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REA625
Real Estate Valuation

Lecture 9



Real Estate Management

Lecture 9

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Recap - Lecture 8

Cost Approach

The Definition According to the Three International Standards

Fundamental Principles of the Cost Approach

Conditions for Applying the Cost Approach

When is the Cost Approach Applied?

Components of the Cost Approach (DRC)

Steps of Applying the Cost Approach (DRC)

Challenges and Mitigation Measures

Comprehensive Comparison of Valuation Approaches

Contents

- *Reconciliation of Valuation Results*
- *The Final Check*
- *Valuation Models*
- *Valuation of Portfolios*

The Main Valuation Approaches

Valuation Approaches

```
graph TD; A[Valuation Approaches] --> B[1. Market (Sales Comparison) Approach]; A --> C[2. Income Approach]; A --> D[3. Cost Approach];
```

1. Market (Sales Comparison) Approach

This approach is based on **comparing the subject property** with **similar properties** that have been sold in the market.

2. Income Approach

This approach converts **expected future cash flows** into a **present value** through **capitalization or discounting techniques**.

3. Cost Approach

This approach is based on **estimating the cost of constructing a comparable asset**, less **depreciation**.

Reconciliation of Valuation Results

➤ Definition and Concept

Reconciliation is a **systematic process** by which **the valuer analyzes** the results obtained from applying multiple valuation approaches or methods, **investigates** the reasons for any discrepancies, and ultimately **arrives** at a **single, justified opinion of value**, based on **professional judgment and the reliability of the available data**.

Why
Reconciliation
is Necessary?

Each approach views the property from a different perspective:

Comparative Approach —► What did the market pay for similar properties?

Income Approach —► What is the present value of future cash flows?

Cost Approach —► How much would it cost to construct a similar replacement?

Reconciliation —► What is the most logical and reliable value?

Reconciliation of Valuation Results

➤ Definition and Concept

Valuers are not required to **use more than one valuation method**. However, they **should consider using multiple approaches** when **observable or reliable inputs are insufficient for a single method to produce a credible result**.

When multiple approaches are applied, the valuer should:

Analyze the different values obtained

- Results should be compared and their consistency examined.
- Causes of differences should be analyzed.

Reconcile them

Document the analysis and reconciliation process in the valuation report

Reconciliation of Valuation Results

➤ Principles of Proper Reconciliation

Reconciliation $\neq$ simple averaging

✗ **Incorrect reconciliation:**

- $\text{Value (A)} + \text{Value (B)} + \text{Value (C)} \div 3$
- (This is merely an arithmetic mean, not a professional reconciliation)

✓ **Correct reconciliation:**

- **Reconciliation** = Analysis + Weighting + Professional Judgment + Justification
- **Final Weighted Value** = $[\text{Value (A)} \times \text{Weight (A)}] + [\text{Value (B)} \times \text{Weight (B)}] + [\text{Value (C)} \times \text{Weight (C)}]$

Reconciliation of Valuation Results

➤ Steps for Reconciliation

Steps for Reconciliation

```
graph TD; A[Steps for Reconciliation] --> B[Stage 1: Preliminary Analysis]; A --> C[Stage 2: Determining Weights];
```

Stage 1: Preliminary Analysis

Stage 2: Determining Weights

Reconciliation of Valuation Results

➤ Steps for Reconciliation

Stage 1: Preliminary Analysis

Step	Action	Key Questions
Review Results	Examine values from each approach	Are the results reasonable?
Calculate Variance	Identify differences	What is the magnitude of the variance?
Analyze Causes	Understand reasons for divergence	Why do the results differ?
Assess Reliability	Evaluate the quality of each approach	Which approach is more reliable?

Reconciliation of Valuation Results

➤ Steps for Reconciliation

Stage 2: Determining Weights

Criteria for assigning relative weights

Criterion	Increases Weight	Decreases Weight	Practical Example
Data Quality & Quantity	Abundant, accurate, multiple sources	Limited or incomplete data	Numerous documented transactions
Data Recency	Recent transactions (≤ 3 months)	Old transactions (> 12 months)	Active market with current data
Source Reliability	Official sources (government/records)	Unreliable sources or estimates	Registry data
Method Suitability	Approach reflects property nature	Approach unsuitable for property type	Income method for investment property
Purpose of Valuation	Alignment with valuation objective	Conflict with purpose	Insurance → higher weight to cost approach
Adjustment Size	Minimal adjustments ($< 10\%$)	Large adjustments ($> 20\%$)	Comparable properties closely matched

