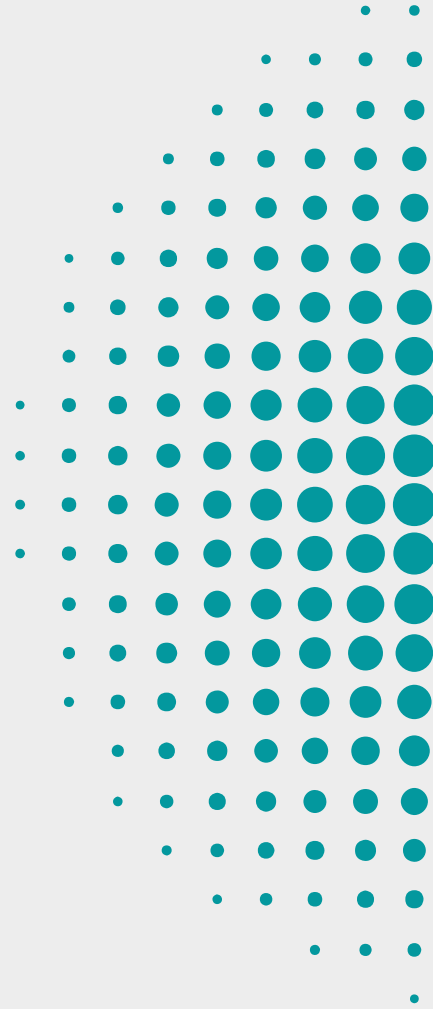




Commercial Off-The-Shelf (COTS) in Business Analysis

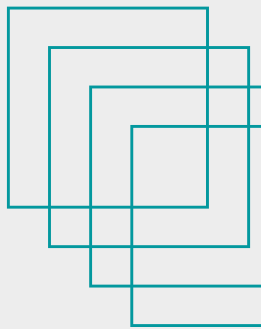
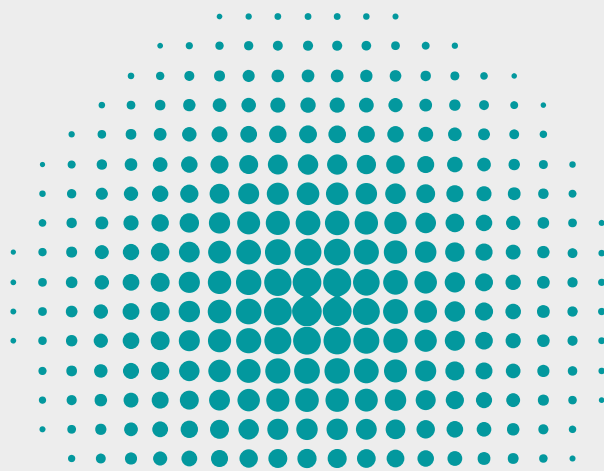
With Mathematical Considerations



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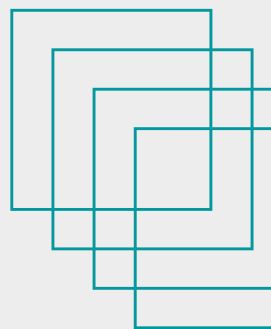
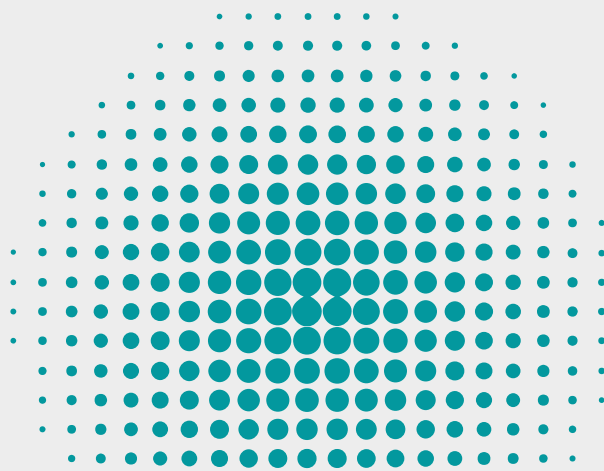
Definition

- **Commercial Off-The-Shelf or commercially available off-the-shelf (COTS) solutions are pre-built software or systems developed by third-party vendors and made available for purchase or licensing.**
- **These solutions are designed to meet common needs across industries or specific domains and typically require some level of customization or configuration to fit an organization's unique requirements.**



