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#RealEstatePredictions

Middle East Real Estate
Predictions
2022
#RealEstatePredictions

# Contents

# Digitalisation of real estate

The future of real estate will be championed by digital-first organisations operating within innovative environs. By combining robust market research with sophisticated technologies, decision makers stand to benefit from predictive analytics and effective value creation for their real estate portfolios.

In this issue of the **Middle East Real Estate Predictions** report, we explore how machine learning, geospatial analysis, integrated data management and blockchain can support data-led strategies for both the public and private sector.

To thrive in a disruptive economy, harnessing the exponential power of Artificial Intelligence (AI) can help key decision makers gain an advantage by transforming the data analysis process to drive real, tangible outcomes.

A review of available data sources, integrated data management and a robust implementation plan can support timely access to data and predictive capabilities during the real estate development process.

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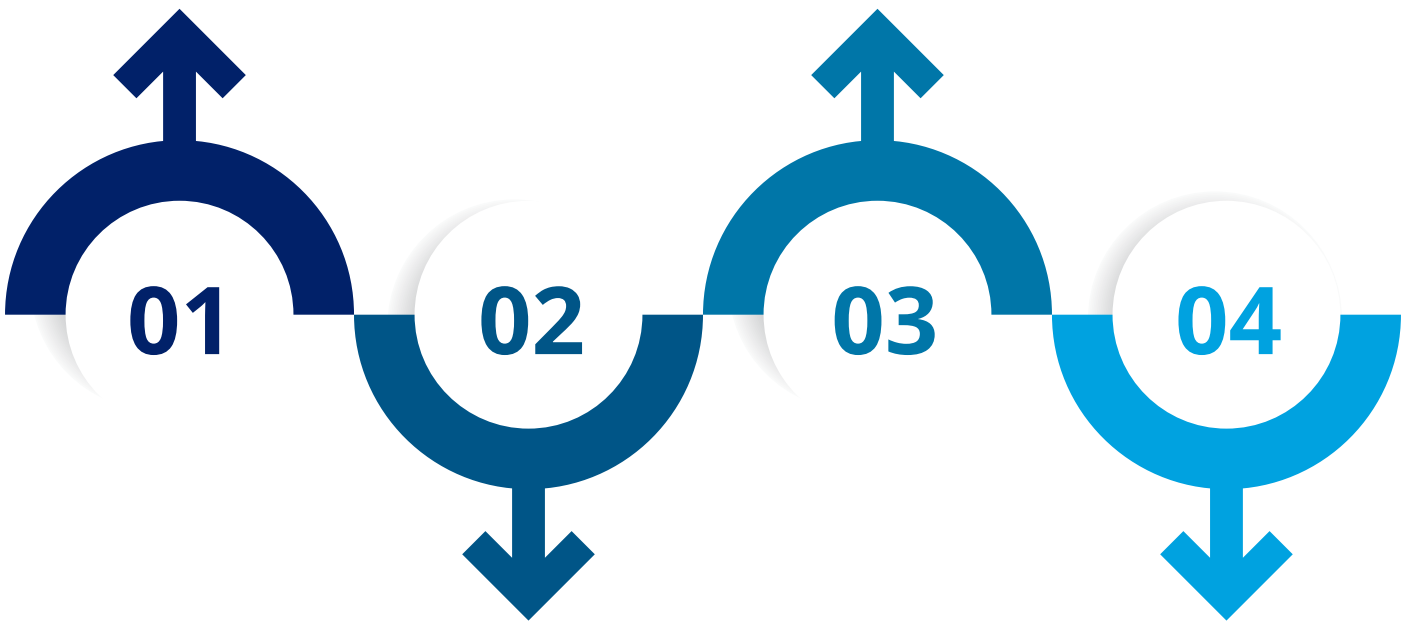
Developing dynamic 3D models and collaborative data platforms driven by digital innovation and technology can help enhance infrastructure planning, transportation and the utilisation of resources.

Fractional ownership of real estate, powered by blockchain technology, can make properties liquid and tradable among a more diverse pool of investors.