Reconciliation of Valuation Results

➤ Steps for Reconciliation

Stage 2: Determining Weights

Criteria for assigning relative weights

Criterion	Increases Weight	Decreases Weight	Practical Example
Result Consistency & Reliability	Consistent, stable outcomes	Divergent or illogical results	Income and comparative results converge
Convergence with Other Approaches	Aligns with other methods' results	Significant deviation from others	All methods indicate similar value
Market Conditions	Active, transparent market	Weak or unstable market	Active market → higher weight to comparison
Property Characteristics	Method reflects actual attributes	Method does not reflect property features	Unique property → reduce comparison weight

Reconciliation of Valuation Results

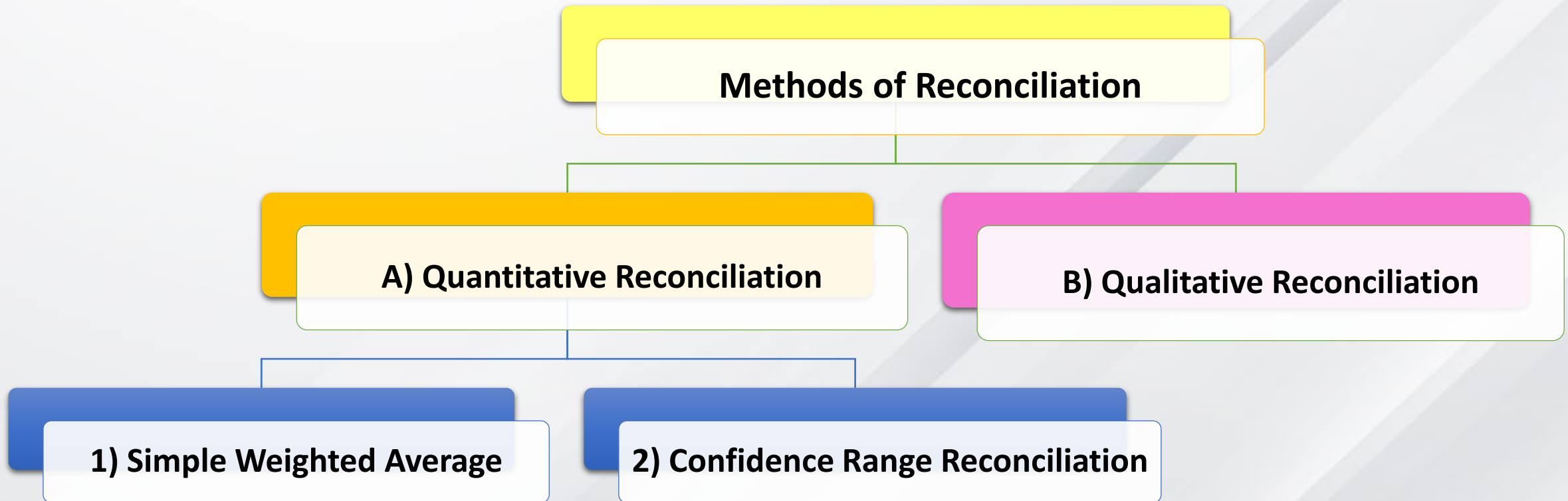
➤ Steps for Reconciliation

Stage 2: Determining Weights

Weighting of valuation results relies on criteria related to data quality, method suitability, reliability of results, and market conditions. **Higher weights** are given to approaches based on recent, reliable data that reflect the property's nature and the valuation purpose. **Conversely, weights are reduced** where data is weak, the method is unsuitable, or results diverge.

Reconciliation of Valuation Results

➤ Methods of Reconciliation



Reconciliation of Valuation Results

➤ Methods of Reconciliation

A) Quantitative Reconciliation

1) Simple Weighted Average

 **Example:**

Approach	Value	Weight	Weighted Contribution
Comparative	10,000,000	50%	5,000,000
Income	9,500,000	30%	2,850,000
Cost	10,500,000	20%	2,100,000
Final Value		100%	9,950,000

Reconciliation of Valuation Results

➤ Methods of Reconciliation

A) Quantitative Reconciliation

2) Confidence Range Reconciliation



Example:

Minimum: 9,500,000 (lowest value)

Maximum: 10,500,000 (highest value)