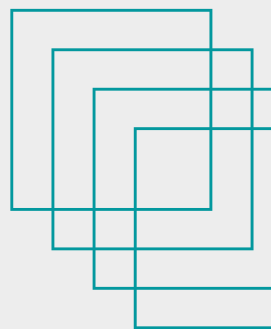
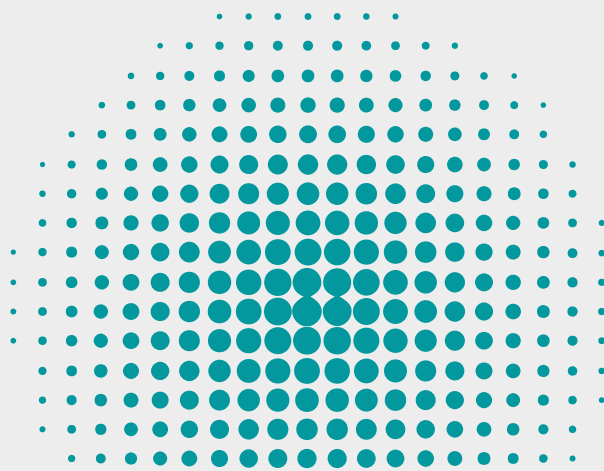
Importance of COTS in Business Analysis

- **COTS solutions** are widely used because they offer a faster and cost-effective way to address business needs compared to building custom solutions.
- **Business analysts (BAs)** play a crucial role in evaluating, selecting, and implementing COTS solutions to ensure they align with organizational goals and deliver value.



Key Characteristics of COTS Solutions

- **Pre-Built and Ready to Use:** Minimal development time is required as the solution is pre-designed.
- **Generic Features:** COTS solutions often serve broad use cases, requiring configuration for specific business processes.
- **Vendor-Supported:** The vendor manages updates, patches, and maintenance.
- **Scalability and Modularity:** Many COTS solutions are designed to integrate with other systems and scale as business needs grow.



Advantages of COTS

- **Reduced Development Time:**

- Ready-to-use solutions accelerate deployment timelines.

- **Lower Upfront Costs:**

- Economies of scale reduce initial investment compared to custom development.

- **Vendor Expertise:**

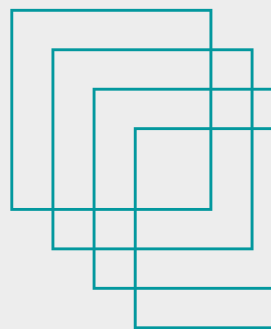
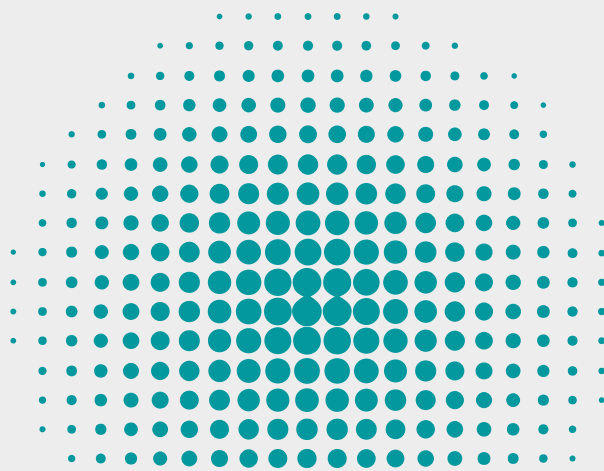
- Vendors provide ongoing support, updates, and industry-specific insights.

- **Proven Reliability:**

- COTS solutions are often tested in various environments, ensuring stability and reliability.

- **Compliance:**

- Many COTS solutions adhere to industry standards and regulations.



Challenges of COTS

- **Limited Customization:**

- May not perfectly align with unique business requirements.

- **Integration Complexity:**

- Requires effort to integrate with existing systems or data sources.

- **Vendor Lock-In:**

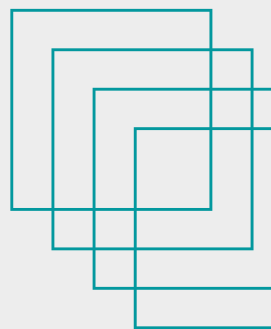
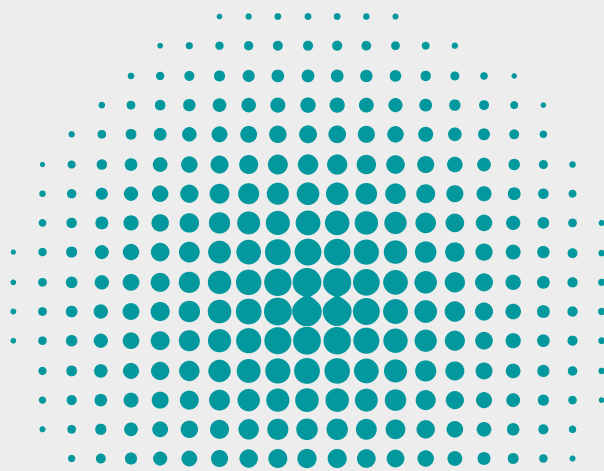
- Dependence on a single vendor for updates, support, or enhancements.