# Applying machine learning to real estate decision making

**To thrive in a disruptive economy, harnessing the exponential power of AI can help key decision makers gain advantage by transforming the data analysis process to drive real, tangible outcomes.**

City or master plan real estate market data, including supply, transactions, price and rent information is typically held in disparate source formats. Additionally, the correlation of economic metrics, such as Gross Domestic Product (GDP), oil price, construction financing, among others, is often not clearly articulated to enable the study of their true impact on real estate sector demand.

**The benefit of applying machine learning/AI tools** is the ability to readily incorporate existing historical data into the tool or algorithm in a structured and standardised manner. This data collation allows relevant information to be reproduced through a consistent extract, transform, load (ETL) process.

In developing a useful data template to aid decision makers, the initial process must take into account the granularity, aggregation or disaggregation level required and whether any data cleansing would be necessary.

Maintaining a certain level of granularity in the data can provide unique insights to support planning decisions, as well as to understand market gaps and targeted positioning for new projects. For instance, classifying residential data by location, the number of bedrooms and typology (villas, townhouses, apartments) can enable more meaningful analysis.

With the benefit of advanced pattern recognition and machine learning, decision makers can find previously unrecognised patterns in data, allowing them to execute actions and report on them. In addition, through machine learning, the model is able to continuously evolve, becoming smarter and improving over time supporting on-going analysis in line with the underlying dataset.

## Data discovery

**Reliable, quality data** is essential for a forecast model. Furthermore it is paramount that the data is cleansed, enriched and structured in a manner that aids the forecasting process, as well as allowing discovery of insights and connections.

**Collate**
Incorporate data into the tool or algorithm in a structured, standardised manner that can be reproduced.

**Enrich**
Enrich data by either introducing additional data or feature engineering. The overarching purpose is providing the forecasting process more information to help predict the future.

**Cleanse**
Check data for missing points, nulls and outliers by applying a set of business process rules.

**Discovery**
Initiate data discovery once the information is in a usable format to ensure that the ingestion, cleaning and enrichment process have taken place.

Source: Deloitte

**Through data cleansing and review, the discovery of insights and key drivers can be established.**

The forecasting process is supported by technical infrastructure, which can be custom built or integrated with an existing framework. The primary goal is to ensure that the proposed infrastructure meets storage, computation and security requirements for the development project or relevant government entities.

Following the machine learning based forecasting process, the consumption layer allows users access to the forecasts. This layer can be customised for the purposes of the user (private or government entity) and can be integrated into existing dashboard tools to aide analysis and reporting processes.

**Scenario analysis**

For a full view of the real estate landscape, the forecasts can be combined with descriptive analytics to prepare a scenario analysis dashboard.

This allows different categories of users to study the impact of both macro-economic and sector specific factors on metrics such as price or rent of commercial and residential properties, the number of tourists arriving from key source markets and the level of real estate transactions, among others.

An example of using machine learning for real estate predictions is the Deloitte's time series accelerator called Intuition, a bespoke forecasting engine that automates the process of identifying unique and complex trends within a data set, by passing the data through a range of algorithms to pair the most predictive algorithm with the provided data. Additionally, it gives users the ability to explore the effects of changing key metrics that drive the forecasts.

