NATIONAL ASSOCIATION OF REALTORS®

National Center for Real Estate Research

Commercial Real Estate Research
Terms & Data Standards

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COMMERCIAL REAL ESTATE RESEARCH TERMS & DATA STANDARDS

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COMMERCIAL REAL ESTATE RESEARCH
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I.   Overview and Executive Summary

The purpose of this report is two fold; to examine the methods, assumptions and limitations used by commercial real estate data vendors in their data collection processes and secondly, examine the leading commercial real estate data standards and review how they handle these same research terms. The data elements addressed in this report are:

1. Inventory
2. Vacancy
3. Net Absorption
4. Quoted / Asking Lease Rate
5. Sale Price
6. Construction
7. Demolition

The report will review the data collection methods used by the leading national data providers for the following real estate product types; office, retail, industrial and multifamily.   The data provider / method tables included in this report summarize the survey findings by research term and product type.

The commercial real estate data standards reviewed in this report are as follows:

- Multifamily Information Transaction Standard (MITS)
- Real Estate Transaction Standard (RETS)
- Data Consortium (DC)
- Property Information Systems Common Exchange Standard (PISCES)
- Mortgage Industry Standards Maintenance Organization (MISMO)

This report will provide a brief overview of each data standards effort, discuss the topics and area of focus for each data standard and introduce methods and technology tools for integrating data from disparate data sources.

II.   *Data Providers Included in Survey*

CoStar (and affiliated companies): Leading national commercial real estate information provider covering office, industrial, multifamily and retail property sales, leasing rates for office industrial and retail properties.

REIS: National provider of office, industrial and multifamily lease / rental data. REIS collects a portion of its data through survey calls and distributes the results as raw data and through models to each property and market.

Torto Wheaton: Torto Wheaton is a national provider of data for the office, industrial, multifamily and hotel product types. Torto Wheaton is known for its forecasts and employs data from third party sources to educate their models. Torto Wheaton uses data from NRB, CB Richard Ellis, CoStar and others to generate its forecasts.

PPR: PPR is a leading national provider of construction data and provider of vacancy figures, rents, and hotel demand data elements. Additionally, PPR is an aggregator of economic data from third party sources and originated by PPR staff.   The use of PPR as a resource in this survey encompasses Smith Travel, F.W. Dodge, the National Real Estate Index and Economy.com data which PPR aggregates.

Real Capital Analytics (RCA): RCA is a national research and consulting firm covering the investment market for commercial real estate for properties valued at over $5 million. RCA collects sales data for apartment, retail, industrial and office product types nationwide.

AptResearch (Axiometrics): AptResearch is a data vendor specializing in apartment rent, construction permit and economic data. AptResearch collects its data via phone surveys for approximately 11,000 multifamily properties around the U.S.

The Shopping Center Directory (NRB): NRB is a national source of national retail lease, tenant and property data. NRB collects its data primarily through telephone and mail surveys and maintains data on 40,000 shopping centers around the U.S. NRB data is primarily focused on tenancy but also includes retail construction and vacancies.

Variations in data accuracy, collection methods, assumptions and geographic scope between market data providers, render analysis a mix of science and art. As an example, an analyst or broker with significant local market experience and data resource knowledge can often interpret data that differs widely from source to source, using their experience to account for differences in data collection methods, property size, market size and other variables. With market and data source experience, analysts and brokers can often generate reliable conclusions. By this same assessment, however, unfamiliar

markets and data sources can render baffling or contradictory conclusions, even for experienced professionals.

Traditionally, the best way to solve this problem is to know your data resources and know your local market. However, this type of micro-market expertise is not always available. In these instances, knowledge of data vendor collection methods, market coverage, geographic granularity and data limitations are critical to rapid market assessment and analytical rigor.

This report has examined a list of key real estate terms selected by NAR, along with their associated definitions, data collection processes and data development methods to illuminate their distinctions. The goal is to establish how the leading data providers define, collect and process their information (i.e., through surveys, assembly of external sources, proprietary statistical models, etc..), identify the limitations and scope of data collected (property size parameters, location, and geographic area coverage), as well as data-related restrictions and assumptions.

III.   Data Collection Process & Audience

The process of data collection for this report entailed a combination of methodology comparisons between data providers, interviews with data providers and discussions with data consumers. The focus of the data collection process was to report the data collection particularities of each data vendor and present their differences so a broker, analyst or other real estate professional could readily assess how sources differed and how they could best be compared. This report has made no attempt to qualify or rank data providers but simply to disclose their methods.

There are a growing number of real estate and market data providers in the U.S. continuously collecting, cataloging, and marketing property-specific information to a myriad of data consumers, including research analysts, brokers and investors. Some of those data providers include AptResearch.com, CoStar Group, NAIOP, F.W. Dodge, LeaseData, NAR Industry Research, National Real Estate Index, First American Real Estate Solutions, Real Capital Analytics, REIS, Retail Tenant Directory, Shopping Center Directory, Torto Wheaton Research, BOMA, TurboValue, PPR, Marshall & Swift, Economy.com, the Appraisal Institute, to list a few. In many cases, these companies and organizations are not focused on data collection for resale, but may generate data in support of members or handle data in order to create value-added reports and analysis.

As part of our study, many of the listed data providers and organizations have been contacted, however only the national data providers were included in the final survey matrix to conform to the limited scope of this report.

IV.   *Survey Findings*

Despite the apparent similarities in the manner in which most real estate research firms define, collect and process their market data, certain distinctions were revealed during our survey which may explain the variations in published market analysis reports. Following is a summary of our findings in each of the key terms examined:

a. Inventory

Most commercial real estate data providers included in our survey agreed that product type inventory includes all property sizes and subtypes within a market and have left it up to the data user to set the desired criteria when utilizing their market data.

Some data providers and real estate brokerage firms tend to have predetermined data collection thresholds which may vary by market area, such as minimum square footage or transaction dollar value, or exclude certain property sub-types when performing market analysis and producing market reports for client consumption. There were instances where the data provider's inventory definition was less explicit and more implied, i.e., the data vendor did not strictly define the term and assumed clients understood what the term meant even though data limits and restrictions were not provided.

On the data front, sources varied by organization, though some common threads were identified. Most organizations use public records as a starting point for inventory assessment – in some cases that's all they use – and then enhance the quality of the data with additional information sources including phone verifications or field surveys. The main data sources identified in our survey are:

- Public records/Assessor data
- Building owners
- Building managers
- Department of Energy
- U.S. Census Bureau
- Brokerage firms
- Field Researchers
- Data published by other similar organizations
- Appraisers
- Data users/Organization members
- Other micro-market data vendors (varies by market and product type)

OFFICE INVENTORY	CoStar	Apt Research	Torto Wheaton	PPR	REIS	Real Capital Analytics
Definition	Total square feet of all buildings in a defined market area	Apartment data only, not office	Data provided by CoStar	Amount of rentable square feet of office space.	Amount of rentable square feet of office space.	Does not maintain an inventory database (only sales activity)
Unit	Square Feet		Square Feet	Square Feet	Square Feet	
Assumptions	Includes all building types		Includes all building types	Includes all bldg types including R&D (if 2 or more stories)		
Limitations / Exclusions	None		None	Excludes courthouses, capitols, police & fire stations and city halls as well as Medical facilities	Incl. Multi-tenant, 15,000 SF and up, 80+ markets	
Data Source(s)	Brokers/ bldg owners & mgrs/ field researchers, surveys		CoStar	Multiple third party sources	Proprietary database and several third party sources	
Data Processing Method	Maintained through direct data collection		Aggregated	Derived by taking a benchmark of inventory and adjusting for completed space, demolition, analyst input	Third parties and confirmed through direct data collection, analyst input	

