## Ownership Insights:

# Connecting You to Opportunities in CRE

reonomy

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## Summary

Commercial real estate (CRE) has a history of being perceived as slow-moving and inefficient. The inefficiencies that this $16 trillion market[1] faces are twofold: one is due to the shortage of solutions to reduce paperwork and manage costs. The second is due to the lack of tools to structure and capture data to power insights and improve decision-making.

Over the last decade, point solutions have come to market to reduce the paperwork problem and improve deal management. From the adoption of construction management platforms to deal management and leasing and tenant management platforms, among others, the industry has been reducing its dependency on paper and increasing its adoption of SaaS solutions.

Big data, on the other hand, is still considered a new frontier: something talked about aspirationaly at industry roundtables, but not yet something core to business planning and operations.

The lack of big data investment in CRE presents a major drawback for the industry as a whole. IBM reports that 66% of executives across all finance sectors gained a competitive advantage from data analytics.[2] They also report that companies in the top third in their industries using data-driven decision making get more done and make more money than their competitors.[3]

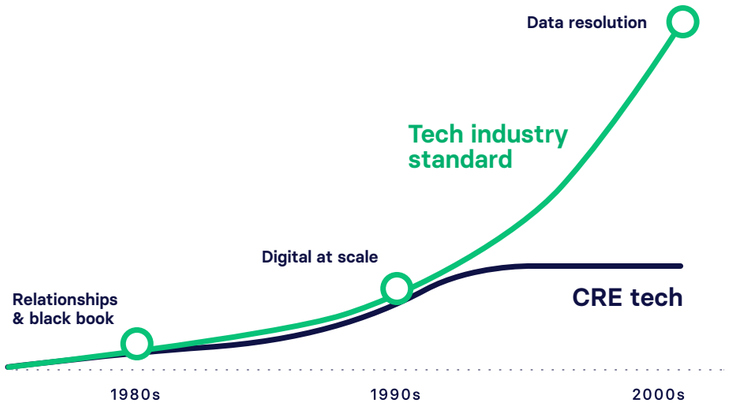
In the coming pages, we will provide a history of big data in CRE, the impact it promises, and new technologies shaping the future of the industry. Read on to discover how Reonomy's cutting-edge technology is empowering companies to improve deal sourcing and client relationships, identify investment opportunities, construct risk assessments, and streamline research processes.

[1] *https://www.reit.com/data-research/research/nareit-research/estimating-size-commercial-real-estate-market-us*

[2] *https://www.ibm.com/blogs/internet-of-things/real-impact-big-data-cre/*

[3] *https://www.ibm.com/blogs/internet-of-things/real-impact-big-data-cre/*

# Closing the technological gaps: the history of CRE big data




To understand where CRE and big data stand on the spectrum of adoption, it is important to first understand the trajectory of technology within the context of other industries.

Take Finance, for example, an industry known for traditional practices and big, bulky processes. Despite its reputation, the industry is undergoing a data revolution, as evidenced in a study conducted by IBM's Institute for Business Value. Within their global research study, they unearthed the statistic that banking and financial markets companies have demonstrated a 97 percent increase over the course of two years in response to whether or not their organizations are leveraging information (including big data) and analytics to create a competitive advantage.[4]

The primary driver catapulting many industries into adoption of big data is the desire to become more customer-centric. The more an organization understands its customers, the better it can predict how behaviors and needs of its customers will evolve. The organizations that can most effectively predict customer preferences will be bestpositioned to deliver the highest standard of products and services and will earn customer loyalty.

Banks, and other financial institutions are strong examples of the move to realize a competitive advantage through data. In contrast, CRE and its adoption of big data has lagged behind.

[4] *https://www.ibm.com/downloads/cas/E4BWZ1PY*

## Why has CRE lagged behind?

The slowness of CRE to adopt big data is not due to a shortage of data. There are, in fact, many types of data that can be harnessed for CRE big data applications.[5] Structural inconsistencies, latency issues, and the ability to connect data lakes has impeded the industry's utilization of big data for actionable insights.