**Residential Sector - Scenario Impact Comparison**

A comparison of scenarios in the residential sector indicating whether the demand has been met or if there is an undersupply or oversupply of units
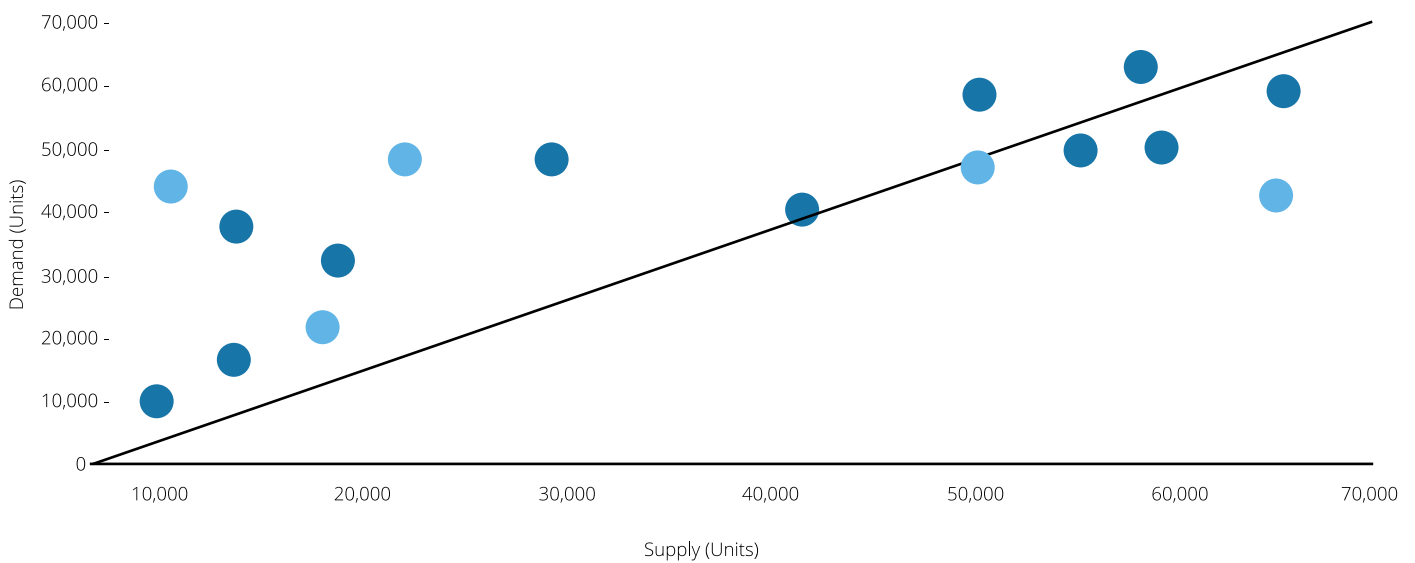


Note: The above circles represent the different scenarios created to test the impact against the baseline.

# Creating a digital twin for city planning and asset management

**Geospatial analytics can help governments, developers and asset owners leverage the power of location to gain critical insights for improving their mission outcomes.**

When multiple layers of data that have been geocoded or tagged are overlaid on top of each other, the benefits of geospatial analysis increase. New relationships become visible and new analytical capabilities become possible. The more accurate, varied and current the geospatial data, the more opportunities there can be for visual and quantitative analytics.

For instance, **geocoding city information** can help answer questions such as: where are the points of entry of government facilities in relation to modes of transport, or in which districts of a new master planned project would assets maximise accessibility considering the changing demographics?

Geospatial analytics can provide benefits for any class of property, including buildings, infrastructure, land and transport facilities. A common data platform can enable sharing of information on terrain attributes such as water bodies and existing infrastructure for creating efficient transport networks. Additionally, the potential for deploying renewable energy sources such as solar energy can be studied using data on building height and rooftop surface characteristics, among other metrics.

The benefits of geospatial technology also extend to asset management and where an integrated, portfolio-wide view of property information is critical as many budget environments continue to tighten.

The use of standardised interfaces to view and analyse information, including ETL tools and web services architecture, can help improve flexibility and usability across the organisation.

**Geospatially enabled asset management** uses the power of location to properly utilise assets and provide an organising principle, which helps to bring together all aspects of management into one framework.

This can be managed through an integration of Geographic Information System (GIS), which highlights locational attributes with Building Information Modeling (BIM), including data from the interior and exterior of the building. The latter are typically prepared during the construction phase, and can be integrated with geotagged neighbourhood images and map views, among other parameters.

Managing assets through a digital representation of its attributes can help owners meet a number of objectives related to asset management.

Cost reduction

Improved accountability and compliance oversight

Enhanced audit readiness

**Enhanced asset management**

Better budgeting and acquisition planning

Improved public trust

Increased return on assets' investment

Source: Deloitte

**Developing a dynamic 3D city model and collaborative data platforms driven by digital innovation and technology can help enhance infrastructure planning, transportation and the utilisation of resources.**

In line with the Whole-of-Government Approach (WGA) to solve a nation's biggest challenges, the adoption of a geospatial analytics led governance model can enhance the sharing of information among government entities, and provide access to relevant information for residents, students and the wider public.

An integrated GIS enabled platform can collate geometric and image data from different public agencies, as well as 2D data and information from existing geospatial and non-geospatial platforms. This enables the roll out of initiatives supporting way finding, traffic management, efficient infrastructure and building design, land management as well as critical capabilities such as simulating emergency evacuation procedures.