Table 1: "Inventory" Definition -- OFFICE

INDUSTRIAL INVENTORY	CoStar	Apt Research	Torto Wheaton	PPR	REIS	Real Capital Analytics
Definition	Total square feet of all industrial bldgs in a defined market area.	Apartment data only, not industrial	Data supplied by CoStar	Total rentable square feet of rentable warehouse and distribution space	Amount of rentable square feet of industrial space.	Does not maintain an inventory database (only sales activity)
Unit	Square Feet		Square Feet	Square Feet	Square Feet	
Assumptions	Includes all bldg types		Includes all bldg types		80+ markets	
Limitations / Exclusions				As provided by third parties	Incl. Multi-tenant, 25,000 SF and up, Warehouse/Dist. & Flex/R&D	
Data Source(s)	Brokers/ bldg owners & mgrs/ field researchers, survey		Brokers/ bldg owners & mgrs/ field researchers, survey	Compare multiple third party sources	Proprietary database and several third party sources	
Data Processing Method	Maintained through direct data collection		Aggregated	Aggregated third party models, construction and demolition	Maintained through direct data collection	

Table 2: "Inventory" Definition -- INDUSTRIAL

RETAIL INVENTORY	CoStar	NRB	Torto Wheaton	PPR	REIS	Real Capital Analytics
Definition	All properties in market as market "stock"	Retail properties with 3 or more retail spaces and separate parking	Same as CoStar	Total square footage of rentable space in major retail categories.	Amount of rentable square feet of retail space.	Does not maintain an inventory database (only sales activity)
Unit	Square Feet	Square Feet	Square Feet	Square Feet	Square Feet	
Assumptions				Completed space	78 markets	
Limitations / Exclusions		NRB does not have an exhaustive inventory database for all retail properties fitting their definitional criteria. Inventory is available for approximately top 100 markets.		Incl. Shopping ctrs, stores, and other mercantile bldgs, food stores (incl. food & beverage service), and stores excluding food. Subclasses are: Freestanding, Neighborhood (30K-49,999 SF), Comm. (150K-399,999 SF), Regional (400K-799,999 SF), Super Regional (800K+ SF), Outlet ctrs of 30,000+ SF)	Incl. Multi-tenant, Neighborhood & Community Shopping Centers, 10,000+ SF	
Data Source(s)		Partnership with Claritas and survey data	CoStar	Department of Energy, U.S. Census Bureau, Brokerage Firms	Collected via 3rd parties and surveys	
Data Processing Method		No modeling, only direct data collection	Aggregated	Third party and direct data verification as required	Maintained via direct data collection	

Table 3: "Inventory" Definition -- RETAIL

MULTI-FAMILY INVENTORY	CoStar	Apt Research	Torto Wheaton	PPR	REIS	Real Capital Analytics
Definition	N/A – does not report inventory for this product type.	Market rate properties in proprietary database	Apartments stock as provided by third party vendors in aggregate	Total number of rentable units, building with 5+ units	Number of rentable units, building with 5+ units	Does not maintain an inventory database (only sales activity)
Unit		Units	Units	Units	Units	
Assumptions		Units are marketable and ready to be occupied	Stock data is not granular and can only be modeled for changes	Completed space	Volume of "phantom" stock in market, 80+ markets	
Limitations / Exclusions		Does not include condo units or non market rate products	Apartment presence in 72 metro areas around the country	Attached housing of 5+ units (units that do not share a common living space, are physically adjacent, and separated by a ground-to-roof wall from neighbors) in apt bldgs & townhouses. Excl. owner-occupied, public housing, student dormitories, & medical facilities.	Incl. 50+ units, except for California: 15+ units	
Data Source(s)		Proprietary database of 11,000 properties	Third party providers, verifications primarily brokerage based	Department of Energy, U.S. Census Bureau, Brokerage Firms	Proprietary database and several third party sources	
Data Processing Method		Complete database each quarter, moving to monthly update cycle	Aggregate data, not property-by-property	Aggregated for each market and modified using analyst input, not property-by-property	Aggregate data, not property-by-property. Maintained via direct data collection and adjusted per analyst input	

Table 4: "Inventory" Definition -- MULTI-FAMILY

b. Construction

The majority of data providers surveyed agree that the term "under construction" refers to those properties where ground has been broken and/or are still in the construction process and where a certificate of occupancy has not yet been issued or received. PPR includes planned/proposed projects in their figures, but only for projects that are expected to break ground within 60 days of the survey/report date.

The Society of Industrial and Office Realtors (SIOR) uses construction data but limits the list of under construction projects included in their published reports to those that are expected to be completed and ready to be occupied by the end of the report's calendar year. It is valuable to check with data vendors occasionally to identify any aberrations to their data collection methods or significant database growth. Either occurrence can dramatically alter market analysis and modeling routines if left unchecked.

Data sources used by the various organizations for this category are similar to those used to collect inventory information, added to that list are F.W. Dodge, local journals and some levels of additional in-house verification efforts which are sometimes used to augment central data collection efforts. Theoretically, new units or square feet that have just been completed and have become ready to be occupied should immediately be added to the total list of inventory for that particular market, although in practice, total inventory is only updated sporadically, typically on an annual basis.

Construction is an important figure in most markets and represents a significant competitive threat to many similar properties in the market. Research firms that verify permitting and construction at a local level are clearly the best but the quality of this data is highly dependent on the diligence and thoroughness of the data collection effort. Modeled construction data is typically fine for trending and other macro level analysis but distinctly inferior to local construction data if this information is being used to assess competitive threats.

Permit data is also an excellent source of pre-construction intelligence and can be gathered through many publicly available municipal, state or national government sources. Understanding the conversion rates of permits to construction and the timeline between these events is helpful in competitive threat assessment.

OFFICE CONSTRUCTION	CoStar	Apt Research	Torto Wheaton	PPR	REIS	Real Capital Analytics
Definition	Bldgs in a state of construction, up until they receive their certificate of occupancy.	Does not track office construction	Data definition provided by CoStar	Total square feet of office bldgs presently under construction OR ready to break ground within 60 days of survey date	Amount of square feet of industrial space currently under construction. Tracks planned and later phases of construction	Does not track construction (only sales activity)
Unit	Square Feet		Square Feet	Square Feet	Square Feet	
Assumptions				Includes all bldg types including R&D (if 2 or more stories)		
Limitations / Exclusions	Typically buildings under 10,000 square feet, do not often make it into the database		Buildings over 10,000 square feet	Excludes courthouses, capitols, police & fire stations and city halls as well as Medical facilities	Incl. Multi-tenant, 15,000 square feet and greater	
Data Source(s)	Brokers/ bldg owners & mgrs/ field researchers		Developing construction data repository with CoStar and CB Richard Ellis	F.W. Dodge	Newspapers, Lexus Nexus, Internet, trade journals followed by phone call verifications	
Data Processing Method	Direct data collection		Direct data collection via vendors, aggregated, modeled for forecasts	Local data collection done by F.W. Dodge, raw data modeled and employ analyst input	Combination of automated benchmark & manual quality control	

Table 5: "Construction" Definition -- OFFICE

INDUSTRIAL CONSTRUCTION	CoStar	Apt Research	Torto Wheaton	PPR	REIS	Real Capital Analytics
Definition	Bldgs in a state of construction, up until they receive their certificate of occupancy.	Does not track industrial construction	Data definition provided by CoStar	N/A - Does not track manufacturing or R&D industrial construction but does track warehouse & distribution construction.	Amount of square feet of industrial space currently under construction. Tracks planned and later phases of construction	Does not track construction (only sales activity)
Unit	Square Feet		Square Feet	Square Feet	Square Feet	
Assumptions						
Limitations / Exclusions	None		Buildings over 10,000 square feet		Incl. Multi-tenant, 25,000 SF and up, Warehouse/Dist. & Flex/R&D	
Data Source(s)	Brokers/ bldg owners & mgrs/ field researchers		Developing construction data repository with CoStar and CB Richard Ellis	F.W. Dodge	Newspapers, Lexus Nexus, Internet, trade journals followed by phone call verifications	
Data Processing Method	Direct data collection		Direct data collection via vendors, aggregated, modeled for forecasts	Local data collection done by F.W. Dodge, raw data modeled and employ analyst input	Combination of automated benchmark & manual QA/QC	