As Phil Wales, CEO of Ebusiness Strategies LLC, is quoted as saying in a recent IBM report, CRE big data challenges include things like "getting a handle on a workable platform, taking the right steps to assemble a CRE data repository, isolating meaningful data patterns, and understanding which opportunities that analytics is actually bringing to the table."[6]

## Limitations in CRE Data

### Data Gathering

As a result of the industry's fragmented data structure and inability to access information from a unified source, each organization has the challenge of fusing together data from across data lakes. To do so, they must address 1) limited access and rights to data 2) data cleanliness 3) latency of data, along with a scalable way to fuse information together.

### Information Silos

Currently, commercial real estate data sits across tens of systems, each governed by a different entity. County records, property management systems, leasing/deal flow platforms, valuations systems, marketing tools, listing services, construction management tools and tenant engagement platforms, are only a small set of the platforms in which CRE data lives today.

Within each data lake, or repository in which raw data is stored, information is structured according to different conventions. With no universal ontology governing something as basic as an address, the ability to extract insights can be severely obstructed. The example below illustrates the impact of information silos when applied to a single address: *123 Main Street.* (chart below)

Moreover, the contributors to the datasets sit across many companies, from assessors to appraisers, lenders, brokers, investors, developers, tenants and contractors. Each one of them cares about and tracks a different slice of CRE data.

| DUPLICATE DATA | TYPOS | VANITY NAME |
|---|---|---|
| 123 Main Street<br>123 Main Street | 123 Maine Street | America Tower |

| NAME CHANGES | HUMAN ERROR |
|---|---|
| 68 Library Place | 123 Main |

[5] *https://www.ibm.com/blogs/internet-of-things/real-impact-big-data-cre/*

[6] *https://www.ibm.com/blogs/internet-of-things/real-impact-big-data-cre/*

### Fragmentation and Latency

Adding to the complexity of database sanctity within CRE is the fact that several pieces of information surrounding the U.S. property market are obscured from public consumption, either purposefully or due to issues of latency. Examples of obscured data points include the identity of a property owner, typically hidden behind an LLC. Additionally, information on who the CRE power players are, and exactly what properties they own, is scattered like breadcrumbs through layers of legal entities, and further shrouded in data inconsistencies at the both the national and local levels. Other examples of blindspots felt across the property landscape are occupancy information, lease comps, rent roll details, construction details and operating expenses, among others.

Issues in data latency can prevent CRE professionals from making quick, strategic decisions, particularly as relates to acquisitions, valuations, and optimizing sales pitches to larger clients.

### Limitations of the Industry

In addition to the limitations posed by CRE data, professionals within the industry have long perpetuated a dependence on relationships as an information gathering source. While establishing relationships with industry stakeholders can undoubtedly enhance a CRE professional's understanding of opportunities and supplement hard-to-reach information, relationship building is not sufficient on its own in today's competitive environment.

Further, many in the industry have historically paired this information with gut instincts[7] when making business decisions. This heuristic approach, rooted in speculation, rather than fact may not be enough for the growing expectations of the industry. Leveraging cleansed and contextualized data helps reduce subjectivity and substantiate decision-making.

CRE tech companies and certain players within the space have sought to resolve specific data challenges by developing software that can be used to streamline data collection and research processes. Once adopted, these tools empower users to better understand aspects of CRE, as related to markets, opportunities, risk assessments, etc.

### The implications of lagging behind in technological adoption

Several organizations across the brokerage, lending, investment, and facilities services communities are investing heavily, both in human resource and in solutions that will help to improve their relationships with data. Those organizations will inherently have a leg up on competition, as they realize the value of substantiating strategic direction with data and are able to pivot faster based on what the data is telling them.

Conversely, organizations unarmed with clarified and comprehensive data may assume the high cost of making uninformed decisions and inability to pivot in response to market trends. With challenges to decision-making also comes the impact that poor quality of data may have on the end-consumers of that data. For example, lenders or brokers reliant on data to drive their origination or prospecting efforts and inform their outreach may grow frustrated with the dearth or unruliness of information available to them. Companies resistant to updating their databases and information-gathering practices may lose out or fail to attract new talent should their competitors provide more advanced data strategies.

[7] *https://www2.deloitte.com/us/en/insights/industry/financial-services/data-analytics-commercial-real-estate-investors.html*

# Finding opportunity within CRE data

In the following section, we will walk through the processes for capturing raw data and translating to business insights.

