Tangible Personal Property Appraisal Approaches, Methods, and Procedures

Lerry A. Suarez and John C. Ramirez

Appraisals of industrial or commercial tangible personal property ("TPP") prepared for property tax purposes are often subject to contrarian review. In order to withstand such a contrarian review, the TPP appraisal should rely on generally accepted property appraisal approaches, methods, and procedures. This discussion summarizes the generally accepted property appraisal approaches, the generally accepted property appraisal methods applied within each approach, and the individual procedures that would be applicable to the appraisal of special purpose industrial or commercial TPP for property tax purposes.

Introduction

There are many reasons why valuation analysts ("analysts") may be asked to value industrial and commercial tangible personal property ("TPP"). These valuation purposes include sale/license transactions, secured financing, taxation, financial accounting, litigation, and bankruptcy.

For whatever purpose the TPP appraisal is prepared (including for property tax compliance, appeal, or litigation purposes), the appraisal may be subject to contrarian scrutiny and review.

In order to withstand contrarian scrutiny, particularly within the property tax appeal or litigation context, the industrial and commercial TPP appraisal should follow generally accepted property appraisal approaches, methods, and procedures.

This discussion introduces issues related to the valuation of industrial or commercial TPP for property tax purposes. Most of these issues relate to the valuation of locally assessed industrial or commercial TPP that is valued based on the summation principle of property appraisal. Some of the issues summarized in this discussion also relate to the valuation of centrally assessed industrial and commercial TPP that is valued based on the unit principle of property appraisal.

This discussion (1) summarizes what TPP is, (2) explains the generally accepted property appraisal approaches, and (3) describes the various appraisal methods and procedures applied to value industrial or commercial TPP for property tax purposes.

Tangible Personal Property

For property tax compliance, appeal, or litigation purposes, it is often necessary to distinguish between tangible property and intangible property, as well as between real estate and personal property. These distinctions are also important for a variety of financial accounting, income taxation, legal/regulatory, and financing purposes that are not related to property taxation.

Taxpayer tangible property can either be real (i.e., the value is derived from land) or personal (i.e., the value is not derived from land) in nature. Likewise, taxpayer intangible property can either be real (i.e., the value is derived from land) or personal (i.e., the value is not derived from land) in nature.

The textbook *Valuing Machinery and Equipment* defines TPP as "[a]n asset that maintains all rights that can be transferred to another party and that can be seen and felt."[1]

More generally, TPP includes movable tangible assets that are not permanently affixed to or part of real estate. TPP is not endowed with the rights of real estate ownership.

It is sometimes difficult to determine whether a particular asset should be considered as TPP or as real estate. For example, a fixture is typically an asset that was once personal property. But, once the fixture is installed or attached to the land or building in a permanent manner, it may be considered as part of the real estate.

To help determine whether a particular asset should be considered as TPP or as real estate, analysts often consider questions regarding the asset's permanency. These questions, sometimes referred to as the "Whiteco Factors," include the following:

1. Can the property be moved and has it been moved?
2. Is the property designed or constructed to remain permanently in place?
3. Are there circumstances that show that the property may or will have to be moved?
4. Is the property readily movable?
5. How much damage will the property sustain when it is removed?
6. How is the property affixed to land?[2]

Examples of TPP include furniture and fixtures, tools and dies, machinery and equipment, office and data processing equipment, trucks and automobiles, and (sometimes) merchandise inventory.

The generally accepted TPP appraisal approaches include the cost approach, the sales comparison approach, and the income approach. Each of these generally accepted property appraisal approaches is summarized below.

Generally Accepted Property Appraisal Approaches

The cost approach considers the concept of property cost as an indicator of value. A prudent investor will typically pay no more for a fungible property than its replacement cost new ("RCN").

One cost approach method is the replacement cost new less depreciation ("RCNLD") method. In this method, first, the RCN of the property is estimated. Second, this RCN estimate is adjusted for all forms of depreciation in order to provide a value indication for the property. The depreciation components typically considered in any cost approach analysis include physical deterioration, functional obsolescence, and external obsolescence.