The adoption of geospatial technologies can be extended to **support sustainability initiatives.** By accessing detailed information about buildings' surface materials and land cover, urban planners can form insights related to noise propagation or determining accurate solar panel roof angles.

**Potential benefits include:**

- Identification and monitoring of environmental quality i.e. air, groundwater and marine water

- Reduction in carbon footprint by removing the need for paper use

- Reduction in the risk of adverse environmental impacts by improved monitoring of hazardous materials

## Case studies

### Project summary

**Name:** Virtual Singapore (VSg)

**Overview:** VSg , (coverage approximately 720 sq km) USD 53 million GIS based project, aimed at efficient urban planning, improved accessibility and sustainable development.

**Key focus areas:**

- Sustainable environment
- Transport management
- City planning
- Efficient utilisation of natural resources

### Project summary

**Name:** Brussels Smart City

**Overview:** A centralised mapping portal 'geo.brussels' set up by a 'GeoBru' Committee comprising six government entities, that manages the functioning and the coordination of the portal, and allows data exchange between different government agencies in Brussels.

**Key focus areas:**

- Establishing a digital map of the brussels capital region of approximately 162 sq km
- Improving urban mobility
- Sustainable development

### Key entities / agencies

| Government entities | | |
|---|---|---|
| **National Research Foundation** | **Singapore Land Authority** | **GovTech Singapore** |
| Lead entity- VSg platform (data dissemination) executed by programmes dept. | 3D mapping national project (data collection) | Expertise in Information and Communications Technology (ICT) initiatives and its management |

### Key entities / agencies

| Government entities |
|---|
| **The Brussels Regional Informatics Centre (BRIC)** |
| Leading entity |
| An ICT partner with the focus on computer, telematics and cartographic development across government organisations in the Brussels capital region |

| Vendors | | |
|---|---|---|
| **Dassault Systemes** | **Asset Allocation & Management Company** | **Bentley Systems** |
| Developed 3D simulation model data is utilised by key sectors/ departments | Data collection aerial and terrestrial surveys | To capture and convert the survey data in CityGML format |

| Software providers (open source) | | |
|---|---|---|
| **Geo.brussels** | | |
| **GeoNode** | **GeoNetwork** | **GeoServer** |

Note: CityGML (City Geography Markup Language) exchange form
Source: Deloitte; Virtual Singapore (nrf.gov.sg); Smartcity.brussels

# Integrated data strategy for new master plans and city development

**As part of the business planning exercise, a review of available data sources, integrated data management and a robust implementation plan can support timely access and predictive capabilities during the real estate development process.**
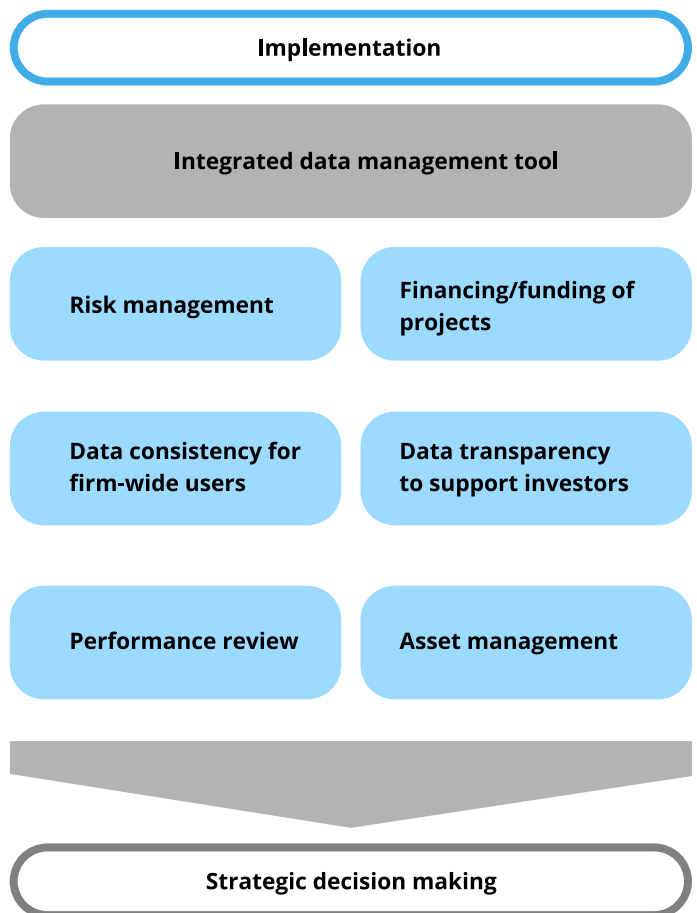
To assess the optimal data framework for a city scale development, the first step is a **current state assessment** to review available data sources and existing data management system(s). During this data discovery phase, the existing framework for managing information is typically benchmarked against national standards, the vision of the government entity/private organisation and industry best practice. This includes factors such as data architecture, data models, data catalogue and data flow processes. The current state assessment helps identify gaps either at department or entity level, and the level of maturity of each to be scored against industry benchmarks, including global case studies.