Range: 1,000,000

Coefficient of Variation: 10.3%

**Selected Value:
10,000,000
(within acceptable
range)**

Reconciliation of Valuation Results

➤ Methods of Reconciliation

B) Qualitative Reconciliation



Example:

Criterion	Comparative	Income	Cost
Data Quality	Excellent	Good	Average
Suitability for Purpose	High	High	Low
Market Reliability	High	Medium	Low
Decision	Higher Weight	Medium Weight	Lower Weight

Reconciliation of Valuation Results

➤ Scale for Interpreting Differences Between Approaches

Difference (%)	Interpretation	Required Action
<5%	Excellent convergence – high reliability	Direct reconciliation with justified weights
5–10%	Acceptable difference	Review key inputs and justify variation
10–15%	Requires careful review	Examine assumptions and data used
15–25%	Significant difference	Comprehensive review of all inputs
>25%	Very large, unacceptable	Full revaluation from scratch

Reconciliation of Valuation Results

➤ Sample Reconciliation Table

Approach	Estimated Value	Weight %	Contribution	Weight Justification
Market Comparison	Value (A)	40–60%		Abundant, verified market data
Income Approach	Value (B)	30–50%		Fully leased property with valid contracts
Cost Approach	Value (C)	5–15%		Verification only (older property)
Final Value		100%	Total	

Reconciliation of Valuation Results

➤ Cases Where Integration is Professionally Mandatory

Case	Reason	Integrated Approaches
Litigation & Arbitration	Strengthening legal evidence	All three approaches
Expropriation & Compensation	Demonstrating fair value	Comparative + Income
Financial Reporting (IFRS)	Level requirements	According to level
Mixed-Use Properties	Each sector has its own method	According to each sector
Lack of Market Data	Cross-verification	Cost + Income

Reconciliation of Valuation Results

➤ Numerical Example: Reconciliation of a Leased Commercial Building

Property Data: Commercial building (offices + shops), 1,000 m², fully leased

Approach	Value (SAR)	Weight	Contribution (SAR)	Justification
Market Comparison	3,200,000	45%	1,440,000	Good, verified market data
Income Approach	3,050,000	45%	1,372,500	Stable income, documented contracts
Cost Approach	2,750,000	10%	275,000	For verification only (12 years old)
Final Value		100%	3,087,500	
Approximate Value			≈ 3,100,000	

Difference between Comparative and Income: $(3,200,000 - 3,050,000) \div 3,200,000 = 4.7\%$ ← Excellent 

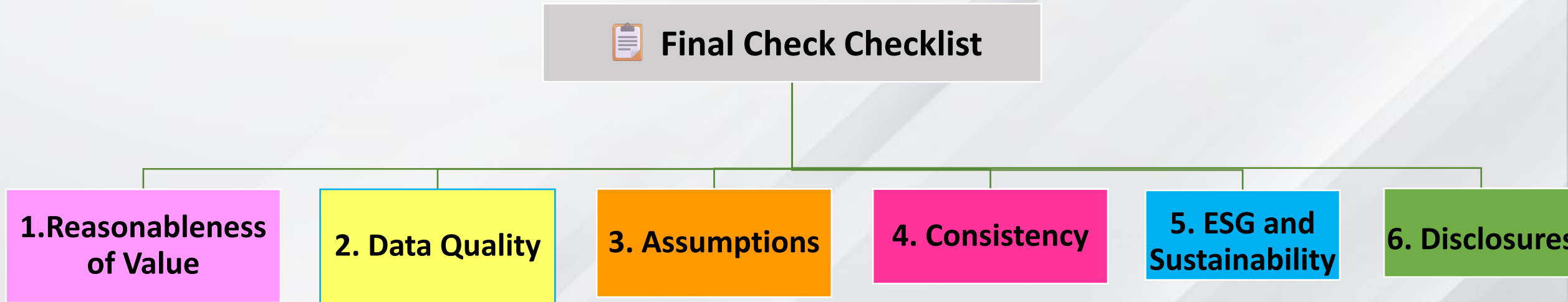
Cost approach gave a lower value: expected for a 12-year-old building

Conclusion: Excellent convergence, enhancing confidence in the final value

The Final Check

➤ Concept and Importance

The Final Check is the last step prior to issuing the valuation report, in which the valuer tests the reasonableness of the concluded value and its consistency with market conditions and the subject property. It reflects **the valuer's final professional judgment**.