Physical deterioration is a loss in the value of the property brought about by wear and tear, action of the elements, disintegration, use, and all physical factors that reduce the life and serviceability of the property.

Functional obsolescence is a loss in the value of the property caused by the inability of the property to adequately perform the function for which it was intended. Functional obsolescence is typically internal to the property. Functional obsolescence is typically related to such factors as excess capital costs, excess operating costs, and superadequacies/inadequacies.

External obsolescence is a loss in the value of the property caused by external forces such as changes in the supply/demand relationships, legislation, and industry and local economic conditions that affect the value of the property.

Two components of external obsolescence include (1) locational obsolescence and (2) economic obsolescence. TPP is moveable. Therefore, the economic obsolescence component of external obsolescence is typically more significant than the locational obsolescence component in the cost approach appraisal of TPP.

In the sales comparison approach, recent sales of comparable property are gathered and analyzed by the analyst. Adjustments are then applied to these comparable property sale transaction data to account for differences in the age and condition of the subject property, time of sale, and the physical characteristics between the property and the comparable property.

The adjusted sale transaction pricing data are analyzed in order for the analyst to extract market-derived pricing multiples or other pricing metrics. From this array of market-derived pricing data, the analyst can derive an indication of the property value.

The income approach measures the present worth of the anticipated future income (e.g., net income, net operating income, or net cash flow) associated with the ownership or operation of the property. The income measure is projected over an appropriate time period. The projection period typically relates to the property's expected useful economic life ("UEL") . The income stream is brought to a present value by the use of an appropriate market-derived, risk-adjusted rate of return (in the yield capitalization method).

Alternatively, a single period estimate of normalized income may be capitalized by (i.e., divided by) a direct capitalization rate (in the direct capitalization method). This capitalization rate considers the

time value of money, the effect of expected price inflation, and the risk inherent in the property ownership.

The following discussion summarizes the conceptual foundation related to the three generally accepted property appraisal approaches. Unless otherwise indicated, the following discussion focuses on the application of the summation principle (rather than the unit principle) of property valuation.

The Cost Approach

The cost approach is often applied to value industrial or commercial TPP.

The principle of substitution governs the application of the cost approach. This economic principle indicates that a prudent investor would pay no more for a fungible TPP than the cost of producing a substitute TPP with the same utility as the actual property. This economic principle only applies when a prudent purchaser can either construct or buy a new substitute TPP with equivalent utility to the TPP.

The cost approach measures value by estimating a cost metric related to the utility of the TPP and then applying deductions for all relevant forms of depreciation. For TPP, these forms of depreciation typically include (1) physical deterioration, (2) functional obsolescence, and (3) external obsolescence.

One cost measurement metric is RCN. RCN represents the dollar amount necessary in terms of current labor, materials, and overhead to construct or acquire new TPP of similar utility. Similar utility means similar economic satisfaction—that is, the substitute property is perceived by the owner or operator as being equivalent to the actual property.

RCN is not the same as reproduction cost new ("RPCN"). The textbook *Valuing Machinery and Equipment* explains the terms RCN and RPCN as follows:

> It is essential that the appraiser understand the difference between replacement cost new and reproduction cost new. Replacement cost new is the current cost of a similar new property having the nearest equivalent utility as the property being appraised, whereas RPCN is the current cost of reproducing a new replica of the property being appraised using the same, or closely similar, materials.
>
> In using the cost approach, the appraiser is comparing the subject property to the property that could actually replace it. The replacement property would be the most economical new property that could replace the service provided by the subject.[3]

In its simplest form, the cost approach estimates a cost measurement of the TPP less all forms of depreciation. In the cost approach, the analyst identifies the TPP, develops a current cost new estimate, and subtracts all depreciation that makes the TPP less desirable to own than if it were new.

The TPP appraisal report should identify the cost measure used as the starting point in the cost approach analysis: (1) RCN, (2) RPCN, or (3) some other defined measure of cost.

The Sales Comparison Approach

In the sales comparison approach, the fundamental principle is that a prudent investor can go to the marketplace and purchase property that can be assembled to provide similar output as the property. The sales comparison approach is applied to the appropriate secondary market. By researching secondary market sales transaction data, the analyst estimates value through an analysis of recent sale prices of guideline properties.