Following this stage, the data strategy can be articulated further through a needs assessment and defining roles and responsibilities. The key parameters to be assessed during this phase include:

- **Objectives:** What data is required to support decision making?

- **Analytics:** What is the level of analysis and frequency of update required?

- **Technology:** What technology/tools need to be implemented to support data management?

- **Users:** Who will require access to the data and what security controls need to be implemented?

- **Responsibility:** What roles must be assigned for ongoing data update and system management?

## Implementation framework

Digital-first organisations operating within innovative environments can benefit from predictive decision making and effective value creation as they progress in their transformation journey. Data analytics combined with real estate market information can provide decision support through an integrated view of the development lifecycle.

| Implementation |
| --- |

| Integrated data management tool |
| --- |

| Risk management | Financing/funding of projects |
| --- | --- |
| Data consistency for firm-wide users | Data transparency to support investors |
| Performance review | Asset management |

| Strategic decision making |
| --- |

Source: Deloitte

Both public and private entities in the Middle East stand to benefit from harnessing the value of data to unlock innovation, drive growth and transformation, and improve competitiveness.

# Fractional ownership of real estate using blockchain

**Fractional ownership of real estate, powered by blockchain technology, can make properties liquid and tradable among a more diverse pool of investors.**

Fractional ownership of real estate typically involves multiple co-owners (usually four or more) who participate in the transaction either by each acquiring an undivided share in the property itself or through separate shares in a special purpose vehicle (SPV) that owns the title of the relevant property. The concept has had limited traction in the Middle East to date due to the constraints surrounding regulations on foreign ownership in certain locations, as well as restrictions on registering multiple owners on the relevant title deed.

Another hurdle for a market-wide adoption of fractional ownership is the transfer fee impact each time the shareholding is changed during the course of the investment period.

The concept of fractional title deed is common for holiday properties in the United States, Europe and parts of the Caribbean. It differs from the 'timeshare' model which allows use of the property during certain times of the year. By contract, the fractional deed allows ownership of a portion of the property and the usage rights are typically part of the co-owners' agreement.

**Tokenisation of real estate ownership**

Tokens, which are digital rights to assets, can include ownership interests in real estate. Public records bearing timestamps, such as title deeds, property identification numbers and site surveys can be embedded into tokens, to ensure that the property title is secure and related records are readily and cheaply available.

The technology used to verify the authenticity and source of precious items, such as diamonds, can be implemented to verify property ownership and title documents. Many countries, such as the United States and the United Kingdom, have already begun developing blockchain land and title records.

Going a step further, tokens can be programmed to automatically generate deeds upon title transfer, pay dividends or rental income, generate digital contracts and retain auditable records. Transfer restrictions can be established through defining the maximum token transfer limits and Know Your Customer (KYC) or Anti-Money Laundering (AML) requirements.

Over time, the use of blockchain technology and digitisation of assets is expected to lower transaction costs that typically restrict participation from a wider base of retail investors.