Data becomes actionable when tied directly to business solutions. In order to do so effectively, organizations must first eliminate data silos and establish concrete data standards. In an effort to create a sustainable data pipeline built for longevity, companies must establish data governance protocols that guide the flow of data into their systems.

To begin, harnessing key insights requires a series of technical steps, including:

1. Collection of data from multiple sources
2. Cleansing of data
3. Analysis of data
4. Generation of insights
5. Communication of insights within organization
6. Development into action plans

A core component of the data cleansing process, essential to exposing opportunity within systems, is the process of Entity Resolution (ER). ER is fueled by AI and ties together two or more records associated with the same real-world entity, such as a person, company, or property.

DEDUPLICATION

RECORD LINKAGE

CANONICALIZATION

REFERENCING

Entity Resolution has four main steps: deduplication, canonicalization, record linkage and referencing.

These steps are needed to make sure that each data point is only represented once in the dataset.

Deduplication refers to reducing duplicate copies of any repeated data.

Canonicalization ensures that the data maintains a uniform, standardized format. In canonicalization, data that may have more than one possible representation is standardized so that it follows the convention of accompanying data. Oftentimes, this process includes assigning a persistent identifier to entities. For example, associating an ID to all properties or companies.

Record linkage deals with linking records associated with the same canonical id. Then, instead of having various naming conventions for a single property, making it difficult to group the property-related records, all property records, tied to the same ID (ex. 123-456-abc), can be easily joined.

Once deduplication, canonicalization, and record linkage are applied, reference mapping is made possible, allowing unstructured data to match to resolved data.

As the volume and velocity of data grow, drawing decisions on connections between entities becomes increasingly difficult. Data quality issues, schema variations, and idiosyncratic data collection traditions can all complicate these problems even further. When combined, such challenges amount to a substantial barrier to organizations' ability to fully understand their data, let alone make effective use of insights.[8]

Once data of a particular type is collected, organized and connected, the next challenge an organization faces is how to create relationships between these unique data types, also known as entities. In the world of CRE, these challenges present themselves once entities, such as properties, tenants, investors, and others, are cleansed and contextualized.

To create the necessary relationships between these entities and ultimately to solve this advanced data problem, organizations turn to Knowledge Graphs.

[8] *https://www.districtdatalabs.com/machine-learning-with-python*

[7] *https://www2.deloitte.com/us/en/insights/industry/financial-services/data-analytics-commercial-real-estate-investors.html*

# The CRE Knowledge Graph: an ontology built for commercial real estate

## About Knowledge Graphs

With the help of machine learning algorithms, knowledge graphs provide a structure and common interface for large bodies of data and enable the creation of smart multilateral relations throughout databases. Structured as an additional virtual data layer, the Knowledge Graph lies on top of existing databases to link data together at scale – be it structured or unstructured.

Knowledge graphs empower organizations to create webs of knowledge representative of their specific domain. The technology can seamlessly break down data silos, allowing consumers of data to use information assets in an agile way. They bring together disparate data silos; unite structured and unstructured data; help companies make better decisions by reaching valuable information faster; and provide a future-proof, standardized source of data to mine for insights.

## The Reonomy Knowledge Graph

Armed with a firm understanding of the complexities of data within the U.S. commercial property market, Reonomy has dedicated significant resources to relieving the technological burden that its data sources and practices have imposed. The guiding principle for investing in this technology is straightforward — build a system that will allow stakeholders within the industry to surface answers to their questions quickly and at scale.

The questions are almost incalculable due to the nuance of each sector involved in the industry. That said, there is also tremendous overlap, in terms of the questions brokerages, financial institutions, investment firms and other CRE professionals are looking to answer. Examples include, but are not limited to:

# What questions can the Reonomy Knowledge Graph answer?

### Ownership

- Who are the **largest property owners** in a particular market?
- What is the **breakdown of assets** within a particular owner's portfolio?
- What is the **total value** of an owner's assets?
- How leveraged is the owner's portfolio?

### Properties

- How diversified are **asset types** within a particular market or portfolio?
- What are the **property attributes** (i.e. SF, lot size, units, floors) of properties within a particular market or portfolio?
- Which properties best fit a specific set of criteria across multiple markets (e.g. industrial properties, over 25,000 SF in Long Beach, CA)?