The Final Check

➤ Final Check Checklist

1. Reasonableness of Value

☐ Is the final value reasonable in comparison with the local market?

☐ Is it consistent with prevailing price trends?

☐ Does it fall within the acceptable value range for this property type?

The Final Check

➤ Final Check Checklist

2. Data Quality

☐ Are all data inputs verified and reliable?

☐ Are data sources properly documented in the working file?

☐ Are the data periods recent and relevant?

The Final Check

➤ Final Check Checklist

3. Assumptions

☐ Are material assumptions justified and documented?

☐ Have sensitive assumptions been tested?

☐ Has a sensitivity analysis been performed on key inputs?

The Final Check

➤ Final Check Checklist

4. Consistency

☐ Is the value consistent with the purpose of the valuation?

☐ Is the adopted basis of value appropriate for the purpose?

☐ Are the results of the different valuation approaches consistent?

The Final Check

➤ Final Check Checklist

5. ESG and Sustainability

☐ Have ESG factors been taken into consideration?

☐ Are future environmental compliance costs reflected?

☐ Are climate-related risks addressed in the valuation?

The Final Check

➤ Final Check Checklist

6. Disclosures

☐ Have all limitations and reservations been disclosed?

☐ Are any conflicts of interest clearly stated?

☐ Are special assumptions explicitly documented?

➤ Value Reasonableness Cross-Checks

Validation Test	Description	Example
Yield / Capitalization Test	$\text{NOI} \div \text{Value} = \text{Market capitalization rate?}$	$3,669,800 \div 46,000,000 = 7.98\% \approx 8\%$ 
Price per m² Test	$\text{Value} \div \text{Area} = \text{Reasonable unit rate?}$	$3,100,000 \div 1,000 \text{ m}^2 = 3,100 \text{ SAR/m}^2$ 
Rent Multiplier Test	$\text{Value} \div \text{Annual Rent} = \text{Reasonable multiplier?}$	$3,100,000 \div 250,000 = 12.4 \text{ years}$ 
Historical Comparison Test	Is the value consistent with previous valuations of the property?	Compared with prior valuations

Valuation Models

➤ Definition and Concept

A valuation model is an analytical tool or a mathematical/statistical framework used by the valuer to transform available data and inputs into an objective estimate of value by applying a specific valuation approach or method based on clearly defined and documented assumptions.

What is
Difference
between
**valuation
model** and
**valuation
approach**??

Element	Valuation Approach	Valuation Model
Definition	An overall framework used to determine the value of an asset.	A mathematical tool or practical application used to implement a valuation approach and convert data into a numerical value.
Level	Strategic (conceptual)	Operational (detailed)
Function	Defines “how you think to value”	Defines “how you calculate”
Nature	Theoretical concept	Mathematical/statistical tool
Quantity	Limited (3 main approaches)	Numerous
Example	Income Approach	DCF Model