Table 6: "Construction" Definition -- INDUSTRIAL

RETAIL CONSTRUCTION	CoStar	NRB	Torto Wheaton	PPR	REIS	Real Capital Analytics
Definition	Does not closely track retail construction	Construction tracked along with normal survey process but not diligently tracked	Retail construction not closely tracked, definitions developing	Total square feet of retail bldgs presently under construction OR ready to break ground within 60 days of survey date	Amount of square feet of industrial space currently under construction. Tracks planned and later phases of construction	Does not track construction (only sales activity)
Unit		Square Feet	Square Feet	Square Feet	Square Feet	
Assumptions		Data not exhaustive for any geography or retail product type		Completed space		
Limitations / Exclusions		Construction tracked loosely for proposed and planned projects but more closely tracked as construction begins	Buildings over 10,000 square feet	Incl. Shopping centers, stores, and other mercantile bldgs, food stores (incl. food & beverage service), and stores excluding food. Subclasses are: Freestanding, Neighborhood (30K-49,999 SF), Comm. (150K-399,999 SF), Regional (400K-799,999 SF), Super Regional (800K+ SF), Outlet centers of 30,000+ SF)	Incl. Multi-tenant, Neighborhood & Community Shopping Centers, 10,000+ SF	
Data Source(s)		Direct data collection via phone and mail surveys, managers / owners provide data	Developing construction data repository with CoStar and CB Richard Ellis	F.W. Dodge Pipeline, news articles, project list and analyst input	Newspapers, Lexus Nexus, Internet, trade journals followed by phone call verifications	
Data Processing Method		Direct data collection, no modeling	Direct data collection via vendors, aggregated, modeled for forecasts	Local data collection done by F.W. Dodge, raw data modeled and employ analyst input	Combination of automated benchmark & manual quality control	

Table 7: "Construction" Definition -- RETAIL

MULTI-FAMILY CONSTRUCTION	CoStar	Apt Research	Torto Wheaton	PPR	REIS	Real Capital Analytics
Definition	Does not closely track apartment construction	Tracks permits to derive construction by market	Apartment construction not closely tracked, definitions developing	Total number of units in bldgs presently under construction OR ready to break ground within 60 days of survey date	Amount of square feet of industrial space currently under construction. Tracks planned and later phases of construction	Tracks apartment sales only
Unit		Unit, dollar value per building project	Units, Square Feet	Units	Units	
Assumptions						
Limitations / Exclusions		Approximately 300 markets as tracked by Census department	Buildings over 10,000 square feet, no defined unit limit	Attached housing of 5+ units (units that do not share a common living space, are physically adjacent, and separated by a ground-to-roof wall from neighbors) in apt bldgs & townhouses. Excl. owner-occupied, public housing, student dormitories, & medical facilities. Only properties over $50,000 in value	Incl. 50+ units, except for California: 15+ units.	
Data Source(s)		Census data	Developing construction data repository with CoStar and CB Richard Ellis	F.W. Dodge, PPR project list	Newspapers, Lexus Nexus, Internet, trade journals followed by phone call verifications	
Data Processing Method		Permit data modeled for starts which are converted to a forecasted construction figure	Direct data collection via vendors, aggregated, modeled for forecasts	Local data collection done by F.W. Dodge, modeled for forecasts and use analyst input	Combination of automated benchmark & manual quality control	

Table 8: "Construction" Definition -- MULTI-FAMILY

c. Demolition

Demolition is commonly defined among surveyed data providers and real estate brokerage firms as the total square feet or number of units that are being completely evacuated and removed, bringing the lot back to vacant land. It also includes sections of a building that are being destroyed permanently (such as illegal residential units, etc…).

In general, demolitions are not as closely tracked as new construction projects and are often overlooked portions of the market, but not significant drivers. Theoretically, units or square feet that are being demolished ought to be immediately subtracted from the total inventory for that particular market, although in practice, the total inventory is typically updated annually or adjusted based on statistical models.

Demolition is virtually untracked by all national data vendors regardless of property location or project size.

OFFICE DEMOLITION	CoStar	Apt Research	Torto Wheaton	PPR	REIS	Real Capital Analytics
Definition	Land where a bldg did exist, but it has been torn down. Not closely tracked.	Does not track demolition	Does not track demolition	Properties removed from stock or repurposed into alternate use through renovation	Properties removed from stock and not usable in their current form	Does not track demolition (only sales activity)
Unit	Square Feet			Square Feet	Square Feet	
Assumptions						
Limitations / Exclusions						
Data Source(s)				Direct market feedback via survey	Direct data collection	
Data Processing Method				Compare market data with catalog of projects under monitoring, modeled for property removed from stock each year	Direct data collection	

Table 9: "Demolition" Definition -- OFFICE

INDUSTRIAL DEMOLITION	CoStar	Apt Research	Torto Wheaton	PPR	REIS	Real Capital Analytics
Definition	Land where a bldg did exist, but it has been torn down. Not closely tracked.	Does not track demolition	Does not track demolition	Properties removed from stock or repurposed into alternate use through renovation	Properties removed from stock and not usable in their current form	Does not track demolition (only sales activity)
Unit	Square Feet			Square Feet	Square Feet	
Assumptions						
Limitations / Exclusions						
Data Source(s)				Direct market feedback via survey	Direct data collection	
Data Processing Method				Compare market data with catalog of projects under monitoring, modeled for property removed from stock each year	Direct data collection	

Table 10: "Demolition" Definition -- INDUSTRIAL

RETAIL DEMOLITION	CoStar	NRB	Torto Wheaton	PPR	REIS	Real Capital Analytics
Definition	Does not track retail demolition	Does not track demolition	Does not track demolition	Properties removed from stock or repurposed into alternate use through renovation	Properties removed from stock and not usable in their current form	Does not track demolition (only sales activity)
Unit				Square Feet	Square Feet	
Assumptions						
Limitations / Exclusions						
Data Source(s)				Direct market feedback via survey	Direct data collection	
Data Processing Method				Compare market data with catalog of projects under monitoring, modeled for property removed from stock each year	Direct data collection	

Table 11: "Demolition" Definition -- RETAIL

MULTI-FAMILY DEMOLITION	CoStar	Apt Research	Torto Wheaton	PPR	REIS	Real Capital Analytics
Definition	Does not track apartment demolition	Properties removed from stock by change of use	Does not track demolition	Properties removed from stock or repurposed into alternate use through renovation	Properties removed from stock and not usable in their current form	Does not track demolition (only sales activity)
Unit		Units		Units	Units	
Assumptions		Data employed as given				
Limitations / Exclusions						
Data Source(s)		Multiple sources		Direct market feedback via survey	Direct data collection	
Data Processing Method		Accept best analyst estimate of demolition figure for current reporting period		Compare market data with catalog of projects under monitoring, modeled for property removed from stock each year	Direct data collection	

Table 12: "Demolition" Definition -- MULTI-FAMILY

d. Vacancy Rate

Of the seven real estate term definitions examined in this report, vacancy rate is perhaps the most vaguely calculated. However, vacancy is considered one piece of market information that data providers and users agree is important to accurate property and market assessments. Variations in vacancy rate reporting also differ within the same organization. PPR's vacancy rate, for example, for the Office & Multi-family product type is taken directly from external sources and is reflective of vacant physical space; whereas their retail vacancy rate is their own estimate and is based on economic vacancy (lost income) rather than vacant physical space.

Vacancy sample data is often obtained from brokers, appraisers, property owners or managers and modeled to generalize the overall market condition. The statistical models deployed vary, and the organizations we surveyed were reluctant to reveal their proprietary methods of extrapolation. In addition, our survey showed that there are two bases on which the market vacancy rate is reported, which is seldom noted in the published reports:
1. Based on unoccupied space
2. Based on lost income

Furthermore, vacancy rate may or may not include the following:
1. Sublet space
2. Space leased but not yet occupied
3. Owner-occupied space

Under some market conditions vacancy is a highly guarded statistic and is considered competitive information. As a result, vacancies are one of the least accurate market statistics. One of the best defenses against vacancy data error is to have a series of trusted sources of accurate data that can serve as bellwethers for the local market and comparables to your research data sources.

