USE CASE ORIENTED METRICES

The UCP is a function of the number of actors and transactions implied by the use-case models and is analogous to the FP in some ways.

**Unadjusted Use Case Weight (UUCW)**

To calculate the UUCW, the use cases must be defined and the number of transactions for each use case identified. The ATM development system use case diagram uses 14 use cases. Assuming 4 of these use cases are simple, 6 are average and 4 are complex, the calculation for UUCW is as follows:

UUCW = (Total No. of Simple Use Cases x 4) + (Total No. Average Use Cases x 6) + (Total No. Complex Use Cases x 15)

For ATM Development System

UUCW = (4x5) + (6 x 10) + (4 x 15) = 140

**Unadjusted Actor Weight (UAW)**

To calculate the UAW, the actors must be identified. The Bank and 2 complex for each of the human users’ actors (i.e. Developer and technician) :

UAW = (Total No. of Simple Actors x 1) + (Total No. Average Actors x 2) + (Total No. Complex Actors x 3)

For the ATM System, UAW = (1 x 1) + (1 x 2) + (2 x 3) = 9

**Technical Complexity Factor (TCF)**

To calculate the TCF, each of the technical factors is assigned a value based on how essential the technical aspect is to the system being developed. The values are multiplied by the weighted values and the total TF is determined.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Factor** | **Description** | **Weight** | **Assigned Value** | **Weight x Assigned Value** |
| T1 | Distributed system | 2.0 | 5 | 10 |
| T2 | Response time/performance objectives | 1.0 | 5 | 5 |
| T3 | End-user efficiency | 1.0 | 3 | 3 |
| T4 | Internal processing complexity | 1.0 | 2 | 2 |
| T5 | Code reusability | 1.0 | 3 | 3 |
| T6 | Easy to install | 0.5 | 1 | 0.5 |
| T7 | Easy to use | 0.5 | 5 | 2.5 |
| T8 | Portability to other platforms | 2.0 | 2 | 4 |
| T9 | System maintenance | 1.0 | 2 | 2 |
| T10 | Concurrent/parallel processing | 1.0 | 3 | 3 |
| T11 | Security features | 1.0 | 5 | 5 |
| T12 | Access for third parties | 1.0 | 1 | 1 |
| T13 | End user training | 1.0 | 1 | 1 |
| **Total (TF):** | | | | **42** |

TCF = 0.6 + (TF/100)

For the , TCF = 0.6 + (42/100) = 1.02

TCF = 1.02

**Environmental Complexity Factor (ECF)**

To calculate the ECF, each of the environmental factors is assigned a value based on the team experience level. The diagram below shows the assigned values for the ATM Development System. The values are multiplied by the weighted values and the total EF is determined.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Factor** | **Description** | **Weight** | **Assigned Value** | **Weight x Assigned Value** |
| E1 | Familiarity with development process used | 1.5 | 3 | 4.5 |
| E2 | Application experience | 0.5 | 3 | 1.5 |
| E3 | Object-oriented experience of team | 1.0 | 3 | 3 |
| E4 | Lead analyst capability | 0.5 | 5 | 2.5 |
| E5 | Motivation of the team | 1.0 | 2 | 2 |
| E6 | Stability of requirements | 2.0 | 2 | 4 |
| E7 | Part-time staff | -1.0 | 0 | 0 |
| E8 | Difficult programming language | -1.0 | 3 | -3 |
| **Total (EF):** | | | | **14.5** |

ECF = 1.4 + (-0.03 x EF)

For the ATM Development System, ECF = 1.4 + (-0.03 \* 14.5) = 0.965

ECF = 0.965

**Use Case Points (UCP)**

Once the Unadjusted Use Case Weight (UUCW), Unadjusted Actor Weight (UAW), Technical Complexity Factor (TCF) and Environmental Complexity Factor (ECF) has been determined, the Use Case Points (UCP) can be calculated with the following formula:

UCP = (UUCW + UAW) x TCF x ECF

= (140 + 9) x 1.02 x 0.965 = 149.67

= 149.67

For the ATM Development System, the total estimated size to develop the software is 149.67 Use Case Points.