is a common ground in a value-based system. Some systems allow appeals on the basis of non-uniformity as well. Sophisticated legal systems specify standards of appeal (burdens of proof) and standards governing the admission of evidence. Later sessions deal with appeal systems in more detail.

6. Taxpayer and Stakeholder Relations

Effective dissemination of information to the public about property taxation and taxpayer assistance programs are integral to public acceptance of a property tax. Efforts to secure this acceptance should occur at all levels of government involved in property tax administration. Policy makers and tax administrators must communicate effectively with taxpayers. The rationale for the tax, how it is administered, and taxpayers' rights and responsibilities must be explained.

Records should be open and available for public inspection unless confidential information is involved. An accessible, effective appeal system is required. Individual inquiries should be answered. The tax administration should demonstrate at every opportunity that the tax is being equitably administered.

Acknowledgements and References

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References on real property assessment and mass appraisal (with a Canadian and US flavor) include:

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