OFFICE VACANCY RATE	CoStar	Apt Research	Torto Wheaton	PPR	REIS	Real Capital Analytics
Definition	The percentage of space existing, but not currently occupied. Calculation: the space that is currently marketed in an existing bldg which is physically vacant plus any space not on the market and not yet occupied/ existing RBA. CoStar offers 2 vacancy rates, one without and one including sublet space; so, vacancy rate can be calculated as new/relet OR new/relet/sublet.	Does not track office vacancy	Provided by CoStar	Overall vacancy rate number, incl. sublease space, as well as owner-occupied space.	Physical vacancy	Physical vacancy
Unit	Percent		Percent	Percent	Percent	Percent
Assumptions	Space is ready to be occupied in a completed bldg		Space is ready to be occupied in a completed bldg	Multi-tenant properties only	Collects data on both total & sublet, 80+ markets	
Limitations / Exclusions	Excludes under construction		Excludes under construction, typically metro markets	Market areas covered	Competitive stock in database and market area, properties over 15,000 square feet	Only collects vacancy for properties sold for over $5 million
Data Source(s)	Brokers/ bldg owners & mgrs/ field researchers		CoStar and CB Richard Ellis.	National & local sources including CB Richard Ellis, Cushman & Wakefield and Colliers	40% of data is collected telephonically – calls are made to bldg owners, mgrs & agents.	Public records, periodicals and phone calls as necessary
Data Processing Method	Direct data collection		Torto Wheaton forecasts vacancy based on data from various sources, statistical models, aggregated	Data adopted from external sources, modeled and contoured using analyst input	Remaining 60% of data is derived through econometric models, analyst input	Data collection using third party resources

Table 13: "Vacancy Rate" Definition -- OFFICE

INDUSTRIAL VACANCY RATE	CoStar	Apt Research	Torto Wheaton	PPR	REIS	Real Capital Analytics
Definition	The percentage of space existing, but not currently occupied. Calculation: the space that is currently marketed in an existing bldg which is physically vacant plus any space not on the market and not yet occupied/ existing RBA. CoStar offers 2 vacancy rates, one without and one including sublet space; so, vacancy rate can be calculated as new/relet OR new/relet/sublet.	Does not track industrial vacancy	Provided by CoStar	Physical vacancy and sublease for warehouse and distribution properties	Physical vacancy	Physical vacancy
Unit	Percent		Percent	Percent	Percent	Percent
Assumptions	Space is ready to be occupied in a completed bldg		Space is ready to be occupied in a completed bldg	Multi-tenant properties only	Collects data on both total & sublet, 80+ markets	
Limitations / Exclusions	Excludes under construction		Excludes under construction, typically metro markets	Economic vacancy rather than physical vacancy	Competitive stock in database and market area	Only collects vacancy for properties sold for over $5 million
Data Source(s)	Brokers/ bldg owners & mgrs/ field researchers		CoStar and CB Richard Ellis.	Multi-source vendor supplied	40% of data is collected telephonically – calls are made to bldg owners, mgrs & agents.	Public records, periodicals and phone calls as necessary
Data Processing Method	Direct data collection		Torto Wheaton forecasts vacancy based on data from various sources, statistical models, aggregated	PPR' own estimate based on a predetermined benchmark	Remaining 60% of data is derived through econometric models	Data collection using third party resources

Table 14: "Vacancy Rate" Definition -- INDUSTRIAL

RETAIL VACANCY RATE	CoStar	NRB	Torto Wheaton	PPR	REIS	Real Capital Analytics
Definition	Physical vacancy	Physical vacancy, but does not track vacancy closely	Does not closely track retail vacancy but does gather some data from CoStar & CB Richard Ellis	Overall vacancy rate number, incl. Sublease space, as well as owner-occupied space.	Physical vacancy	Physical vacancy
Unit	Percent		Percent	Percent	Percent	Percent
Assumptions					Collects data on both total & sublet vacancy, multi-tenant properties only, 78 markets	Vacancy for properties recently sold reflects market vacancy
Limitations / Exclusions	Market coverage is less complete than office vacancy data	Collects vacancy data during the course of other data verification calls	Market coverage is less complete than office vacancy data	Economic vacancy rather than physical vacancy	Competitive stock in database and market area	Only collects vacancy for properties sold for over $5 million
Data Source(s)	Owners, managers & brokers	Surveys	Owners, managers & brokers	Multiple national & local sources depending on market	40% of data is collected telephonically – calls are made to bldg owners, mgrs & agents.	Public records, periodicals and phone calls as necessary
Data Processing Method	Direct data collection	Direct data collection, no modeling	Direct data collection via vendors	PPR' own estimate based on a predetermined benchmark	Remaining 60% of data is derived through econometric models	Data collection using third party resources

Table 15: "Vacancy Rate" Definition -- RETAIL

MULTI-FAMILY VACANCY RATE	CoStar	Apt Research	Torto Wheaton	PPR	REIS	Real Capital Analytics
Definition	Does not track apartment vacancy	Physical vacancy	Physical vacancy	Physical vacancy	Number of units available	Physical vacancy
Unit		Percent	Percent	Percent	Count of unoccupied units	Percent
Assumptions						
Limitations / Exclusions		Properties in their database	Mix of property sizes and locations as provided by data channels	Variety of sources and data applicability to certain markets	Properties in database of competitive stock typically 50+ units in 80+ markets	Only collects vacancy for properties sold for over $5 million
Data Source(s)		Proprietary database of 11,000 properties	CB Richard Ellis, Economy.com	Multiple national & local sources depending on market	Direct data collection for 40% of data– calls are made to bldg owners, mgrs	Public records, periodicals and phone calls as necessary
Data Processing Method		Phone survey of entire database, quarterly and increasing frequency to monthly	Direct data collection via vendors and modeled as necessary, aggregated	Data adopted from external sources combined with analyst input	Remaining 60% of data is derived through econometric models	Data collection using third party resources

Table 16: "Vacancy Rate" Definition -- MULTI-FAMILY

e. Net Absorption

The data providers surveyed agreed that Net Absorption refers to the net change in total occupied space between two surveys. The differences arise in the type of space included in their calculations. For example, The Appraisal Institute includes proposed projects in their calculations and reports the result as an estimated percentage, while CoStar and others do not. Some brokerage firms, although not direct data vendors, such as Grubb & Ellis, include sublease space in their total figure. Comparing these figures to sources that do not include sublease space can significantly obfuscate direct data source comparisons. As a work around, it is helpful to assess the typical sublease incident rate to determine how important this element is in the reported absorption figures.

In general, the net absorption is reported as a net figure in terms of total square feet or total multi-residential units.

OFFICE NET ABSORPTION	CoStar	Apt Research	Torto Wheaton	PPR	REIS	Real Capital Analytics
Definition	For existing bldgs, the measure of total sq. ft. leased (indicated as Move-In) less the total space vacated (indicated as Move-Out) over a given period of time. In a lease renewal that includes the leasing of additional space, that additional space is counted.	Does not cover office absorption	Provided through CoStar	The net change in occupied units versus stock	Amount of new competitive stock consumed by demand	Does not track absorption (only sales activity)
Unit	Square Feet		Square Feet	Number of square feet absorbed per market, accounting for stock & construction	Number of square feet absorbed per market, accounting for stock, demolition & construction	
Assumptions						
Limitations / Exclusions	Excludes sublet space and direct renewals. Pre-leasing in non-existing bldgs (planned, under construction or renovation) is excluded until actual move in (i.e., by delivery date).		Excludes sublet space and direct renewals. Pre-leasing in non-existing bldgs (planned, under construction or renovation) is excluded until actual move in (i.e., by delivery date).			
Data Source(s)	Brokers/ bldg owners & mgrs/ field researchers, surveys		CoStar, CB Richard Ellis	Multiple sources selected by market and weighted based on analyst input	Direct data collection	
Data Proc. Method	Direct data collection		Data from vendor sources, aggregated and modeled for forecasts	Data modeled in aggregate, not the accumulation of property-by-property data.	Calculation after accommodation of change in construction and stock variables	

