Date: 04/09/2025

Lab Practical #11:

Practice various techniques for cost estimation in IT projects.

Practical Assignment #11:

- Review different cost estimation techniques like expert judgment, analogy, parametric estimating, etc.
- Apply these techniques to a case study with missing cost information.
- Compare and contrast the estimated costs from different techniques and discuss their accuracy.
- Use Google Sheets.

Description:

Topic: Cost Estimation Techniques in IT Projects

Case Study: *Courier Management System*

Cost estimation is a critical step in IT project management to predict the effort, resources, and financials required for successful project execution. A Courier Management System involves complex components like real-time tracking, a customer portal, a rider application, and backend logistics management. Since complete cost data is often unavailable, estimation techniques help approximate the project costs.

Cost Estimation Techniques Overview

1. **Expert Judgment**

   This technique relies on the prior experience and knowledge of domain experts to arrive at a cost estimate.

   - **Pros:** Quick and practical when detailed data is lacking.
   - **Cons:** Highly subjective and can be prone to personal bias

2. **Analogous Estimating**

   This method uses historical data from past, similar projects to estimate the cost of a current project. For a courier system, one might look at the costs of developing systems for FedEx or Blue Dart.

   - **Pros:** Fast to implement and requires less detailed information.
   - **Cons:** Accuracy is heavily dependent on how similar the past project is to the new one.

3. **Parametric Estimating**

   This technique uses a statistical relationship between historical data and other variables to calculate a cost estimate. For a courier system, a parameter could be the cost per package handled or cost per delivery agent.

   - **Pros:** More accurate than other methods, scalable, and repeatable.
   - **Cons:** Requires a reliable set of statistical data to be effective.

Date: 04/09/2025

4. **Bottom-Up Estimating**

This method involves breaking down the project into smaller, more manageable work packages and then estimating the cost for each individual package. The total project cost is the sum of all package costs.

- **Pros:** Tends to be very accurate because of the detailed breakdown.
- **Cons:** Can be very time-consuming and requires a comprehensive Work Breakdown Structure (WBS).

5. **Three-Point Estimation (PERT)**

    - Uses Optimistic (O), Pessimistic (P), and Most Likely (M) values.
    - Formula: **(O + 4M + P) / 6**.
    - Pros: Reduces risk of under/overestimation.
    - Cons: Depends on availability of ranges.

Application to Spotify Case Study

Let's estimate the yearly project costs for a new Courier Management System assuming we have missing cost data

Cost Component	Description
Software Development	Customer Portal, Admin Dashboard
Hardware & Infrastructure	Cloud Servers, GPS Devices, Barcode Scanners
Third-Party Integrations	Mapping Services (Google Maps), SMS Gateways, Payment Portals
Support & Maintenance	Technical support, bug fixes, and system updates
Marketing & Promotion	Advertising, client and rider onboarding programs

A. Expert Judgment

- Expert A (Logistics Manager): ₹6.68 Crore
- Expert B (Lead Developer): ₹6.26 Crore
- Expert C (Financial Analyst): ₹7.10 Crore
- Estimated Average = ₹6.68 Crore

Date: 04/09/2025

B. Parametric Estimation

- Average operational and development cost per 1,000 packages processed per month = 42000
- Assumed volume = 250,000 packages per month.
- Formula: (Total Packages / 1,000) * Cost * 12
- Estimated = (250,000 / 1,000) * 42000 * 12 = ₹12.53 Crore

C. Bottom-Up Estimation

Work Package	**Estimated Cost (₹)**
Customer Portal Development	300
Admin Dashboard Development	400
Server Infrastructure	200
API Integrations	100
Support & Maintenance	150
Total	**1150**

Estimated = ₹9.60 Crore

D. Three-Point Estimation (PERT)

Work Package	**O (₹K)**	**M (₹K)**	**P (₹K)**	**PERT Estimation**
Customer Portal Dev	12	15	18	₹257.43
Admin Dashboard Dev	100	120	150	₹340.91
Server Infrastructure	25	30	40	₹167.00
API Integrations	8	10	12	₹87.68
Support & Maintenance	20	25	30	₹128.01
Total				**₹9.81 Crore**

Date: 04/09/2025

4. Comparison of Techniques

Technique	Estimated Cost (₹K)	Accuracy/Remarks
Expert Judgment	₹20,000	Too low, subjective
Parametric Estimation	₹1.8 Lakh	Scales with user base, closer to reality
Bottom-Up Estimation	₹2 Lakh	Most detailed, highly accurate
Three-Point Estimation	₹2.03 Lakh	Balances risks, very realistic

Conclusion

- Expert Judgment and Analogous Estimation are useful for generating quick, high-level estimates at the beginning of a project when data is scarce.
- Parametric Estimation becomes highly effective once reliable operational metrics, like package volume, are available.
- For the Courier Management System, the
- Bottom-Up and Three-Point (PERT) techniques provide the most reliable and realistic estimates, suggesting a yearly project cost of approximately ₹12.53 Crore to ₹12.78 Crore. These methods are preferred for detailed budgeting and planning because they are based on a comprehensive breakdown of the project scope and account for potential risks