A basic procedure in the application of the sales comparison approach is to gather empirical

transaction data, determine the relevant pricing metrics to be compared (between the property and the guideline properties), and apply the market-derived pricing metrics to the TPP.

Generally, in applying the sales comparison approach to value of the TPP "in place," the analyst (1) estimates the price to purchase the property in the appropriate secondary market and (2) adds tax, freight, installation, connection, and testing costs.

This is because the secondary market sale transaction data typically indicate the value "in exchange" for the subject property. The analyst has to add delivery, installation, and other costs in order to convert this "value in exchange" estimate to a "value in use" estimate.

In applying the sales comparison approach, it is sometimes possible to arrive at value indications based on the sales of identical properties that have changed hands in the secondary market. However, while it is possible to identify secondary market prices for TPP based on like manufacturer model numbers, unique configurations of specific TPP often make it difficult to obtain data on multiple sales of comparable (or nearly identical) TPP.

Therefore, in practice, the investigation and analyses of the sales of similar, or guideline, TPP in the secondary marketplace is often the basis of the sales comparison approach value estimate.

In addition to the physical configuration of the comparable/guideline TPP, the following factors may be considered in determining the comparability of the guideline TPP to the subject TPP:

- Age of the unit sold
- Condition of the unit sold
- Upgrades or other changes from the standard model specifications
- Location of the sale transaction
- Current market conditions and/or changes in market conditions
- Motivation for the sale
- Quantity of units sold
- Time of the sale
- Type and terms of the sale
- Price, on a cash equivalency basis

Each of these comparability factors has its own importance. And, the importance of each of these factors depends on the type of guideline TPP sales data available.

In applying the sales comparison approach to value TPP, elements that add value-in-use may be identified and included in the value estimate. For most TPP, these elements may include sales tax, insurance, freight, delivery, installation, connections, test batch loading, debugging, and any other indirect costs required to commission and deliver the TPP to the property owner/operator.

The Income Approach

The income approach provides a systematic framework for estimating the TPP value—particularly of rental property—based on an income capitalization or on the present value of future income. This income is typically derived from the use, forbearance, license, or rental of the TPP.

Applying the income approach, income can be measured as one of the following:

- Gross rental income
- Net rental income
- Gross license income
- Net license income
- Gross operating income
- Net operating income

Quantifying the appropriate capitalization rate or present value discount rate is an important procedure in the income approach. The appropriate capitalization rate or discount rate should reflect a fair return on the investment in the TPP. And, the capitalization rate or discount rate should consider the opportunity cost of capital, the time value of money, and the risk of the investment in the TPP.

In applying the income approach to value TPP, the expected UEL of the TPP is an important consideration. This is because the income projection associated with the TPP will typically not extend beyond the term of the UEL.

Cost Approach Property Appraisal Methods

The various cost approach property appraisal methods relate to the following economic principles:

1. Substitution—concludes that no prudent buyer would pay more for a fungible property than the total cost to "construct" one of equal desirability and utility
2. Supply and demand—shifts in supply and demand cause costs to increase and decrease and cause changes in the need for supply of different types of property

3. Externalities—gains or losses from external factors may accrue to property, and may cause a newly "constructed" property to be worth more or less than its cost

One cost approach method is the RPCNLD method. The fundamental principle behind this method is that a value indication for the TPP is its cost new less an allowance for any physical deterioration as well as for any obsolescence—including functional and external. This principle can be applied either to an individual property or to a unit (or bundle) of TPP.

When estimating RCN, the form or appearance of the replacement TPP may be different from the TPP. However, the replacement TPP will be similar to the actual TPP in such functionality attributes as capacity (volume of production) and throughput (speed and efficiency of production). When estimating reproduction cost new ("RPCN"), the reproduction TPP will be identical to the actual TPP in such physical attributes as manufacturer, model or series, and motor or engine size.

In other words, RCN contemplates the cost to recreate the functionality or utility of the property. RPCN contemplates the construction of an exact replica of the actual property.

