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Case Study - Fintech Application design using COCOMO 2 and GANTT

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FUNCTIONALITIES: we add some features in our fintech web application which are as follows:

- Personalization: In the technology era it shows us what customer want and what is the demand in the market. In the financial sector it will help us more because with the help of this features we can make digital payment very easy so people can make their transactions more enjoyable.
- Integration: integration is divided into two parts in the fintech application: first one is capability of working with other software and second is cross platform synchronization. Individual and business owner and all other will be going use digital payment software differently so it will be helpful.
- Authentication: money is always the serious problem for everyone so people want to use trustworthy application to transfer their money. So, when you transfer the money with our application you will receive verification message or code. Moreover, these types of application mostly companies used two factor authentications. So, when you install the application you will receive conformation SMS.
- Data tracking and analysis: In this feature uses can track their transactions and analyse their services and transaction history.

We are developing a digital payment fintech application. So, this project addressed to improve and operate the financial services.

Fintech is defined as a finance and technology together. As a developer our aims to improve and automate the financial services. And we want to help companies or business owners to manage their transaction, operations including a better relation between seller and customers. Moreover, we want to gain more profit and want to become successful app developer.

Introduction and Background

Given the need for a development of a **Fintech Web Application**, our research team worked tirelessly on the analysis of the resources needed and on the design of a basic research project to ensure its feasibility according to the provided constraints: 220k Euros budget and 15 months-time.

The data and analyses provided below are based on strong assumptions and relevant documents obtained by both primary and secondary sources, such as internet researches, past professional direct experience, interviews, and statistical methodologies applied.

We strongly believe that the feasibility of this plan can be ensured by a tested and coherent application of the disclosed steps described in the following paragraphs.

COCOMO Predictive Breakdown Timeline

COCOMO II can be considered one of the best tools to determine the cost estimation process, since it focuses on many different nonsequential features and characteristics to identify the modelling of the development of a software; it therefore includes packages, reengineering, applications composition, and application generation capabilities; object-oriented approaches supported by distributed middleware; software process maturity effects and process-driven quality estimation.

Given the software the research team managed to identify the following fundamental assumptions of the project (see Figure 1)

COCOMO II - Constructive Cost Model

Software Size Sizing Method

Unadjusted Function Points Language

Software Scale Drivers

Precedentedness Architecture / Risk Resolution Process Maturity

Development Flexibility Team Cohesion

Software Cost Drivers

Product		Personnel		Platform	
Required Software Reliability	<input type="text" value="Low"/>	Analyst Capability	<input type="text" value="High"/>	Time Constraint	<input type="text" value="High"/>
Data Base Size	<input type="text" value="Nominal"/>	Programmer Capability	<input type="text" value="High"/>	Storage Constraint	<input type="text" value="Nominal"/>
Product Complexity	<input type="text" value="Nominal"/>	Personnel Continuity	<input type="text" value="Nominal"/>	Platform Volatility	<input type="text" value="Nominal"/>
Developed for Reusability	<input type="text" value="High"/>	Application Experience	<input type="text" value="Very High"/>	Project	
Documentation Match to Lifecycle Needs	<input type="text" value="Nominal"/>	Platform Experience	<input type="text" value="Very High"/>	Use of Software Tools	<input type="text" value="High"/>
		Language and Toolset Experience	<input type="text" value="High"/>	Multisite Development	<input type="text" value="High"/>
				Required Development Schedule	<input type="text" value="Nominal"/>

Maintenance

Software Labor Rates

Cost per Person-Month (Dollars)

Figure 1 – Assumptions an COCOMO II input chart

Software Scale Drivers

- *Precedentedness* as you know we used *precedentedness* nominal for our project because we are developing a new web application so we don't want to use any other similar applications data.
- *Development flexibility*: we want to develop our project more flexible that's why we choose higher scale. Also in technology's era market changes every day so as a new developer we have to be more flexible.
- *Risk Resolution*: We have risk in each and every step. But we want to be in market and we are fresher's so our risk resolution is nominal.
- *Team Cohesion*: This sector indicates the bonding of a group. And we want a team those have a good experience in solving problem together and give us a good work.
- *Process Maturity*: Process maturity is an indicator of how close a process of growth is to being complete and reliable through qualitative measures and feedback of quality improvement being high indicates that the firm follows the procedure strictly and continuously tries to improve the products using feedbacks

Software Cost drivers:

As you can see that in the software cost drivers we have mainly 4 types which are product, personal, platform, and project.