- **Cost of Ownership:**

- Recurring licensing fees and potential costs for upgrades or customizations.

- **Scalability and Flexibility:**

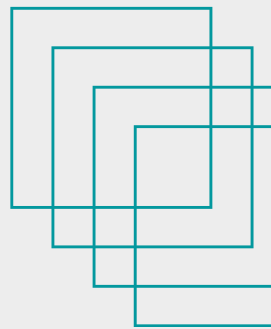
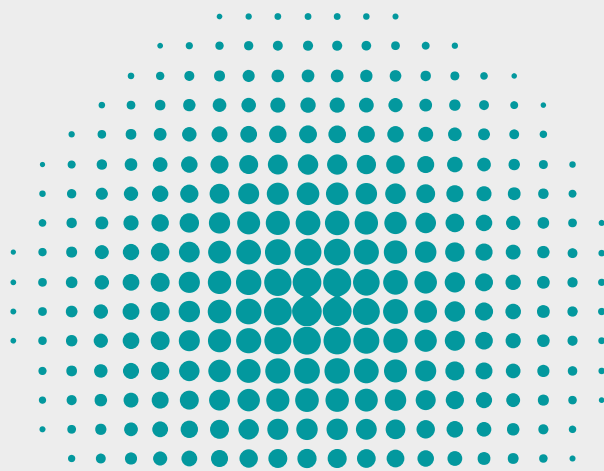
- Some solutions may struggle to adapt to highly specific or rapidly changing needs.



When to Choose COTS

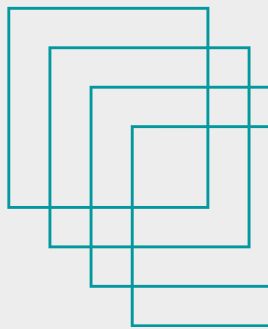
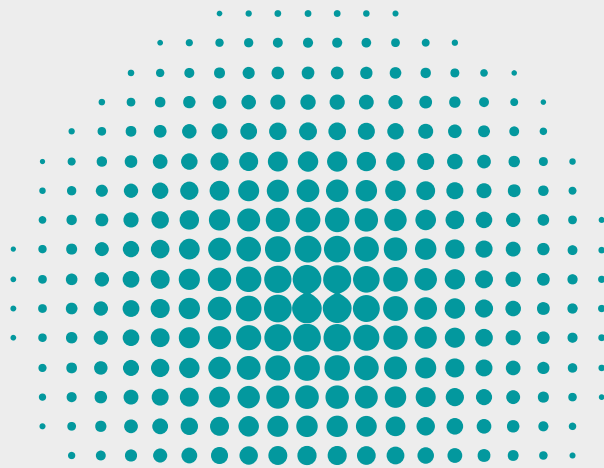
COTS solutions are ideal when:

- **Speed to Market:** The solution needs to be implemented quickly.
- **Budget Constraints:** Custom development is too costly.
- **Standardized Needs:** Requirements align closely with industry-standard processes.
- **Vendor Expertise:** Leveraging the vendor's experience can reduce risks.



The Role of a Business Analyst in COTS Implementation

1. Requirements Gathering and Analysis
2. Vendor Selection and Evaluation
3. Fit-Gap Analysis
4. Cost-Benefit Analysis
5. Implementation Support
6. Post-Implementation Monitoring



COTS in the Context of Cost Mathematics

The Total Cost of Ownership (TCO) with **six cost elements** becomes:

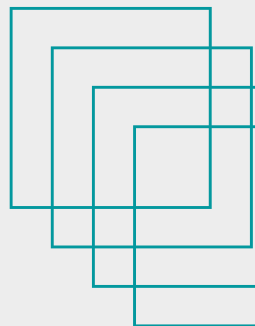
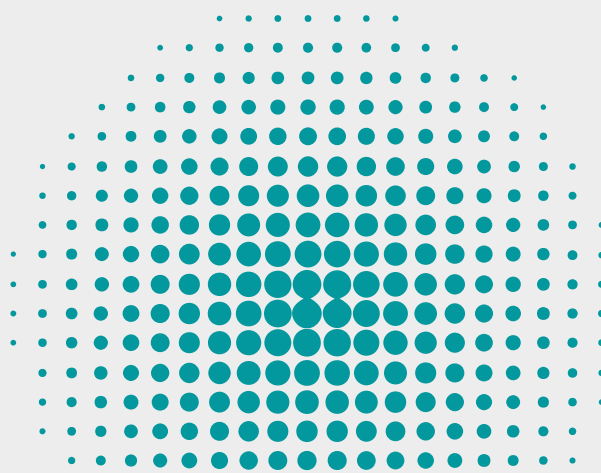
$$TCO = \sum_{t=1}^T \frac{(C_{license} + C_{customization} + C_{integration} + C_{maintenance} + C_{training} + C_{support})}{(1 + r_{actual})^t}$$

Where:

1. $r_{actual} = \frac{(1+r)}{(1+i)} - 1$: Real discount rate, combining inflation (i) and interest (r).
2. Each C_x (e.g., $C_{license}$, $C_{maintenance}$) represents a specific cost component.

Now, we explicitly account for **six cost elements**:

1. $C_{license}$: Initial licensing cost.
2. $C_{customization}$: Cost of tailoring the solution.
3. $C_{integration}$: Cost of integrating the COTS solution into existing systems.
4. $C_{maintenance}$: Recurring maintenance cost per year.
5. $C_{training}$: Cost of training staff.
6. $C_{support}$: Vendor-provided support services (e.g., technical help, upgrades).



Example

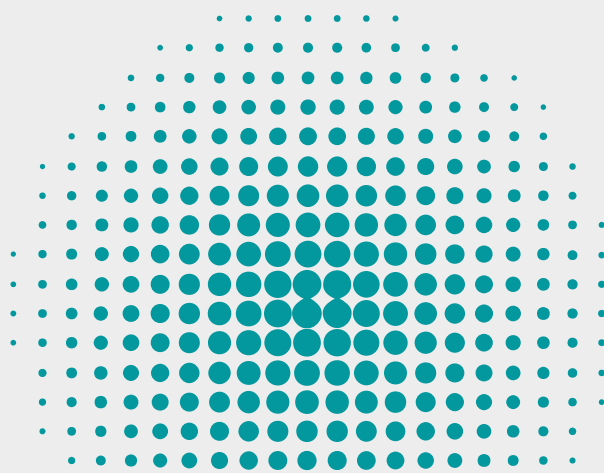
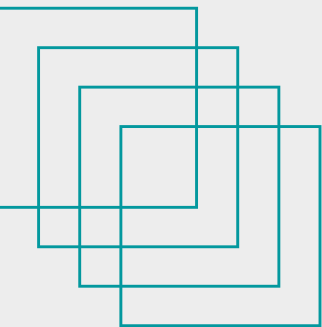
Scenario:

1. Cost Elements:

- $C_{license} = 50,000$ (one-time initial cost).
- $C_{customization} = 20,000$ (one-time cost in year 1).
- $C_{integration} = 15,000$ (one-time cost in year 1).
- $C_{maintenance} = 10,000$ (recurring yearly cost for 5 years).
- $C_{training} = 5,000$ (one-time cost in year 1).
- $C_{support} = 8,000$ (recurring yearly cost for 5 years).

2. Financial Variables:

- Inflation rate $i = 3\% = 0.03$.
- Nominal discount rate $r = 5\% = 0.05$.
- Time horizon $T = 5$ years.



Calculation

Step 1: Calculate the Actual Discount Rate

$$r_{\text{actual}} = \frac{(1 + r)}{(1 + i)} - 1$$

$$r_{\text{actual}} = \frac{(1 + 0.05)}{(1 + 0.03)} - 1 = \frac{1.05}{1.03} - 1 \approx 0.0194 \text{ (or 1.94\%)}$$

Step 2: Nominal Costs for Each Year

The nominal costs (C_t) are calculated based on whether they are one-time or recurring:

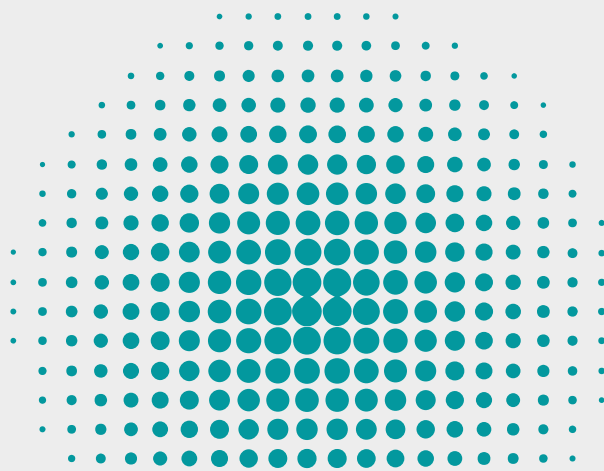
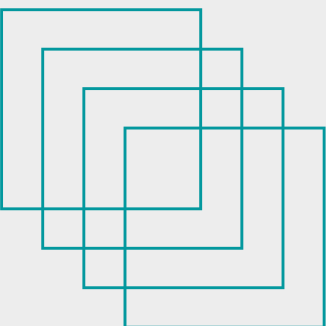
1. Year 1:

$$C_1 = C_{\text{license}} + C_{\text{customization}} + C_{\text{integration}} + C_{\text{maintenance}} + C_{\text{training}} + C_{\text{support}}$$

$$C_1 = 50,000 + 20,000 + 15,000 + 10,000 + 5,000 + 8,000 = 108,000$$

2. Years 2–5: Recurring costs ($C_{\text{maintenance}} + C_{\text{support}}$):

$$C_t = 10,000 + 8,000 = 18,000$$



Calculation

Step 3: Adjust Costs to Present Value

Apply the TCO formula:

$$TCO = \sum_{t=1}^T \frac{C_t}{(1 + r_{\text{actual}})^t}$$

Year-by-Year Calculation:

1. Year 1:

$$PV_1 = \frac{108,000}{(1 + 0.0194)^1} = \frac{108,000}{1.0194} \approx 105,965$$

2. Year 2:

$$PV_2 = \frac{18,000}{(1 + 0.0194)^2} = \frac{18,000}{1.0392} \approx 17,324$$

3. Year 3:

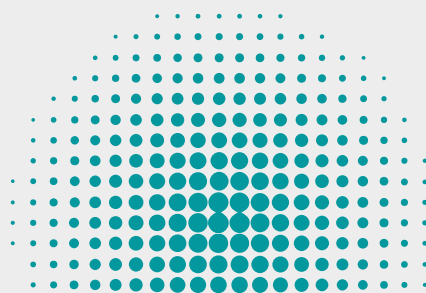
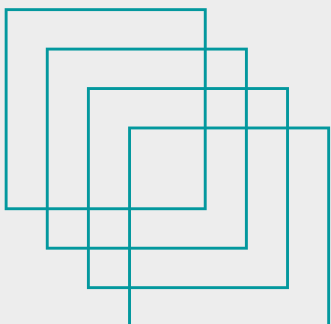
$$PV_3 = \frac{18,000}{(1 + 0.0194)^3} = \frac{18,000}{1.0599} \approx 16,988$$

4. Year 4:

$$PV_4 = \frac{18,000}{(1 + 0.0194)^4} = \frac{18,000}{1.0815} \approx 16,640$$

5. Year 5:

$$PV_5 = \frac{18,000}{(1 + 0.0194)^5} = \frac{18,000}{1.1030} \approx 16,321$$



Calculation

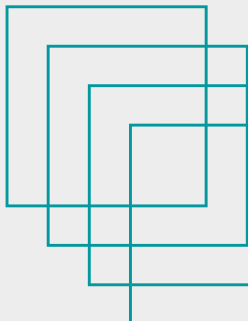
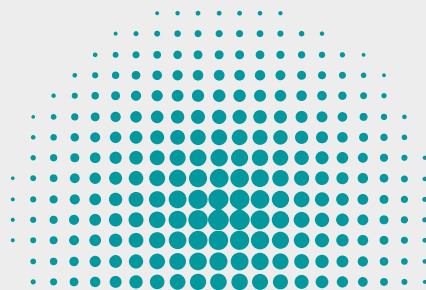
Step 4: Sum the Present Values

$$TCO = PV_1 + PV_2 + PV_3 + PV_4 + PV_5$$

$$TCO = 105,965 + 17,324 + 16,988 + 16,640 + 16,321 = 173,238$$

Final Results

- Total Cost of Ownership (TCO): \$173,238
- Breakdown:
 - Year 1 (one-time costs): \$105,965
 - Recurring costs over years 2–5: \$67,273 (sum of PVs for those years).





Thank You

For Attention



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