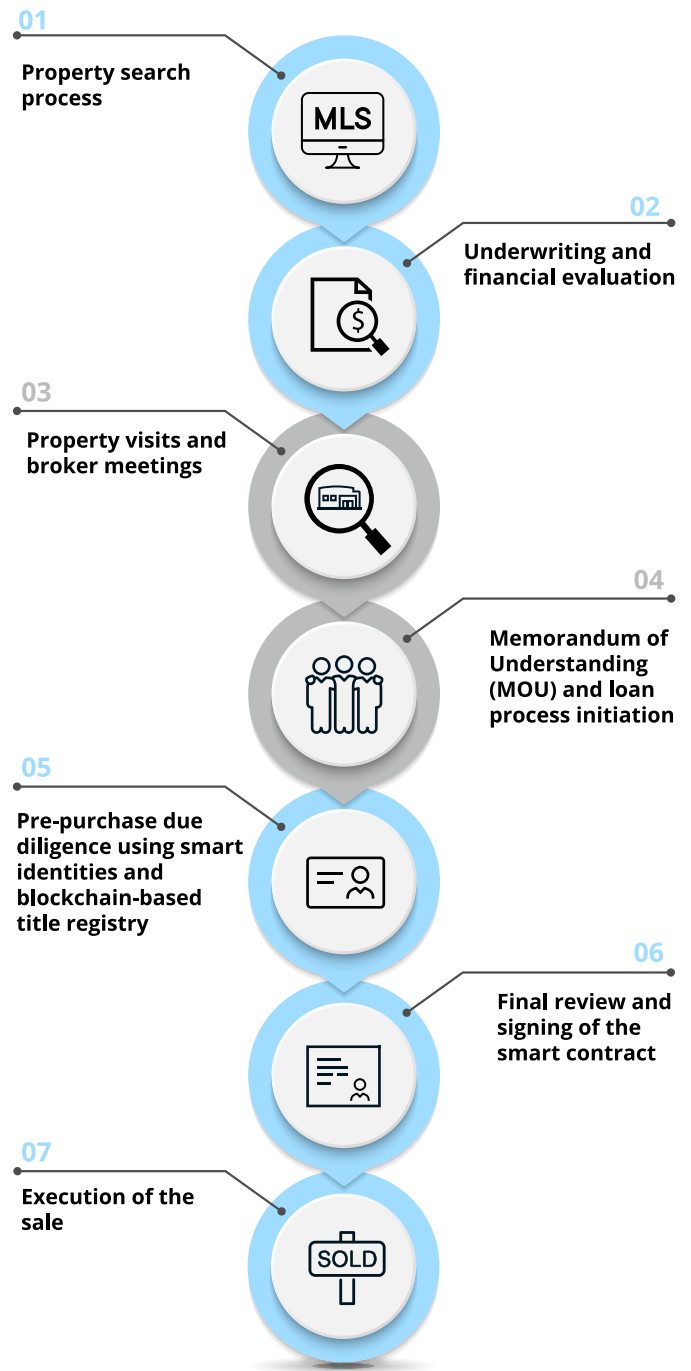> In September 2019, the Dubai Land Department (DLD) launched the Fractional Title Deed initiative for hotel units, whereby an investor can buy up to half or a quarter of the ready unit, rather than buying it in full. The initiative was a pilot phase for one project. Under the fractional title deed model, the buyer is expected to pay a transfer fee only on the amount they have invested, and not on the entire value of the unit.

**A number of regulatory and operational considerations must be ironed out to enable a widespread adoption of fractional ownership using blockchain technology.**

Among the key questions for investors are those surrounding service charge and how this will be managed under fractional ownership. Additionally, as with any joint ownership agreement, investors must have a clear understanding of the following when properties are available for purchase through fractional ownership:

· Level of control or input in the property management process

· Mechanism and timing of receipt of returns

· Management fees to be paid

· Options available to exit the investment and related charges, if any

· Overall rights as a fractional owner

· Terms pertaining to the use of the technology platform that enables the sale and purchase

**Using blockchain technology in a real estate purchase and sale transaction**

**01**
**Property search process**

**02**
**Underwriting and financial evaluation**

**03**
**Property visits and broker meetings**

**04**
**Memorandum of Understanding (MOU) and loan process initiation**

**05**
**Pre-purchase due diligence using smart identities and blockchain-based title registry**

**06**
**Final review and signing of the smart contract**

**07**
**Execution of the sale**

Note: The loan application and servicing steps would be applicable only if mortgage financing is used for purchasing the property.
Source: Deloitte
Key (◯) - Indicates steps which could utilise blockchain technology

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