The industrial or commercial TPP appraisal report should identify the following:

1. The measure (or type) of cost estimated
2. The method used to estimate cost
3. The data sources used to estimate cost

The textbook *Valuing Machinery and Equipment* describes some of the methods for estimating cost as follows:

> There are several methods of determining the current cost new of a property. The major ones are the detail method, trending, cost to capacity, and other engineering methods.
>
> The detail method, also known as the summation method, requires that a current new cost be assigned to each individual component of an asset or property. The property is itemized or "detailed" so that the sum of the components reflects the cost new of the whole.
>
> All normal or typical direct and indirect costs should be included. Direct costs are those material, labor, and related expenditure normally and directly incurred in the purchase and installation of an asset, or group of assets, into functional use . . .
>
> Indirect costs are those expenditures that are normally required to purchase and install a property but which are not usually included in the vendor invoice.[4]
>
> Trending is a method of estimating a property's RPCN (not RCN) in which an index or trend factor is applied to the property's historical cost to convert the known cost into an indication of current cost. Simply put, trending reflects the movement of price over time.
>
> Historical cost is the cost of a property when it was first placed into service by its first owner. This is to be distinguished from original cost, which is the actual cost of a property when acquired by its present owner, who may not be the first owner and who may have purchased at a price greater or less than the historical cost. Original cost may be the used cost of the property, whereas historical cost can never be a used cost. Obviously historical cost and original cost may be the same.[5]
>
> A third method of estimating cost new is commonly referred to as cost to capacity method. This methodology assumes that not all costs vary with size in a straight line.[6]
>
> Several other engineering methods may be used to estimate the cost of entire facilities or components of facilities; most of these methods are best used in chemical or petrochemical processing industries.[7]

As mentioned above, there are several procedures that may be applied to estimate the cost of TPP. These procedures include the detail, trending, cost to capacity, and other engineering methods. Of these four procedures, the detail method and the trending method are sometimes applied in TPP appraisals performed for property tax purposes.

The detail method allows for a cost to be assigned to each individual component of a property. The TPP is itemized or "detailed" so that the sum of the components reflects the cost of the whole.

The trending method estimates the RPCN of property. In the trending method, an index or trend factor is applied to the TPP historical cost in order to convert (1) the known historical cost into (2) an estimation of the RPCN.

To convert the property costs (replacement, reproduction, historical) into a value indicator, the cost measure is adjusted (typically in decrements) for any physical deterioration, functional obsolescence, or external obsolescence related to the property.

Physical Deterioration

The textbook *Valuing Machinery and Equipment* defines physical deterioration as follows:

> Physical deterioration is a form of depreciation where loss in value or usefulness of a property is due to the using up or expiration of its useful life caused by wear and tear, deterioration, exposure to various elements, physical stresses and similar factors.[8]

The particular method applied to measure physical deterioration should be identified and defined. The specific procedures applied within the identified method should be explained. In addition, any significant data sources should be identified.

The methods for measuring physical deterioration include (1) the physical observation method, (2) the age/life method, and (3) the direct dollar measurement method.

The appraisal report should adequately describe the method that was applied and how it was applied. All valuation terminology should be identified and defined. This recommendation is particularly relevant to the age/life method, which may involve nonintuitive "age" and "life" measures.

The textbook *Valuing Machinery and Equipment* summarizes these three methods of estimating TPP physical deterioration:

> Three methods of measuring physical deterioration that were discussed are observation, formula/ratio and direct dollar measurement.
>
> In the observation method, the appraiser makes a comparison based on the experience gained by looking at similar properties and comparing them to new properties.
>
> In one variation of the formula/ratio method, physical deterioration is estimated based on a property's use. Use is a good indicator of physical deterioration when the requisite production statistics can be obtained.
>
> The age/life variation of the formula/ratio method uses the ratio of a property's "age" to its "life" to measure physical deterioration. Although this is straight-line depreciation, it should not be confused with accounting depreciation because the appraiser uses valuation rather than accounting concepts of age and life.[9]

Functional Obsolescence

The textbook *Valuing Machinery and Equipment* defines functional obsolescence as follows:

> Functional obsolescence is a form of depreciation in which the loss in value or usefulness of a property is caused by inefficiencies or inadequacies of the property itself, when compared to a more efficient or less costly replacement property that new technology has developed. Symptoms suggesting the presence of functional obsolescence are excess operating cost, excess construction (excess capital cost), over capacity, inadequacy, lack of utility, or similar conditions.[10]

The TPP appraisal report will typically:

1. describe the concept of functional obsolescence,
2. explain the method(s) used to identify and quantify functional obsolescence, and
3. describe the data sources considered in the functional obsolescence analysis.

