Function Point Analysis for InnoVest

6.1 What is Function Point?

Function Point (FP) is a standard unit for measuring the functional size of software. It considers the user's perspective and focuses on functionality delivered rather than lines of code. It is platform-independent and helps in early estimation of cost, effort, and time required for software development.

The five major components in Function Point counting are:

- External Input (EI)
- External Output (EO)
- External Inquiry (EQ)
- Internal Logical File (ILF)
- External Interface File (EIF)

Function Point = Unadjusted Function Point × Technical Complexity Factor

6.2 What is Function Point Analysis (FPA)?

Function Point Analysis (FPA) is a structured technique to break down software requirements into measurable pieces. It is used for cost estimation, resource planning, and productivity measurement. FPA assigns weights based on complexity to each functional component and calculates an overall size metric, which is then adjusted for technical complexity.

6.3 Types of FPA Components

- External Inputs (EI): Inputs received from users or external systems.
- External Outputs (EO): Outputs sent to users or systems, including reports and messages.
- External Inquiries (EQ): Data retrieval operations with input and output.
- Internal Logical Files (ILF): User-recognizable groups of logically related data maintained by the system.
- External Interface Files (EIF): Files used but not maintained by the application.

6.4 Advantages and Disadvantages of FPA

Advantages:

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1. Early estimation before design or coding.
2. Language-independent.
3. Useful in contract negotiations.
4. Supports performance and productivity comparisons.

Disadvantages:

1. Subjectivity in assigning complexity weights.
2. Requires complete functional specifications.
3. Challenging for real-time/embedded systems.

6.5 ER-Diagram of InnoVest

The ER-Diagram of InnoVest consists of entities like User, Company, Investment, Event, KYC, and Chat. Relationships include User-creates-Company, User-invests-in-Company, User-participates-in-Event, and so on.

6.6 Function Point Calculation of InnoVest

This section calculates the Function Points (FP) for InnoVest. FP = UFP × TCF

6.6.1 Unadjusted Function Point Count (UFP)

Feature-Based Component Counts (InnoVest)

Feature Name	EI	EO	EQ	ILF	EIF
Authentication (Login, Logout, Register)	2	1	1	1	1
User Dashboard	2	2	1	1	1
Browse Companies	1	2	1	1	1
Payment Integration	2	1	0	1	1
KYC Verification	2	2	1	1	1
Community	3	3	1	1	1
Event Management	3	3	2	1	1
My Companies	3	3	2	2	1

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Create/Update Company	2	1	1	1	1
Progress Tracker	2	2	1	1	1
View Investors	1	1	1	1	1
Backed Companies	1	2	1	1	1
Business Analysis	2	3	2	2	1
Chat System	2	2	0	1	1
Profile	1	1	1	1	1

Component Totals:

EI: 29, EO: 29, EQ: 16, ILF: 17, EIF: 15

UFP = (EI × 3) + (EO × 4) + (EQ × 4) + (ILF × 15) + (EIF × 10) = 672

6.6.2 Technical Complexity Factor (TCF)

The TCF is based on 14 technical factors, each rated from 0 to 5.

Sum of Technical Factors = 46

TCF = 0.65 + (0.01 × 46) = 1.11

6.6.3 Final Function Point (FP)

FP = UFP × TCF = 672 × 1.11 = 745.92

6.7 Explanation of Terminologies (InnoVest)

1. Authentication:
   - EI: User credentials input
   - EO: Login success/failure messages
   - EQ: None

2. User Dashboard:
   - EI: User role/context

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- EO: Dashboard stats and metrics
- EQ: Profile or investment summary lookup

3. Browse Companies:
   - EI: Filters/search keywords
   - EO: List of companies
   - EQ: Query specific company info

4. Payment:
   - EI: Payment form inputs
   - EO: Confirmation receipt
   - EQ: None

5. KYC Verification:
   - EI: Document upload
   - EO: Verification status update
   - EQ: KYC status lookup

6. Community:
   - EI: Posts, comments, likes
   - EO: Display community feed
   - EQ: Query specific topic or post

7. Event Management:
   - EI: Event creation form
   - EO: Event listings, confirmations
   - EQ: Event search/filter

8. Chat:
   - EI: Message input
   - EO: Chat display

- EQ: None

6.8 Justification of Complexity Weights

1. External Input (EI): Classified as simple since forms like login, registration, profile updates, and message sending use basic fields and validations (e.g., name, email, password).

2. External Output (EO): Considered simple, as most outputs are status messages, confirmation prompts, and basic reports.

3. External Inquiry (EQ): Assigned average weight due to filtering, keyword-based searches, and dynamic queries.

4. Internal Logical Files (ILF): Marked complex as they represent core data like user info, company metadata, KYC, event details, and chat logs, all managed within the system.

5. External Interface Files (EIF): Rated complex based on MongoDB documents and APIs integrated with external identity providers and payment gateways, making them more extensive in scope and content.

6.9 DET and RET Estimation

For complexity weighting of ILF and EIF, the number of DET (Data Element Types) and RET (Record Element Types) are estimated based on document fields and collection groupings:

- Example (Company Document): DET = name, description, sector, target_fund, current_fund, status, created_at, updated_at -> 8 DETs
- Example (Investment Record): RET = individual investment record for a company

Based on aggregation:
- Total estimated DETs = 130
- Total estimated RETs = 18

This places EIF and ILF in the 'High Complexity' category based on standard FP DET/RET complexity

matrices.