In the first type we have different factors such as Required Software Reliability, Data Base Size, Product Complexity and Developed for Reusability, and Documentation Match to Lifecycle Needs.

Required Software Reliability: for our project we need low software reliability because if our requirement is low then we have more time to solve the problem in the project and we have less chance to get rejection.

Data Base Size: as you know that we are developing a new web application so as new developer we want to go with normal data base size because we don't know that what the exactly size customer wants.

Product Complexity: we also considered this one as a normal size because you know that complexity which means difficult or confusing. And it's become the unsolved question so in our project we do not want take risk with higher and lower level of complexity.

Developed for Reusability: it's consists the reliability, increment of productivity, quality of work. So, this is the reason behind we should go with higher scale on this factor.

Documentation Match to Lifecycle Needs: This point shows right scale cost driver in term of suitability of the project documentation. So we need nominal which means we have only limited documentation for our lifecycle needs. Because you know that we are new in market and we do not want to exceed the limits.

In the platform sector there are 3 types which are Time Constraint, Storage Constraint and Platform Volatility.

Time Constraint: as you know we have limited time for our product which 1.5 years so we must have accurate with the time, so we need higher level in time constraint.

Storage Constraint: we are developing a new web application with 400 functional point so on the first stage we want go with nominal range of storage.

Platform Volatility: it measures the risk of project. So, I think that as a new developer normal range is perfect for taking risk in the project.

Three types of Project Factors have been identified, which are: a) use of software tools, b) multisite development which required c) development schedule.

Use of software tools: For our project (web application) we need accurate and improved tools for project, and it must have higher rating in lifecycle, mature and strong easy to use.

Multisite development: it will increase the frequency of project.

Required development schedule: as per our requirement I think nominal is best suitable for development. Because it shows the 100% of effort which is required for the project so.

Furthermore, as this will be brand new project, it will not be required of maintenance. Also, the average salary of normal java software developer in Europe is about \$5100-5500 per month so assigning software engineers with salary of \$5500/month.

Results

Having set consistent and relevant assumptions, having run the system in COCOMO II, the software provided the following results (see Figure 2).

Results

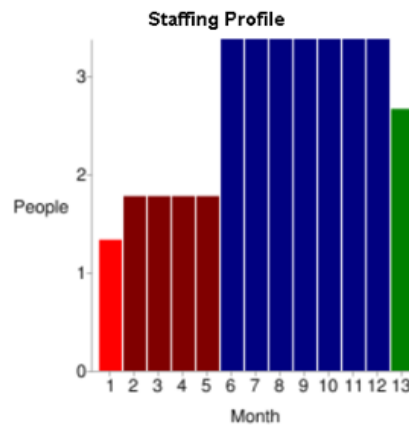
Software Development (Elaboration and Construction)

Effort = 31.9 Person-months
 Schedule = 11.5 Months
 Cost = \$175618

Total Equivalent Size = 21200 SLOC
 Effort Adjustment Factor (EAF) = 0.43

Acquisition Phase Distribution

Phase	Effort (Person-months)	Schedule (Months)	Average Staff	Cost (Dollars)
Inception	1.9	1.4	1.3	\$10537
Elaboration	7.7	4.3	1.8	\$42148
Construction	24.3	7.2	3.4	\$133470
Transition	3.8	1.4	2.7	\$21074



Software Effort Distribution for RUP/MBASE (Person-Months)

Phase/Activity	Inception	Elaboration	Construction	Transition
Management	0.3	0.9	2.4	0.5
Environment/CM	0.2	0.6	1.2	0.2
Requirements	0.7	1.4	1.9	0.2
Design	0.4	2.8	3.9	0.2
Implementation	0.2	1.0	8.3	0.7
Assessment	0.2	0.8	5.8	0.9
Deployment	0.1	0.2	0.7	1.1

Your output file is http://softwarecost.org/tools/COCOMO/data/COCOMO_October_28_2020_18_22_22_63796.bt

Created by Ray Madachy at the Naval Postgraduate School. For more information contact him at rjmadach@nps.edu.

Figure 2 –COCOMO II output chart. Fintech Web Application Results.