Table 17: "Net Absorption" Definition -- OFFICE

INDUSTRIAL NET ABSORPTION	CoStar	Apt Research	Torto Wheaton	PPR	REIS	Real Capital Analytics
Definition	For existing bldgs, the measure of total sq. ft. leased (indicated as Move-In) less the total space vacated (indicated as Move-Out) over a given period of time. In a lease renewal that includes the leasing of additional space, that additional space is counted.	Does not covet this product type.	Provided by CoStar	The net change in occupied units versus stock	Amount of new competitive stock consumed by demand	Does not track absorption (only sales activity)
Unit	Square Feet		Square Feet	Number of square feet absorbed per market, accounting for stock & construction	Number of square feet absorbed per market, accounting for stock, demolition & construction	
Assumptions						
Limitations / Exclusions	Excludes sublet space and direct renewals. Pre-leasing in non-existing bldgs (planned, under construction or renovation) is excluded until actual move in (i.e., by delivery date).		Excludes sublet space and direct renewals. Pre-leasing in non-existing bldgs (planned, under construction or renovation) is excluded until actual move in (i.e., by delivery date).			
Data Source(s)	Brokers/ bldg owners & mgrs/ field researchers		Brokers/ bldg owners & mgrs/ field researchers	Multiple sources selected by market and weighted based on analyst input	Direct data collection	
Data Proc. Method	Direct data collection, no modeling		Data provided in aggregate, modeled	Data modeled in aggregate, not the accumulation of property-by-property data.	Calculation after accommodation of change in construction and stock variables	

Table 18: "Net Absorption" Definition -- INDUSTRIAL

RETAIL NET ABSORPTION	CoStar	NRB	Torto Wheaton	PPR	REIS	Real Capital Analytics
Definition	N/A – does not cover retail absorption	Does not report absorption	Did not contribute this data to survey	The net change in occupied units versus stock	Amount of new competitive stock consumed by demand	Does not track absorption (only sales activity)
Unit				Number of square feet absorbed per market, accounting for stock, construction	Number of square feet absorbed per market, accounting for stock, demolition & construction	
Assumptions						
Limitations / Exclusions						
Data Source(s)				Multiple sources selected by market and weighted based on analyst input	Direct data collection	
Data Proc. Method				Data modeled in aggregate, not the accumulation of property-by-property data.	Calculation after accommodation of change in construction and stock variables	

Table 19: "Net Absorption" Definition -- RETAIL

MULTI-FAMILY NET ABSORPTION	CoStar	Apt Research	Torto Wheaton	PPR	REIS	Real Capital Analytics
Definition	N/A – does not cover apartment net absorption	Net change in occupied units versus stock	Net change in occupied units versus stock	The net change in occupied units versus stock	Amount of new competitive stock consumed by demand	Does not track absorption (only sales activity)
Unit		Number of units absorbed	Number of units absorbed per market	Number of units absorbed per market	Number of units absorbed per market	
Assumptions		As provided by data sources	Reports effective rents after concessions			
Limitations / Exclusions		As provided by data sources	Markets where MPF collects data by submarket	Based on bldg stock & vacancy		
Data Source(s)		Census data; home ownership rates, permits	MPF	Multiple sources selected by market and weighted based on analyst input	Direct data collection	
Data Proc. Method		Aggregated data by geography, influenced by residential permitting, forecast of total employment to renter occupied housing stock based on benchmark ratios	Direct data collection through vendor, aggregated	Data modeled in aggregate, not the accumulation of property-by-property data.	Calculation after accommodation of change in construction and stock variables	

Table 20: "Net Absorption" Definition -- MULTI-FAMILY

f. Quoted / Asking Lease Rates

The general consensus among data providers is that quoted / asking rents represents the amount the landlord or leasing agency is presenting to the market. Some of the critical differences in reporting this figure are in the following areas:

1. The gap between asking and effective rents (time and market contextual)
2. Annual vs. monthly rents
3. Straight average vs. weighted average
4. Gross vs. Net
5. Actual quoted rates vs. estimated rates based on comparable properties
6. Whether sublease space is included or not

Gathering effective rent data is difficult for research firms to do consistently but is typically more reflective of market conditions. As markets transition, the gap between asking and effective rents can become significant. As a result, it is important to monitor research company effectiveness in gathering this data if local markets appear unstable.

OFFICE ASKING LEASE RATE	CoStar	Apt Research	Torto Wheaton	PPR	REIS	Real Capital Analytics
Definition	The amount for which the landlord is offering their space per sq. ft., per year / month	Does not track this product type	Asking rent prior to leasing concessions	Effective gross rent	Asking rent prior to leasing concessions, effective rent after all concession inputs	Does not track market lease rates (only sales activity)
Unit	$/Square foot / month and annual		$/Square foot / month and annual	Expressed in an index format with 100 at the 4th quarter of 1996	$/Square foot / month and annual	
Assumptions	Properties in CoStar database, not entire markets				80+ markets	
Limitations / Exclusions	Typically class A, B, C buildings concentrated in metro markets		Typically class A, B, C buildings concentrated in metro markets	Typically class A & B buildings in metro markets	Typically buildings in REIS market areas and buildings with over 15,000 square feet	
Data Source(s)	Brokers/ bldg owners & mgrs/ field researchers, surveys		Property by property data from CoStar and CB Richard Ellis	National Real Estate Index (NREI)	Direct data collection for 40% of database, collected telephonically	
Data Processing Method	Direct data collection		Direct vendor data collection, aggregated and modeled for forecasts	Aggregated data and modified based on analyst assessment	Remaining 60% of data is derived through econometric models	

Table 21: "Asking Lease Rate" Definition -- OFFICE

INDUSTRIAL ASKING LEASE RATE	CoStar	Apt Research	Torto Wheaton	PPR	REIS	Real Capital Analytics
Definition	The amount for which the landlord is offering their space per sq. ft., per year / month	Does not track industrial data	Asking rent prior to leasing concessions	Effective gross rent	Asking rent prior to concessions for warehouse, R&D, and distribution properties	Does not track market lease rates (only sales activity)
Unit	$/Square foot / yr		$/Square foot / yr	Expressed in an index format with 100 at the 4th quarter of 1996	$/SF/year	
Assumptions	Properties in CoStar database, not entire markets			NREI metro markets	Multi-tenant properties only, 80+ markets	
Limitations / Exclusions	Industrial buildings concentrated in metro markets		Industrial buildings concentrated in metro markets	Typically mid to large warehouse buildings in metro markets	Industrial buildings concentrated in 80+ REIS metro markets, multi-tenant over 25,000 square feet	
Data Source(s)	Brokers/ bldg owners & mgrs/ field researchers, surveys		Property by property data from CoStar and CB Richard Ellis	National Real Estate Index (NREI)	Direct data collection for 40% of database, collected telephonically	
Data Processing Method	Direct data collection		Direct vendor data collection, aggregated and modeled for forecasts	Aggregated	Remaining 60% of data is derived through econometric models	

Table 22: "Asking Lease Rate" Definition -- INDUSTRIAL

RETAIL ASKING LEASE RATE	CoStar	NRB	Torto Wheaton	PPR	REIS	Real Capital Analytics
Definition	Asking rent per square foot prior to concessions or other adjustments	Asking rent per square foot prior to concessions or other adjustments	Asking rent per square foot prior to concessions or other adjustments (CoStar)	Asking and effective rents after concessions	Asking rent per square foot and effective rent after discounts & concessions	Does not track market lease rates (only sales activity)
Unit	$ per Square Foot/ yr or mo.	$ per Square Foot/ yr or mo.	$ per Square Foot/ yr or mo.	Expressed in an index format with 100 at the 4th quarter of 1996	$/SF/year, broken down into Anchor & Non-Anchor, 78 markets	
Assumptions		Data accuracy issues if property managers are trying to promote their projects as "full" when they are not. NRB further researches problematic data.			Same market coverage except no leasing coverage in New York	
Limitations / Exclusions	Limited data in retail arena and largely associated with property sales	Leasing data collected as part of database update but is not a focus of data collection effort	Data is typically limited to metro areas and property sales (CoStar)	Some rents are direct NREI quotes, modified using various other 3rd party data including CB Richard Ellis	Data collected for 78 markets. Rent divided into anchor and non anchor categories. Properties over 10,000 square feet; neighborhood, power and regional centers	
Data Source(s)	Brokers, property managers and owners	Property managers and owners, city departments and brokers as necessary	CoStar and CB Richard Ellis using brokers, property managers and owners	National Real Estate Index (NREI)	Direct data collection for 40% of database, collected telephonically	
Data Processing Method	Direct data collection	Mailing and phone surveys	Direct data collection (CoStar), brokers (CB), analyst input	Modeled data, modified using analyst input and weighting	Remaining 60% of data is derived through econometric models with quality controls	