In quantifying functional obsolescence, some obsolescence (e.g., excess capital cost, excess capacity cost) may be eliminated by applying a RCN measure (in contrast to an RPCN measure). Additional adjustments for functional obsolescence may be made by quantifying excess operating expenses and capitalizing these excess expenses over the UEL of the TPP.

The methods that may be applied to quantify functional obsolescence include the following:

1. Analysis of excess capital costs
2. Analysis of excess operating costs

Valuing Machinery and Equipment describes instances of functional obsolescence. If applicable to the TPP, these instances may be noted in the appraisal report:

> Functional obsolescence, particularly operating obsolescence, is typically found in the following situations:
>
> - plants involved in the process industries;
> - plants involved in industries that either use assets or manufacture products with a high degree of technology;
> - older plants that have increased in size over time;

- plants in which there are a number of identical units;
- plants involved in industries that handle large volumes of material; and
- plants with areas of inactive machinery.[11]

Economic Obsolescence

Valuing Machinery and Equipment defines economic obsolescence as follows:

> Economic obsolescence (sometimes called "external obsolescence") is a form of depreciation where the loss in value of a property is caused by factors external to the property. These may include such things as the economics of the industry; availability of financing; loss of material and/or labor sources; passage of new legislation; changes in ordinances; increased cost of raw materials, labor, or utilities (without an offsetting increase in product price); reduced demand for the product; increased competition; inflation or high interest rates; similar factors.[12]

Particularly in a TPP appraisal performed for property tax purposes, the appraisal report may describe the following:

1. The factors considered in identifying external obsolescence
2. The methods applied in quantifying external obsolescence
3. The specific data sources relied on in the external obsolescence analysis

Many analysts distinguish between two forms of external obsolescence: (1) economic obsolescence (when the TPP does not generate adequate income to provide a fair rate of return to the property) and (2) locational obsolescence (when the obsolescence is a result of the location of the TPP).

Locational obsolescence affects real estate more directly than it affects TPP.

The quantification of external obsolescence is often made collectively. For example, if an economic analysis of the property operations indicates that the expected return on investment is less than the owner/operator's cost of capital, then external obsolescence may be present.

Sales Comparison Property Appraisal Methods

The sales comparison approach encompasses fewer methods than the cost approach or the income approach. However, the practical application of the sales comparison approach is as complex and rigorous a process as the application of the cost approach or the income approach. The comparability of the selected TPP sale transactions is an important aspect of the sales comparison approach.

Transactions selected for the sales comparison approach analysis may be adjusted, if necessary, to compensate for the effect of economic forces that influenced the TPP market during the time interval elapsed between the date of the guideline sale and the valuation date. Market prices move upward or downward with changes in supply and demand, variations in business cycles, and changes in the value of money.

Other adjustments to the guideline sales are made to account for differences between the guideline properties and the TPP. Any adjustments related to differences due to variations in age, features, and quality of the guideline TPP versus the TPP may be identified and quantified in the appraisal report.

Market comparisons are based on the overall percentage value adjustment required in order to make each selected TPP sale transaction with the TPP. The overall percentage applied to each property in turn is justified by the analyst's explanation that the TPP is superior, inferior, or the same in relation to its type, features, age, and condition. By adjusting the guideline sale prices upward or downward in accordance with the characteristics of the TPP, a market value estimate is derived.

The sales comparison approach is applicable to situations where there are an adequate number of similar properties that have recently sold. When using these sales data, the analyst should try to verify each sale in order to confirm the relationship of the parties, date of sale, and any financing terms. In analyzing guideline sales, it may be necessary to adjust a price if prices have changed between the time the guideline TPP sold and the subject valuation date. Also, an adjustment is typically required if a guideline property's sale price was influenced by financing terms.