Based on result, it can clearly see that total project's size is 21200SLOC and it has been divided in total four phases including Inception, Elaboration, Construction and Transition. As it can see Construction is very important phase which requires more than 7monthes and cost about \$133470. Apart from Construction, Elaboration is second important phase which cost \$42148 and lasts till 4months. There are two more phases which not required many resources but very important phase which are Inception and Transition which can be finished in 1.4months and cost much lesser than other two phases. Furthermore, result shows total cost of project is \$207,229 and requires 14.3 months with 37.8 total effort.

GANTT CHART

After having performed the identification of the relevant deliverables, the research team also matched each deliverable with the relevant phase of the project (Inception, Elaboration, Construction, and Transition). This schedule is better represented using a suitable GANTT Chart which is showed below (see Figure 3).

GANTT CHART

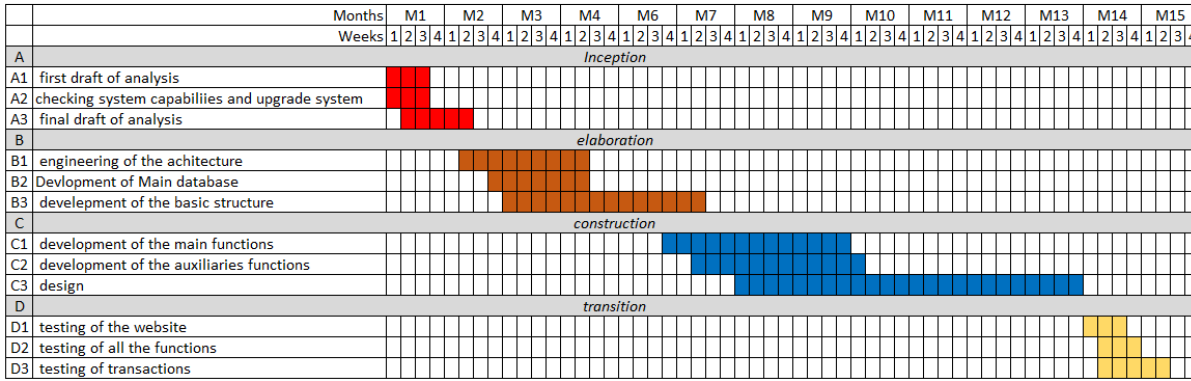


Figure 3 –Fintech Web Application Results. GANTT chart

As it can be clearly observed in Figure 3 (GANTT chart), the project has been divided into four phases. It explains what particular task in which phase requires more attention and based on project network diagram, we can calculate which task can be performed at each stage. According to the GANTT chart, Inception phase has been further divided in three deliverables, with very first task when first preliminary analysis can be done for first 3weeks. Analysis of data which requires to understand size of data we actually dealing with and can help to understand what consumer base is and at what particular points services can be delay. After that, according to analysis, hardware system and other system can be upgraded with better and more storage capacity and more powerful server. During this task, if necessary, customer has to buy new system which cost them some money which can't be included in project cost as its outside cost. During upgradation of system, final draft for analysis can get done and we can have clear layout of which task when to start for remaining three phases.

Elaboration, on the other hand is one of longest phase and it also divided on further 3 sub phases. It starts with engineering Architecture and dividing tasks to developers to evaluating and correcting mistakes which has been found from first Inception phase. A second step/task of this phase is creating new data base on basis of past experience and old database. It is much improved one with lots of extra information of customers. Based on this, our next task starts which includes creating basic structure of the programme on different categories of customers and creating main flowchart of different services which can be provided with help of new programme. This is important phase before actual construction starts so considering its seriousness it can be justify that total phase takes more than 4months because better the Elaboration phase, tasks in Construction phase can go smoothly.

Construction is actual process, where main project does take actual shape. This is most vital part of project and it is longest process of project as well. Giving this phase more than 7months actually justify itself as lots of problems comes during process. For example, any of data which has been not gathered during previous phases, will show here as missing and it will slow down whole construction process and will have to wait till it can be collected again. Very first step of construction starts with creating main functions of software with

basic data which have been gathered in previous tasks. After it complete, all auxiliaries function can be added to make it whole software as much as possible user-friendly for employees. Apart from that main and last task of construction phase where actual design process is the last one. This is longest task of the whole project and actual project takes final shape during this task.

The last phase is called Transition phase where all the functions and tasks are being checked by superior before they handed over to client. The tasks included in this phase are testing websites, testing functions and testing transition. Its takes very small amount of time compares to other tasks but it doesn't mean them not important. Before handing over to clients, web developers have to check each and every corner of project and make sure there is no loophole left in project.

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