Table 23: "Asking Lease Rate" Definition -- RETAIL

MULTI-FAMILY ASKING LEASE RATE	CoStar	Apt Research	Torto Wheaton	PPR	REIS	Real Capital Analytics
Definition	Does not report apartment rents	Asking and effective rent per unit and square foot	Asking and effective rents	Asking and effective rents after concessions	Asking and effective rent per square foot and unit. Adjustments made for all variables impacting effective rent	Does not track market lease rates (only sales activity)
Unit		$ per unit / $ per square foot	$ per unit / $ per square foot	Expressed in an index format with 100 at the 4th quarter of 1996	$ per unit / $ per square foot	
Assumptions		Market rate, no subsidized housing	Market rate properties		Lease data collected only for competitive stock based on REIS database, 80+ markets	
Limitations / Exclusions		Data limited to proprietary database of 11,000 apartments	Markets where MPF reports apartment rents	Some rents are direct NREI quotes, modified using various other 3rd party data	Surveys in 80+ REIS markets but reports only areas with defined submarkets. Properties with 15+ units in Los Angeles, San Francisco and Chicago, 50+ units in all other markets	
Data Source(s)		Telephonic survey of 100% of database	MPF	National Real Estate Index (NREI)	Survey for 40% of data collection to bldg & managers owners, mgrs	
Data Processing Method		Directly collected data, modeled if raw data is not available	Aggregated data per submarket	Modeled data and modified using analyst input and weighting	Remaining 60% of data is derived through econometric models with quality controls	

Table 24: "Asking Lease Rate" Definition -- MULTI-FAMILY

g. Sale Price

The sale price is perhaps the most tracked piece of information amongst data providers nationwide. It is commonly agreed upon as the actual price paid by the buyer and accepted by the seller for a particular property. Some of the differences lie in the sources where that figure was obtained (broker, property manager, assessor records, etc..) and the levels of in-house verification/confirmation efforts.

The level of confirmation here is important to data accuracy. There are several sources for public records sale data, typically garnered directly from county sales records. In some counties sales price does not have to be disclosed, or if it is disclosed it is recorded on the back side of the filing document, effectively out of reach for data aggregators who cannot afford to inspect the physical records associated with each property sale.

The particularities of individual sales and the diligence of the research firm is also critically important to the accuracy of this data element. As an example, if a property is sold in combination with significant extra land or is a portfolio sale, it is often difficult for the research firm to get confirmation of all the sales details. It would be prudent to evaluate the data collection methods for each vendor and market where your firm conducts significant business to ensure your ability to interpret vendor data accurately.

OFFICE SALE PRICE	CoStar	Apt Research	Torto Wheaton	PPR	REIS	Real Capital Analytics
Definition	Actual sale price as reported by the broker with adjustments for extraordinary sales conditions	Does not collect office sales data.	Provided per CoStar	Does not track sales data	Actual sale price with adjustments for extraordinary sales conditions. Where price is not available, reported, contract or estimated price is used.	Transacted price as reported by third party sources
Unit	$/Sq. Ft., $/property		$/Sq. Ft., $/property		$/Sq. Ft., $/property, $/portfolio	$/Sq. Ft., $/property
Assumptions						
Limitations / Exclusions	Adjustments made for portfolios and extra land with property		Adjustments made for portfolios and extra land with property		Adjustments made for portfolios and extra land and other variables	Sales valued at $5 million and up only per property or portfolio of properties.
Data Source(s)	Brokers/ bldg owners & mgrs/ field researchers		CoStar and CB Richard Ellis using brokers/ bldg owners & mgrs/ field researchers to collect data		Brokers, owners & occasionally 3rd party providers	Published reports & industry sources from around the country
Data Processing Method	Direct data collection		Direct data collection via survey and access to transactions		Direct data collection, occasionally estimated if complete data not available	Approx. 75% of sales prices reported are confirmed & 25% are approximated, allocated, or estimated. If sources conflict, price is averaged

Table 25: "Sale Price" Definition -- OFFICE

INDUSTRIAL SALE PRICE	CoStar	Apt Research	Torto Wheaton	PPR	REIS	Real Capital Analytics
Definition	Actual sale price as reported by the broker with adjustments for extraordinary sales conditions	Does not collect industrial sales data	Provided per CoStar	Does not track sales data	Actual sale price with adjustments for extraordinary sales conditions. Where price is not available, reported, contract or estimated price is used.	Transacted price as reported by third party sources
Unit	$/Sq. Ft., $/property		$/Sq. Ft., $/property		$/Sq. Ft., $/property, $/portfolio	$/Sq. Ft., $/property
Assumptions						
Limitations / Exclusions	Adjustments made for portfolios and extra land and other variables		Adjustments made for portfolios and extra land and other variables		Adjustments made for portfolios and extra land and other variables	Sales valued at $5 million and up only per property or portfolio of properties.
Data Source(s)	Brokers/ bldg owners & mgrs/ field researchers		CoStar and CB Richard Ellis using brokers/ bldg owners & mgrs/ field researchers to collect data		Brokers, owners & occasionally 3rd party providers	Published reports & industry sources from around the country
Data Processing Method	Direct data collection		Direct data collection via survey and access to transactions		Direct data collection, occasionally estimated if complete data not available	Approx. 75% of sales prices reported are confirmed & 25% are approximated, allocated, or estimated. If sources conflict, price is averaged

Table 26: "Sale Price" Definition -- INDUSTRIAL

RETAIL SALE PRICE	CoStar	NRB	Torto Wheaton	PPR	REIS	Real Capital Analytics
Definition	Actual sale price as reported by the broker with adjustments for extraordinary sales conditions	Does not collect retail property sales data but may in the future	Provided per CoStar	Does not track sales data	Actual sale price with adjustments for extraordinary sales conditions. Where price is not available, reported, contract or estimated price is used.	Transacted price as reported by third party sources
Unit	$/Sq. Ft., $/property		$/Sq. Ft., $/property		$/Sq. Ft., $/property, $/portfolio, GLA $/Sq.Ft.	$/Sq. Ft., $/property, portfolio
Assumptions						
Limitations / Exclusions	Adjustments made for portfolios and extra land with property		Adjustments made for portfolios and extra land with property		Adjustments made for portfolios and extra land with property and other variables	Sales valued at $5 million and up only per property or portfolio of properties.
Data Source(s)	Brokers/ bldg owners & mgrs/ field researchers		CoStar and CB Richard Ellis using brokers/ bldg owners & mgrs/ field researchers to collect data		Brokers, owners & occasionally 3rd party providers	Published reports & industry sources
Data Processing Method	Direct data collection		Direct data collection via survey and access to transactions		Direct data collection, occasionally estimated if complete data not available	Approx. 75% of sales prices reported are confirmed & 25% are approximated, allocated, or estimated. If sources conflict, price is averaged

Table 27: "Sale Price" Definition -- RETAIL

MULTI-FAMILY SALE PRICE	CoStar	Apt Research	Torto Wheaton	PPR	REIS	Real Capital Analytics
Definition	Actual sale price as reported by the broker with adjustments for extraordinary sales conditions	Does not collect apartment property sales data	Provided per CoStar	Does not track sales data	Actual sale price with adjustments for extraordinary sales conditions. Where price is not available, reported, contract or estimated price is used.	Transacted price as reported by third party sources
Unit	$/Unit, $/Sq. Ft., $/property		$/Unit, $/Sq. Ft., $/property		$/Unit, $/Sq. Ft., $/property, $/portfolio	$/Unit, $/Sq. Ft., $/property, $/portfolio
Assumptions						
Limitations / Exclusions	Adjustments made for portfolios and extra land with property		Adjustments made for portfolios and extra land with property		Adjustments made for portfolios and extra land with property and other variables	Sales valued at $5 million and up only per property or portfolio of properties.
Data Source(s)	Brokers/ bldg owners & mgrs/ field researchers		CoStar and CB Richard Ellis using brokers/ bldg owners & mgrs/ field researchers to collect data		Brokers, owners & occasionally 3rd party providers	Published reports & industry sources
Data Processing Method	Direct data collection		Direct data collection via survey and access to transactions	PPR can engage RCA for sales data processing	Direct data collection, occasionally estimated if complete data not available	Approx. 75% of sales prices reported are confirmed & 25% are approximated, allocated, or estimated. If sources conflict, price is averaged

Table 28: "Sale Price" Definition -- MULTI-FAMILY

V.   *Data Standards Reviewed*

Differences in data definitions, assumptions, limits in data collected, data granularity and issues with multi-source data integration gives rise to questions about commercial real estate data standards.   There are several data standards currently in use and/or in the development stages that may be deployed to help bridge the gap between the various research data providers and the brokers, investors, appraisers and analysts they serve.