Valuation Models

➤ Definition and Concept

Valuation Approaches & Models

A model cannot be used without an approach

Multiple models may be used within the same approach

1. Market (Sales Comparison) Approach

- ✓ Sales Comparison Model

2. Income Approach

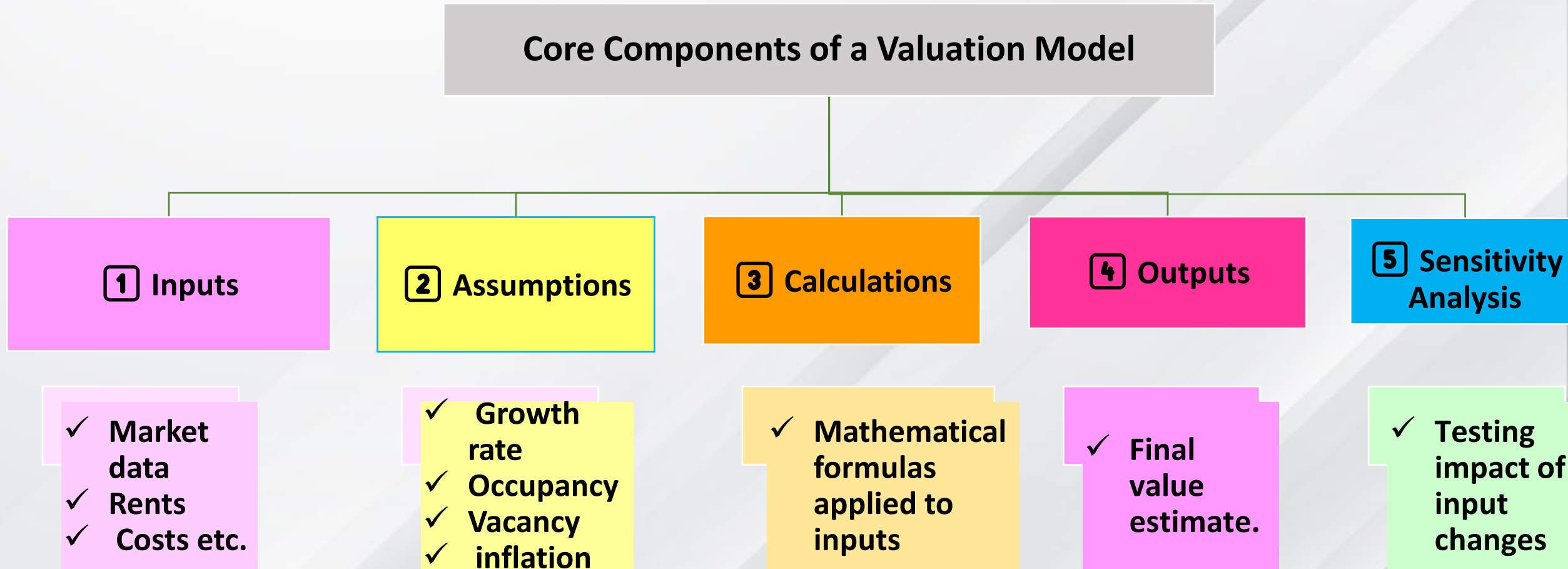
- ✓ Direct Capitalization
 - ✓ Discounted Cash Flow (DCF)
- Same approach... different models*

3. Cost Approach

- ✓ Depreciated Replacement Cost (DRC)

Valuation Models

➤ Core Components of a Valuation Model



Valuation Models

➤ Types of Valuation Models

Types of Valuation Models

**Traditional
Models**

**Statistical
Models**

**Automated
Valuation Models
(AVMs)**

Hybrid Models

**Specialized
Models**

**Simulation
Models**

Valuation Models

➤ Types of Valuation Models

Type 1: Traditional Models

Model	Approach	Core Formula	Use Case
Sales Comparison Model	Market Approach	$V = \text{Price per m}^2 \times \text{Area (after adjustments)}$	Residential & commercial
Direct Capitalization Model	Income Approach	$V = \text{NOI} \div R$	Stabilized income properties
Discounted Cash Flow (DCF)	Income Approach	$V = \sum \text{CF} / (1+r)^t + \text{TV} / (1+r)^n$	Long-term investments
Depreciated Replacement Cost	Cost Approach	$V = \text{Land Value} + \text{Replacement Cost} - \text{Depreciation}$	Specialized properties
Residual Method	Development	$\text{Land Value} = \text{GDV} - \text{TC} - \text{DP}$	Development land

Valuation Models

➤ Types of Valuation Models

Statistical Models

Multiple Regression Analysis

General Equation:

$$\text{Price} = \beta_0 + \beta_1(\text{Size}) + \beta_2(\text{Location}) + \beta_3(\text{Age}) + \beta_4(\text{Finishing}) + \varepsilon$$

Example

- $\text{Price} = 50,000 + 1,500(\text{Size}) + 20,000(\text{Location}) - 3,000(\text{Age}) + 15,000(\text{Elevator})$
- Apartment: 120 m², average location, 5 years old, with elevator:
- $= 50,000 + (1,500 \times 120) + 20,000 - (3,000 \times 5) + 15,000 = 250,000 \text{ SAR}$

Valuation Models

➤ Types of Valuation Models

Statistical Models

Multiple Regression Analysis

Advantages	Limitations
Objective data-driven	Requires large data sets (30+ transactions)
Identifies variable weights	Assumes linear relationships
Reduces subjective bias	Limited in capturing qualitative factors
Suitable for large markets	Requires statistical expertise

Valuation Models

➤ Types of Valuation Models

Automated Valuation Models (AVMs)

How They Work??