The cash equivalency method is sometimes used to adjust for this price influence. The purpose of this adjustment is to reveal the price that a guideline TPP would have brought without the influence of atypical financing.

Normally, sales comparison approach appraisal methods are only practical when an adequate secondary market exists from which to extract meaningful pricing evidence.

Income Approach Property Appraisal Methods

The income approach is particularly applicable to the appraisal of leased TPP. This is because such TPP generates property-specific rental income. Examples of such property include commercial aircraft, railroad locomotives and rolling stock, over-the-road tractor/trailers, and so forth.

To estimate value by application of the income approach, the expected rental income or cash flow is converted to a present value. The income approach appraisal methods may be categorized as either direct capitalization methods or yield capitalization methods.

Direct capitalization methods sometimes rely on direct capitalization rates typically extracted from guideline sales. Additionally, yield capitalization methods rely on yield capitalization rates that are typically derived as the internal rate of return required by the typical investor.

When either calculating value or extracting multipliers, the analyst should ensure that the income metric (however measured) is calculated on a consistent basis.

Property value may be estimated by dividing the one period net operating income by a capitalization rate. That capitalization rate may be estimated by:

1. extracting overall rates from guideline TPP sales,
2. comparing the guideline TPP attributes (physical, functional, and financial) to the TPP, and
3. selecting an appropriate capitalization rate.

Values are often estimated by projecting cash flow over a typical holding period and discounting the cash flow to a present value using a discount rate. This valuation method is called yield capitalization (or a discounted cash flow analysis).

The discount rate directly addresses the expected profitability of the TPP operations. The cash flow components typically projected in a TPP appraisal are net operating income and the net proceeds from the property resale. The discount rate is also called the yield capitalization rate.

The cost of capital components that are considered in the discount rate and/or the capitalization rate measurement include (1) the prevailing risk-free rate, (2) the amount of risk of the property, and (3) the expected price inflation rate.

Tangible Personal Property Appraisal Procedures

The application of each generally accepted property appraisal approaches and methods typically follows these procedures:

1. Inventory and inspection
2. Data collection and analysis
3. Valuation analysis and conclusion

TPP Inventory and Description Procedures

Some of the typical procedures in the property appraisal include obtaining the property listing, confirming the presence of the property (if possible), and inspecting the condition of the property (if possible).

The analyst may create his or her own listing of the TPP based on inventory and inspection procedures. However, if possible, a detailed property listing should be obtained from the property owner/operator for comparison.

The following tests of inclusion and exclusion may be performed on the property listing:

1. Verify that all TPP included on the owner/operator's listing is available for inspection and inventory.
2. Remove from the owner/operator's listing any TPP items included on the property listing that are not available for inspection (e.g., not physically remaining at the facility).
3. Verify that all property available for inspection (i.e., physically at the facility) is included on the property listing.
4. Add any property items observed during the inventory and inspection that are excluded from the personal property listing.

The result of these TPP listing verification, inclusion/exclusion, and inventory procedures should be an accurate, updated, and verifiable inventory listing.

In a summation principle valuation, the data on the property listing may be verified through inventory procedures, including the following:

1. Property listing number

2. Owner/operator property identification number or bar code
3. Manufacturer and country of origin
4. General category of TPP
5. Type of TPP
6. Model number
7. Serial number
8. Date of manufacture
9. Location, including building address, room number, or other indication of physical location
10. Capacity of the TPP compared to model specifications
11. Internal upgrades or enhancements to the TPP compared to model standards
12. Appurtenances and other external peripherals attached to the TPP, and whether they have been identified and noted separately in the property listing
13. Last physical inventory date
14. Date that the TPP item was put into service

TPP Data Collection and Analysis Procedures

The detailed property listing may contain certain property information such as the original cost of the property, the date the property was placed into service, and the amount of accumulated depreciation related to the property.

Certain data on the property listing may be verified with the property owner's accounting department. This includes the TPP original cost, the actual purchase order, the paid invoice amount, the purchase order date, the invoice date, the date the property was received in the property owner's warehouse, the date the property was actually placed into service, and any sales tax, freight, insurance, or other delivery expenses recorded on the original invoice.