The data standards reviewed are:

- Multifamily Information Standard (MITS)
- Real Estate Transaction Standard (RETS)
- Data Consortium (DC)
- Property Information Systems Common Exchange Standard (PISCES)
- Mortgage Industry Standards Maintenance Organization (MISMO)

Following is a brief description of each.

a. Multifamily Information Transaction Standard (MITS)

Summary:
The Multifamily Information Transaction Standard (MITS) was developed exclusively to address the needs of the multifamily companies and trading partners. The diverse group of participants engaged in the standards' development ranged from multifamily property owners to a variety of industry vendors, consultants and technologists. The National Multifamily Housing Council (NMHC) initially funded MITS, however, the standards initiative was a true industry-sponsored effort with participants contributing funds, time and expertise to the standards development process.

The mission of MITS was to create common data dictionaries (terms and usage) and data structures to facilitate data exchange within the multifamily industry. MITS has developed standards for the following areas of multifamily business activity:

- Owner to Internet listing service data exchange – property information and rental data
- Resident screening – data required for resident credit checking
- Leasing and applications – Data and language necessary for creating leasing applications
- Property asset details - construction data, property amenities

MITS has developed data dictionaries and XML schema data structures for the spectrum of multifamily companies to employ and is currently being commercialized.

b. Real Estate Transaction Standard (RETS)

Summary:

The Real Estate Transaction Standard (RETS) was developed to define terms related to single-family homes, with a particular focus on terms related to existing home resales. RETS is an industry sponsored initiative, underwritten by the National Association of REALTORS®(NAR). NAR has released the standard to the public domain and does not control the standard, but rather provides a forum for the single-family industry to develop a standard as their collective wisdom dictates.

RETS is placed in company with commercial standards for several reasons; RETS can be easily adapted to commercial standard development purposes and offers terms that are similar to those used in existing commercial real estate standards.

RETS is currently serving single-family brokers, MLS system operators and software vendors interested in exchanging single-family data and has been commercialized to transport this data throughout a broad portion of the single-family resale marketplace.

c. Data Consortium (DC)

Summary:

The Data Consortium (DC) data standard was developed in 1999, early in the commercial real estate standards development timeline and provides definitions for approximately 6,000 terms, not all related to real estate. The DC standard has evolved from its initial roots as a financial terms repository. The DC standard was used as the foundation for REIS, the standard championed by NACRIEF, and deals with financial reporting.

The DC standard identifies terms associated with property purchase and leasing, exchange, purchase or lease contracts, valuing assets, performing due diligence activities, and financial reporting.   There are many data terms in the DC dictionary that do not have a serious role in commercial real estate.   In the DC standard there are data terms connected to commercial real estate by wit alone; definitions for "bartender," "coffee table" and "beefalo." Large portions of the DC's 6,000 terms do not have any significant place in data standards development.

Technologically, the DC has successfully completed an XML DTD (Document Type Definition), as well as a SDK (Software Development Toolkit). The SDK contains the piece of software used to process and validate XML data streams conforming to the Data Consortium Namespace and Dictionary (DCN and DCD).

d. Property Information Systems Common Exchange Standard (PISCES)

Summary:

The PISCES Standard is a set of definitions and rules to facilitate automatic data transfer between different real estate software packages used in the United Kingdom. PISCES has established specifications to handle property or portfolio analysis, DCF valuation,

capital valuation and traditional valuations. The standard also contains elements needed for property acquisition and disposition reporting.

PISCES is a leader in the commercial real estate data standards arena based on its successful growth from concept to commercialization and its longevity - almost eight years and old about twice the age of the typical U.S. based data standards initiative.

PISCES began their standards work using XML Document Type Definitions (DTD). Their newest specification (version 1.5) is now supporting a more robust and complete alternative to DTD's known as XML Schema.

e. Mortgage Industry Standards Maintenance Organization (MISMO)

Summary:
Mortgage Industry Standards Maintenance Organization (MISMO) was established by the Mortgage Bankers Association of America (MBA) to coordinate the development and maintenance of Internet based XML specifications for the single-family mortgage marketplace. MISMO has published specifications for single family that support mortgage insurance application, mortgage insurance loan boarding, secondary, bulk pricing, real estate services, credit reporting and underwriting process areas. Many consumers are familiar with the results of MISMO, the "80% less paperwork mortgage."

The standard also has many elements relating to property profile reporting, property operating statement reporting, lease administration and property maintenance and operations.

MISMO has identified two deliverables, which will enable the mortgage industry to share data among trading partners.

- An XML architecture, which encompasses data origination, secondary market and servicing data.
- A data dictionary to provide business definitions and corresponding architecture data element tag names.

MISMO's first technology deliverables were Data Type Definitions (DTD). MISMO is now supporting a more robust and complete alternative to DTD's known as XML Schema. Since 1999, MISMO has released a total of 8 different specifications.

VI.   *Commercial Real Estate Data Standards Commonality & Diversity*

Commercial real estate data standards were typically conceived and developed to solve specific business problems, serve particular constituencies and commercial real estate product types. These early efforts were often pursued in relative isolation to each other. As a result, many data standards efforts share similar goals, where each standards group addresses portions of a common business purpose and in many cases share similar definitions where the standards overlap. That said, data standards are precise instruments and the terms and definitions vary enough to require some accommodation by each standards group for the terms to be interchangeable with other standards efforts.

Most standards efforts were not developed with the intent for interoperability but the rapid proliferation of commercial real estate data standards has placed the concept of interoperability in the limelight. As rapid, consistent data exchange becomes more valuable and common the long-term necessity that various commercial real estate standards interact will become clear.

There is precisely this convergence currently underway in the commercial real estate industry. Although the transformation is not complete or entirely clear, convergence appears to be an inexorable force in the commercial real estate marketplace that may revolutionize how research companies, owners and the entire commercial real estate supply chain interact. Based on the pace of past events the industry remains many years away from the realization of this vision – but it is coming.

Chart Explanations

The following chart depicts specific business processes and their respective data elements in the green left hand column and data standards in the gold columns. The percentage figures in the grid represent the number of elements that each standard contains that address or could be applied to the respective business process. As an example, RETS is shown to have 90% of the data elements necessary to convey basic property data in the commercial real estate arena. In each case, as is the case with RETS specifically, the data standard may not have been designed to carry the data elements in question but can be repurposed to do so if required. As an example, RETS was not designed to carry commercial real estate property address data elements, only single family data elements. Property location and address elements can be readily repurposed for the commercial real estate arena with relative ease and RETS has most of the necessary elements already included in its standard, thus the 90% ranking.

As often as possible, the percentage represents an actual count of data elements needed to adequately fulfill the stated business purpose. However, "adequately" fulfilling a data-definition task is a subjective exercise and, in all fairness, this report can only attest to a generalized rendering of these data handling requirements. As a result, the writers used

their best judgment to accurately render these percentages but they should not be considered definitive figures.

The chart below identifies several areas of data standards development and reflects the commonality and diversity between standards efforts.