Inputs: Big data (transactions, property characteristics, market indicators)

Processing: Algorithms + artificial intelligence

Outputs: Estimated value + confidence interval

Professional Use:

Use Case	Suitability	RICS Consideration
Mass tax assessment	High	Acceptable with transparency
Mortgage screening	Good	Requires human verification
Portfolio monitoring	Good	For monitoring, not decisions
Final valuation for decisions	Low	Not to be relied upon alone

Valuation Models

➤ Types of Valuation Models

Hybrid Models

Hybrid models combine **modern automated models (AVMs/AI)** with **professional valuer judgment**, integrating computational efficiency with human expertise.

Hybrid models is used for:

- ☐ Individual or mid-size portfolios
- ☐ Standard & unique assets

Valuation Models

➤ Types of Valuation Models

Hybrid Models

Component	Description
Mechanism	AVM + valuer review
Inputs	Big data + expert input (Transactions + expert insight)
Processing	Automated Analysis+ expert adjustment
Outputs	Supported value (AVM adjusted by valuer)
Advantages	Accuracy + speed + reliability
Limitations	Requires expertise + cost +Not fully automated

Valuation Models

➤ Types of Valuation Models

Specialized Models

Model	Application	Key Inputs
Hotel Model	Hotel valuation	RevPAR, occupancy, ADR
Retail Model	Shopping centers	Sales/m ² , footfall
Agricultural Model	Farmland	Crop yield, market prices
Development Model	Large projects	GDV, development cash flow

➤ Types of Valuation Models

Simulation Models

Simulation models rely on **scenario analysis** and are used to **assess uncertainty and risk in valuation**, particularly for **investment analysis**.

Component	Description
Mechanism	Scenario generation (Monte Carlo)
Inputs	Market data (Prices, occupancy, cash flows), assumptions
Processing	Probability calculations (Thousands of simulations)
Outputs	Value range + probabilities
Advantages	➤ Risk analysis in Uncertain markets ➤ Forecasting in Uncertain markets ➤ Strategic decisions in Uncertain markets ➤ Scenario flexibility in Uncertain markets
Limitations	➤ Assumption-dependent (Not exact values) ➤ Requires statistical expertise

Valuation Models

➤ Comparison of Model Types

Model Type	Description	Examples	Speed	Accuracy	Transparency	Valuer Role	Best Use
Traditional	Based on core approaches	DCF, DRC, Comparison	Low	High (unique assets)	High	Central	Final valuation
Statistical	Quantitative analysis	Regression	Medium	Data-dependent	Medium	Moderate	Analytical support
AVM	Big data & AI	Machine learning	Very high	High (standard assets)	Sometimes low	Supervisory	Rapid valuation
Hybrid	Combined approach	AVM + Valuer	Medium–High	Very high	Medium–High	Central	Best practice
Specialized	Asset-specific	Hotels, retail	Medium	High (sector-specific)	High	Central	Specialized assets
Simulation	Scenario-based	Monte Carlo	Medium	Assumption-based	Medium	Analytical	Risk analysis

➤ Controls on the Use of Models

Valuation models are helpful analytical tools, but their use is subject to strict professional controls to ensure compliance with international standards

Control	Professional Requirement
Fit for Purpose	Model must suit asset and valuation purpose (Reflects nature of asset and basis of value)
Professional Judgment	No fully automated reliance (Valuer intervention required)
Model Understanding	Must understand assumptions (Avoid “black box” use)
Testing & Validation	Model must be tested (Outputs must be analyzed)
Transparency	Explain model and limits (Must be understandable)
Monitoring	Regular review (Updating to Reflect market changes)
Documentation	Full documentation required (Inputs, assumptions, limitations)
Limitations Handling	Disclose all limitations, Otherwise non-compliant

Valuation Models

➤ Selection and Use of Valuation Models

The selection process of valuation model is not arbitrary, but rather depends on a **comprehensive analytical framework** that includes:

	✓ Purpose of valuation	
	✓ Basis of value (Market Value, Fair Value, etc.)	
	✓ Asset type	
	✓ The Degree of Asset complexity	
	✓ Data availability	

➤ Practical Use of Models

The valuer should:

- 1) Fully understand the model
- 2) Test it before use
- 3) Critically analyze outputs
- 4) Adjust results with justification
- 5) Cross-check with other approaches

➤ Use of External Models or Specialists

When using third-party models:

- Assess competence of the (Specialist / Service Organization)
- Document reasons for reliance
- Retain full professional responsibility (Not transferring full professional responsibility)

➤ Valuation Model Documentation

The valuation report must include clear documentation covering:

- I. Justification for model selection
- II. Description of inputs and outputs
- III. Key inputs
- IV. Core assumptions
- V. Limitations
- VI. Quality control procedures
- VII. Testing and validation results

Valuation of Portfolios

➤ Definition and Concept

A real estate portfolio is a group of properties owned or managed by a single entity, which may be valued either individually or collectively depending on the purpose of the valuation.