### Events and Transactions

- Which properties of a particular type have been **recently sold**?
- What are **sales comps** in the market for a subject property?
- What is the **sales history** of a particular property or across assets within a portfolio?
- What is the **debt history** of a particular property or across assets within a portfolio?

### Tenants

- What is the **footprint** of a particular tenant?
- What is the **risk exposure** associated with a certain tenant across a portfolio or market?

### Lenders

- Who are the **top lenders** in a specific market? For a specific **asset type**?
- What is the **total volume** of commercial loans underwritten by a specific lender?
- Which properties are showing **signs of distress**?

In order to answer these questions, Reonomy realized that it would have to introduce technology that could mirror the dynamism and dimensionality of the built world.

In order to create views focused on the companies and people who control assets across CRE, a foundation covering all businesses and people across the country was needed. These sources were disassembled and reorganized according to an ontological map of the CRE domain, capturing all of the possible relationships between people, companies and properties. This map defines the components of our Knowledge Graph- a flexible framework that provides a more true-to-life data representation of the CRE domain.

The components of the Knowledge Graph are created via high volume data pipelines, which are then informed by machine learning and AI algorithms. Once applied, the system is able to provide, for example, not just the name of a particular owner, but also the confidence that a certain owner is or is not the same owner as an individual or company with a like name.

Reonomy's Knowledge Graph is built on the following components:

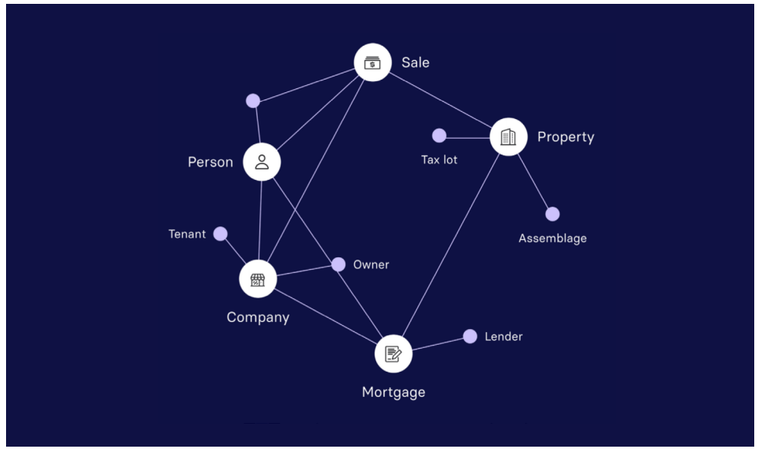
**Vertex Creation** creates the constituent entities of the knowledge graph. This process requires resolution and clustering algorithms to uniquely identify entities that comprise the Reonomy Knowledge Graph. Objects created by vertex creation include companies, properties, people, sales, mortgages, and more.

**Attribute Creation** contains a description of each entity. It provides a rich nd actionable description associated with each object, including physical characteristics, contact details of decision-makers, and predictive analytics.

**Edge Creation** links the entities to uncover insights as to how key players in the CRE ecosystem are behaving.

The result of these components is a view, never before leveraged by the industry. Other similar data assets focus on a significantly smaller subset of properties and/or are manually constructed.

This new found view fuels the discovery process as CRE professionals look to answer business critical questions, either within Reonomy's application or when paired with supplemental data sources, such as in-house systems.



# How Reonomy's Knowledge Graph improves access to portfolio insights

SPOTLIGHT

**Unlocking insights on REIT performance with ownership portfolio data**

Discover how a New York-based, long-short equity hedge fund leveraged Reonomy's Ownership Portfolio feature to streamline their research processes, gain clarified portfolio insights, and ultimately mitigate risk to the fund.

**VIEW CASE STUDY >**

## Reonomy Ownership Portfolios

The Reonomy Knowledge Graph is the backbone of a new feature that came to market in 2021, the Reonomy Ownership Portfolio. The Reonomy Ownership Portfolio provides users with an in-depth understanding of all assets owned by a single individual or company, including asset mix, location, debt profile, and tenant mix of the portfolios.