Business Processes	Data Standards	RETS	MITS	Data Consortium	PISCES	MISMO
Basic Commercial Real Estate Property Data Property address, age, size in square feet or units, etc.		90%	MITS is most complete 100%	90%	95%	90%
Property Acquisition / Disposition Information Sales price, sale date, terms, property financial metrics, etc.		Lacks commercial data elements, due diligence detail 25%	Lacks many fields and detail 15%	Lacks adequate detail 45%	PISCES is most complete but lacks detail 80%	Deals with single-family data only 25%
Property Operations Reporting Operating statements, rent rolls, cash flow statements, etc.		Lacks most commercial data elements	80%	70%	Currently not supported	85%
Property Performance, Analysis & Reporting Appraisals, DCF valuations, capital valuations, financial reports, etc.		Lacks most commercial data elements	Pending approval into standard 40%	100%	100%	Lacks most commercial data elements
Market Research & Reporting Aggregated terms for "market," trends, avg. rents, market vacancies, etc.		None	10%	10%	None	None

The chart shows the type of business processes and their respective data elements addressed by each standard. The percentage figure represents the portion of data elements needed to completely address the business function in the green column.

Notably, there are few terms or established definitions that apply to research and market data, represented in the bottom row of the table on the preceding page. Currently there are no data standards efforts focused exclusively on the research area of commercial real estate.

Chart Explanations

The data standards and research term chart on the following page depicts how each data standard renders the definitions addressed in this report. In each case, the data standard term is noted and the definition quoted from each data standard dictionary. In some cases the data standard definitions provided appear strained and do not seem a ready fit for the research term. This has typically occurred for one of two reasons; the data standard's application of the term is used in a different context from the research term or the data standard's term is a composite term to be used in conjunction with other terms to derive its full meaning.

The chart does not highlight or attempt to resolve these difficulties. Instead the chart depicts what each data standard reports to illustrate the similarity and diversity between research and data standards terms. Using this chart, interested parties can easily identify the idiosyncrasies and outright differences between the research and data standard terms and pursue more detailed research independently.

	Sales price	Vacancy	Asking rent / quotes lease rates	Net absorption	Inventory	Construction
Data Consortium (DC)	ClosingAmount: term listed but no definition provided	Vacqancy Rate: "The percentage of all units or space that is unoccupied or not rented."	Rent: "The cost for the use of property."	Absorption Rate: "The percentage of a particular type of real estate that can be sold or leased in a particular location during a specific period of time."	DC does not use this concept. DC provides a definition and data format for any individual building. Inventory is the sum of individual properties.	DC does not employ this concept
MISMO	Sales Price concept does not apply since the MISMO standard applies to lending and is thus pre-sale. Related term "Acquisition Cost": The total cost associated with the borrower's acquisition of the collateral property.	The vacancy concept in MISMO refers to vacancy in a particular property, not "market vacancy"	Asking rents per unit / square foot: "Asking rent for the space available or unit in the sales comparable." MISMO's data refers to rent as aggregate income, not per unit / lease rents	MISMO does not define this as a market term in their data dictionary.	MISMO does not use this concept. MISMO provides a definition and data format for any individual property. Inventory is the sum of individual properties.	MISMO does not employ this concept
PISCES	The definition is listed as "The actual costs incurred in purchasing the property by the purchaser."	PISCES does not define this as a market term in their data dictionary.	PISCES does not define this term for a particular unit or lease but as a rolled up revenue component.	PISCES does not define this as a market term in their data dictionary.	PISCES does not use this concept. PISCES provides a definition and data format for any individual building. Inventory is the sum of individual properties.	PISCES does not employ this concept
Appraisal Institute (AI)	Sale Price: "The amount a particular purchaser agrees to pay and a particular sell agrees to accept under the circumstances surrounding their sales transaction"	AI does not define this as a market term in their data dictionary.	ContractRate: "The initial annual guanrantee rental or base rental rate per square foot of rentable or gross leasable area, before consideration of stated rental increases, percentage overage rent clauses, escalation or expense recovery clauses, or rent concession provisions."	Capture Rate: The estimated percentage of the total market for a specific property type that is currently absorbed by existing facilities or is forecast to be absorbed by proposed facilities."	AI does not use this concept. AI provides a definition and data format for any individual building. IInventory is the sum of individual properties.	AI does not employ this concept
MITS	MITS does not use this concept	Vacancy: "The published average vacancy rate for the collateral property's property type in the Collateral Market."	MITS has terms for asking, average and effective rents	MITS does not employ this concept	MITS does not use this concept. MITS provides a definition and data format for any individual building. Inventory is the sum of individual properties.	MITS does not employ this concept
RETS	"ClosePrice: The final sale price of the property."	Vacancy Factor: "The ratio of vacanct units to total units, expressed as a decimal fraction."	Rent: "The rent income for an individual unit expressed as an amount per given period, by default per year. Periods other than annual are deprecated"	RETS does not employ this concept	RETS does not use this concept. RETS provides a definition and data format for any individual building. Inventory is the sum of individual properties.	RETS does not employ this concept

VII. *Data Standards and Commercial Real Estate Research*

In many cases the leading commercial real estate data standards are carrying data elements necessary to a research data standard. As an example, the property address and lease elements in each commercial real estate standard could be employed by any research data standard. In simple terms this might involve each data vendor providing the property name, address, city, state, zip mapping coordinates, asking and effective rent data in a common format. If several research companies were to employ these standard elements according to a standard, the data consumer could combine multiple vendor databases and create a data superset for a particular analysis or decision-making process.

Each data vendor offers their own level of definitional granularity, the standard's ability to represent specific terms precisely, allowing the data consumer to assemble the terms in whatever manner is necessary to fulfill their data consumption, computation and reporting requirements is the critical capability. In this manner, the data standard does not force any data consumer to use the data elements in a particular manner or for particular business purpose. The data is offered in a structured format that allows the sending party to build or employ tools to format and deliver the data in a consistent manner and for the receiving party to consume the data in an equally consistent manner.

If both parties closely adhere to the data definitions, the data standard allows for immediate interpretation of the data delivered.

In the research arena, this process would allow each vendor to deliver their data in a consistent format, allowing the data consumer to process the data using standardized tools, saving enormous human and technological costs over manual data matching and custom analysis. As an example, the problem of one data vendor providing data on a custom defined submarket basis while a second provides data at a city level and third on a county or MSA basis would be eliminated. Each vendor would use a research data standard to provide precise data that would be rolled up into any geographic unit the client required. This could be done without the consumer having access to the granular data, which may be confidential, the client being the only one to see the analytical result. Using standardized data and data processing tools, the consumer could combine different data resources into a unified whole and leverage the power of fully integrated data sets for sophisticated analysis and reporting.

VIII.. *Data Integration Tools*

Until research data is provided in a standardized format brokers, appraisers, analysts and investors can use a growing number of tools to integrate multiple data sources and perform sophisticated analysis and reporting. Data developers refer to this process as "data mapping" where one data source is transformed into a new format so it can be combined with other data resources. This mapping process typically involves a business or functional translation layer where rules for processing a data set reside. As an example, if one data source provides office lease data based on asking rents and a second source provides their data based on effective rents, there can be a translation layer with conditional data processing rules and statistical algorithms to convert asking rents to effective rents in a particular market.

There are many vendors that provide these data translation tools, called "Electronic Transformation and Load" tools (ETL), if manual data mapping and processing is overly complex or the source data often changes. Using these tools and methods, data consumers can integrate data from multiple sources, various levels of precision, differing geographic units of measurement, and varying levels of completeness to support sophisticated decision-making and render the data as their needs require. Until research data standards exist, this is one of the few methods available to integrate disparate data sources apart from employing analysts and brokers with years of experience, data familiarity and an acute sense of local market dynamics.

This is not a difficult technological, analytical or business process. On a smaller scale, typically within individual companies, it is already being done and will likely become commonplace in the years ahead.

IX.   *Conclusion*

The differences in data provider collection methods, limits to property and market data granularity, data completeness for a particular market or purpose requires data consumers to carefully consider their data usage needs and data handling methods. The data providers described in this report all provide excellent data or analysis for their respective areas of focus. Until commercial real estate data standards for research data become pervasive, data consumers will have to pursue other data integration options. Employing ETL tools to transform and integrate disparate data sets is the most efficient method of multi-source data integration today. There are few technical barriers to the next level of commercial real estate data usage and analytical sophistication. Industry visionaries are grasping the power of the rapidly evolving commercial real estate landscape and will eventually transform it into a more efficient arena for investment, operations and the enormous cadre of professionals earning a living in this field.

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