TPP Data Collection Procedures for the Cost Approach Analysis

For each TPP item, the following cost and expenses may be estimated based on either (1) the analyst's personal experience or (2) the analyst's consultation with the owner/operator operations or maintenance departments:

- Installation costs—such as set-up costs based on the normal amount of time required for various activities, including unpacking and checking, and making necessary power and other internal or external connections
- Special requirements—expenditures required specifically for the subject property to work efficiently, such as high-power source and wiring, dust-free air equipment, and installation
- Commissioning expenses—such as start-up expenses based on the normal time required for. example, loading necessary systems and applications software, debugging, and delivery to the TPP operator.

TPP Data Collection Procedures for a Cost Approach Method

For each TPP category on the property listing, the appropriate price, production, and cost indexes may be researched. An index is the mathematical relationship of relative changes in the price or the cost of specific items or groups of items over time.

TPP Data Collection Procedures for a Sales Comparison Method

For an individual TPP item on the detailed property listing, transactional data of the actual sale of guideline TPP may be researched. Guideline TPP generally has the same characteristics as the subject property with regard to the following:

1. Manufacturer and country of origin
2. General category of property
3. Specific type of TPP
4. Model number
5. Date of manufacture (any difference in the year of manufacture may be noted and considered in the final analysis)

If sufficiently comparable sales transactions are not found, then the analyst may search for guideline TPP sales transactions. Guideline TPP performs the same functions as the subject TPP.

One difference between the guideline property and the subject property is often the manufacturer. Guideline properties are often identified using specifications of comparable models produced by different manufacturers.

If possible, the analyst may verify or otherwise confirm the following information with regard to each guideline TPP item sale:

1. Actual market price of the comparable/guideline TPP sale transaction

2. Time (month and year) of the sale transaction
3. Location of the sale transaction
4. Condition of the comparable/guideline TPP
5. Any upgrade or deviation from the property model's standard specification
6. Any appurtenances of the comparable/guideline TPP included/excluded in the sale
7. Any special terms and conditions of the sale

TPP Data Collection Procedures for an Income Approach Method

For each TPP item on the property listing, transactional data with regard to the actual rental of guideline property may be researched.

For each rental transaction of guideline TPP, the terms and conditions of the agreement may be verified, including the term of the agreement, rent payable for each period of the term, inclusion of any penalty clause, the amount of the penalty, the inclusion of any purchase clause, and the contractual purchase price.

For each rental TPP item, the following data may be considered: rental history, maintenance history including expenses, general and administrative expenses, and marketing and advertising expenses. Also, the following components included in the estimation of the appropriate rental income capitalization rate may be considered:

1. The prevailing risk-free rate
2. The amount of risk associated with the subject TPP
3. The expected price inflation rate

TPP Data Analyses Procedures for a Cost Approach Method Only

Using a cost of production index for the property operator's industry, cost "inflation" trending factors may be developed for each vintage TPP group. The cost new of the TPP may be estimated by multiplying the historical cost by the appropriate age-dependent cost trending factors.

The average age of the TPP may be estimated. Based on property-specific statistical studies, or on published information regarding the effective life of TPP in the industry, the property UEL may be estimated.

Using this life estimate as a proxy, the "percent-good" for the subject property may be estimated. The percent-good conclusion equals (1 – physical (i.e., not accounting) depreciation percentage). This percent-good factor considers normal physical depreciation.

From the observations regarding the condition of the TPP, its maintenance schedule, and other factors, the costs that would be required to bring the existing property to state-of-the-art—or the costs required to operate the property at less than state-of-the-art—may be estimated. This is one basis for the identification and estimation of curable functional obsolescence.

To derive an estimate of external obsolescence, the subject industry may be analyzed, including a review of any new government regulations being passed, and the demand of the product and supply of raw material—as well as competitive products. The input from these subject industry sources may lead to the identification and quantification of external obsolescence. Other marketplace influences (not related to the subject industry) may also cause external obsolescence.

