**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

1. **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.

1. **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.

1. **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).

1. **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

**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** |

**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