The offering enables organizations within the industry to more quickly access and leverage portfolio insights and:

### Improve deal sourcing

- Gain more holistic view of opportunities specific to an organization's unique criteria
- Uncover clear pathways to decision-makers and facilitate more informed conversations

### Construct more accurate risk assessments

- Streamline research
- Clarify portfolio insights

### Grow client relationships

- Understand the total potential of a relationship
- Access to portfolio details to support more informed conversations

### Streamline data warehousing and research processes

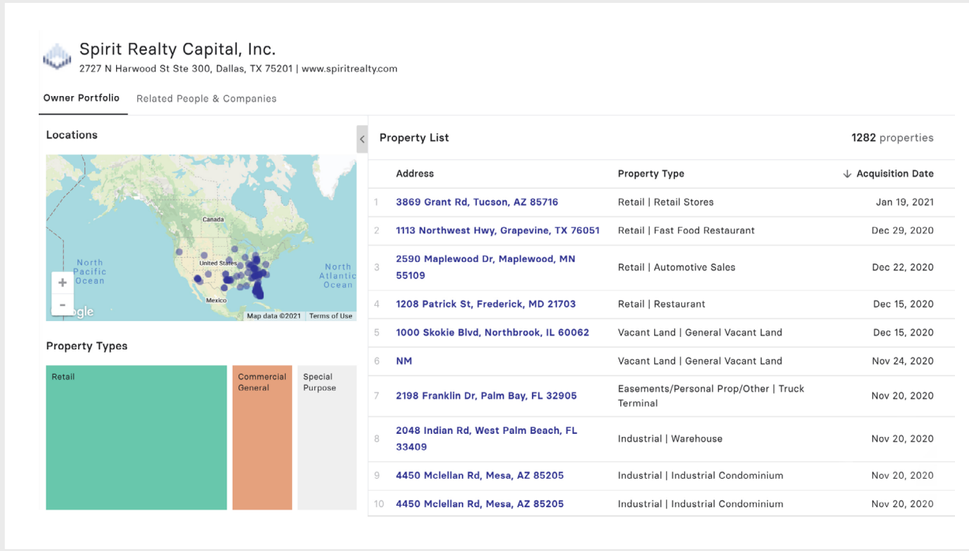
- Leverage unique entity identifiers to strengthen your organization's data infrastructure
- Augment commercial real estate data

### Identify investment opportunities and local operating partners

- Reveal local operators of interest, along with the health of the assets within their portfolios
- Identify which portfolios are showing signs of distress and may be a compelling acquisition opportunity

# The Anatomy of an Ownership Portfolio

*Sample Data*




**Basic Information:** physical address, website

**Interactive Map:** portfolio assets across the U.S.

**Related People and Companies:** individuals or entities associated with the owning entity

**Property Count and Assessed Value:** size of a portfolio

**Property List:** comprehensive list of properties within the portfolio and navigate directly to properties of interest

**Property Types:** breakdown of the portfolio, according to asset type

**Companies:** entities associated with the owning entity

## Accessing Ownership Portfolios

Reonomy Ownership Portfolios are available to all Reonomy Web Application subscribers and are accessible from any desktop browser.

For organizations interested in leveraging data assets to fuel in-house systems, Reonomy offers a series of data solutions, delivered via API or data feed. For more information and to speak to an expert on Reonomy's Data Solutions, please contact enterprise@reonomy.com.

# Conclusion

## Where will successful adoption of big data lead us?

The benefits provided by big data and analytics have become too advantageous to ignore, especially as leveraged to make sense of large and complex datasets and to generate novel insights. As Fintech and other technology-advantaged industries have indicated, there is tremendous upside to modernizing how CRE professionals gather, make sense of, and harness data.

The ability to make predictions about the people, companies, and properties across CRE and how they interact is no longer out of reach for organizations willing to take that leap. Because big data and having the capabilities to harness it effectively hasn't yet reached peak adoption, therein lies an opportunity for organizations to get a leg up on competition.

With no playbook or benchmark to precede us, Reonomy looks to the industry and its willingness to adapt new technologies to explore this new frontier in connected, multifaceted commercial landscapes.

## About Reonomy

Reonomy is the leading provider of CRE insights, empowering top brokerages, financial institutions, and commercial services providers with actionable data and solutions.

Armed with Reonomy's enterprise-grade products, CRE professionals and organizations gain comprehensive market understanding, discover opportunities, and streamline research processes.

## Interested in learning more?

For additional information on Reonomy, please contact sales@reonomy.com.

To learn more about Reonomy Ownership Portfolios, click here.

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