TPP Data Analysis Procedures for a Sales Comparison Method

Adjustments to the transactional sale price may be made for any differences between the specifications and information regarding the TPP, including the following:

1. Year of manufacture of the guideline TPP
2. Manufacturer and specifications of the guideline TPP
3. Time between the guideline sale date and the valuation date
4. Location of the guideline sale and the location of the TPP
5. Condition of the guideline TPP relative to the TPP
6. Any additions/deletions to the specifications of the guideline TPP and of the TPP
7. Any special terms and conditions of the guideline sale transaction should be adjusted to reflect the sale of a fee simple interest.

Based on consideration of the above-described adjustments, an adjusted market price for the TPP may be estimated.

TPP Data Analyses Procedures for an Income Approach Method

The market-derived normalized—or stabilized—annual rental income for the TPP may be estimated. Maintenance, marketing, and other administrative expenses may be estimated. The procedure for

"normalizing" rental income should eliminate (1) less than a full year of income in the first year of a lease and (2) "free" months of rental to a lessee in the first year of a lease.

The net operating income associated with the rental of the TPP may be calculated. Next, the expected UEL of the subject TPP may be estimated. Finally, the TPP capitalization rate (or present value discount rate) may be developed, based on the property-specific risk factors.

TPP Valuation Synthesis and Value Conclusion Procedures

For TPP appraisals performed for many purposes, it is reasonable to conclude a range of values as the final value opinion. However, for TPP appraisals performed for property tax purposes, it is more typical for the analyst to conclude a point estimate as the final value opinion.

Sometimes it is not possible or practical to apply more than one appraisal approach when valuing TPP. In such situations, the most appropriate appraisal approach and method is selected based on (1) the constraints of the quality and quantity of data and (2) the existing circumstances. In such an instance, the analyst may rely on this single appraisal approach to conclude the final value estimate.

If more than one TPP appraisal approach is applied, the analyst may assign an appropriate weight to the various value indications in order to calculate a value point estimate. This weight of the various value indications may be based on:

1. the relative dependability and applicability of each approach given (a) the TPP type and (b) the quantity and quality of data analyzed,
2. the confidence of the analyst in the individual valuation variables and projections, and
3. the analyst's personal experience with the subject property and the subject industry.

This value point estimate may be rounded to conclude the TPP value.

Summary and Conclusion

This discussion summarized the three generally accepted TPP appraisal approaches. Within each of the TPP appraisal approaches, there are several generally accepted appraisal methods. And, within each of these appraisal methods, there are individual appraisal procedures.

This is the sequence that the analyst typically follows in order to conduct an appraisal of industrial or commercial TPP. First, general appraisal approaches are considered. Second, individual appraisal methods are selected. Third, specific appraisal procedures—both quantitative and qualitative—are applied to the available data in order to derive value indications. And, fourth, the various value indications are reconciled in order to arrive at a value synthesis and conclusion.

There are many reasons why the analyst may be asked to appraise industrial or commercial TPP, including secured financing, income taxation or property taxation, financial accounting, litigation, and bankruptcy. For whatever purpose the appraisal is prepared, the appraisal may be subject to contrarian review.

To withstand such a contrarian scrutiny, particularly within the property tax appeal or litigation context, the TPP appraisal should follow the generally accepted property appraisal approaches, methods, and procedures summarized in this discussion.

This article was adapted from "Tangible Personal Property Appraisal Issues for Ad Valorem Tax Purposes" (*Insights*, 2008).

Notes:

1. *Valuing Machinery and Equipment*, 3d ed. (Washington, D.C.: American Society of Appraisers, 2011), 562.
2. Ibid., 373.
3. Ibid., 39.
4. Ibid., 43.
5. Ibid., 50.
6. Ibid., 51.
7. Ibid., 55.
8. Ibid., 56.
9. Ibid., 59.
10. Ibid., 56.
11. Ibid., 72.
12. Ibid., 57.

Lerry Suarez is an associate in our Portland, Oregon, practice office. Lerry can be reached at (503) 243-7512 or at lasuarez@willamette.com.

John Ramirez is a managing director in our Portland, Oregon, practice office. John can be reached at (503) 243-7506 or jcramirez@willamette.com.