Types of Portfolio Valuation

```
graph TD; A[Types of Portfolio Valuation] --> B[1. Individual Asset Valuation]; A --> C[2. Portfolio / Bulk Valuation]; A --> D[3. Staged / Tranche Valuation];
```

1. Individual Asset Valuation

2. Portfolio / Bulk Valuation

3. Staged / Tranche Valuation

Valuation of Portfolios

➤ Types of Portfolio Valuation

Type	Description	Methodology	Optimal Use
Individual Asset Valuation	Each property is valued separately	High accuracy (Aggregation of individual asset values)	➤ Internal decisions, ➤ Financial reporting, ➤ Asset-level performance analysis
Portfolio / Bulk Valuation	The portfolio is treated as a single unit	Reflects transaction size and bulk discount (Application of a discount or premium to the aggregate of individual values)	➤ Portfolio disposal, ➤ Full sale or acquisition
Staged / Tranche Valuation	Portfolio divided into sub-groups	Flexible (Classification by type or location, then valuing each group)	➤ Managing large portfolios , ➤ Phased acquisition, ➤ Sectoral risk management ➤ Sectoral performance analysis

Valuation of Portfolios

➤ Key Considerations in Portfolio Valuation

Are assets
valued
independently?

Assumption: Each asset is sold separately → use individual valuation

Is the portfolio
valued as a
whole?

Assumption: All assets are sold together → use portfolio/bulk valuation, considering a portfolio discount

Is there a
portfolio
discount?

Applied when market prices are affected by offering a large portfolio simultaneously

Valuation of Portfolios

➤ Key Considerations in Portfolio Valuation

Are portfolio assets competing?

Simultaneous sale in the same market may reduce prices and require value adjustments

Is total value equal to the sum of individual values?

Not necessarily; differences arise due to bulk discounts or diversification premiums

Valuation of Portfolios

➤ Factors Affecting Portfolio Value

Factor	Impact on Value	Typical Range
Portfolio Size	Discount for large portfolios	-5% to -15%
Diversification	Premium for well-diversified assets	+2% to +5%
Unified Management	Cost efficiencies, increased value	+1% to +3%
Concentration Risk	Discount for concentration in one market/type	Depends on degree of concentration

These factors apply when valuing the portfolio as a whole, not when valuing individual assets

Valuation of Portfolios

➤ Comparison: Single Asset vs Portfolio Valuation

Aspect	Single Asset Valuation	Portfolio Valuation
Unit of Analysis	Single property	Group of properties
Interdependency	None	Assets may influence each other
Portfolio Discount	Not applicable	May apply in bulk sale
Reporting	Individual report	Consolidated report + appendices
Complexity	Lower	Higher
Time Required	Less	More

➤ Steps for Portfolio Valuation

- I. Determine whether valuation is individual or collective
- II. Identify portfolio discount or diversification premium
- III. Consider unified management benefits and concentration risk
- IV. Address key valuation considerations
- V. Fully document all assumptions, discounts, and premiums in the final report

Lecture Summary: Quick Review

Reconciliation of Valuation Results

Definition and Concept

Principles of Proper Reconciliation

Steps for Reconciliation

Methods of Reconciliation

Scale for Interpreting Differences Between Approaches

Sample Reconciliation Table

Cases Where Integration is Professionally Mandatory

Numerical Example

Concept and Importance

Final Check Checklist

Value Reasonableness Cross-Checks

The Final Check

Lecture Summary: Quick Review

Valuation Models

Definition and Concept

Core Components of a Valuation Model

Types of Valuation Models

Controls on the Use of Models

Selection and Use of Valuation Models

Practical Use of Models

Use of External Models or Specialists

Valuation Model Documentation

Lecture Summary: Quick Review

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Definition and Concept

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Key Considerations in Portfolio Valuation

Factors Affecting Portfolio Value

Comparison: Single Asset vs Portfolio Valuation

Steps for Portfolio Valuation



Thank You