5. Economic analysis

5.1 Description

Command Line Interface (CLI) is the main interaction element in a Unix or Linux system, on one hand because on server-side there are rarely present GUI interfaces, on the other hand because knowing you way around in a shell gives one the ability to manage data and perform actions with incredible efficiency and at impressive speed. The reason why there are not so many people who really can handle the possibilities offered by a Linux shell is because the shell offers a whole lot of commands and even more options for each, also it does not have the best learning curve. That is where "Shelly" comes in handy. One need not remember all the commands that are. Shelly receives input in form of natural language and spits out the result of the request or performs the requested operation. Shelly makes using CLI and shell a breeze, allowing anyone to enjoy the full potential of the command line.

5.2 Schedule

Work schedule is only for the first iterations of the project. It is built based on the following approach: defining the objectives, determining of the amount of work and tasks division, tasks' implementation.

5.2.1 Objectives

As the very first iteration of the program will constitute the base for further development, it must be a solid foundation, meaning that the technology, architecture and implementation will be at a high level. There are strict time bounds, thus it is necessary that a solid, functional, extensible and what's important - useful base be built. How well the objective is reached will influence directly the fate of the program.

5.2.2 Work amount evaluation

The process of development will be divided in three steps: planning, implementing and testing. Last two will run several iterations, to assure that the objectives, mainly - solid and functional - code base, are considered.
More time will be invested in planning to make sure that there is a concrete and correct roadmap to be followed. While the time for development will be directly proportional with the number of software engineers and quality assurance personnel involved.

5.2.3 The time destined for project's accomplishment and the schedule

Estimating the time necessary to develop the product is crucial to make two things: study all the information necessary for its implementation, then divide the whole process of development in smaller steps, called activities which will be evaluated individually. The methods of dividing the project into activities will allow proper defini of logical steps for program development. Duration of the project can be represented using the following formul

Duration of action = end date - start date + reserve time (days)

Where *start and finish date* are days when activities take place and *Reserve time* is an overhead, the number of days reserved for handling exceptional situations that were not expected/considered during the planning period, the amount of time by which the initial estimate might occasionally be exceeded..

Table 5.1: Brief schedule

Nr.	Activity name	Activity duration	Worker	Who approves the activity	Resources used
1	Define concept of the idea	5 days	PM SA	PDM	Internet, PC, PM Software, Versioning Tool (as git)
2	Graphical models of main components relationships. (automata-s)	7 days	SA	PM	Internet, PC, books, Automata editor, PM Software, Versioning Tool (as git)
3	Selecting right technologies	3 days	SD SA BA	PM	Internet, PC, PM Software, Versioning Tool (as git)
4	Business logic	20 days	SD	PM	Internet, PC, IDE, books, PM Software, Versioning Tool (as git)
5	Presentation layer	25 days	SD	PM	Internet, PC, IDE, books, PM Software, Versioning Tool (as git)
6	Testing and fixing	20 days	SD QA	PM	Internet, PC, IDE, books, PM Software, Versioning Tool (as git)

7	Deployment	3 days	SD	PM PDM	Internet, PC, IDE,, PM Software, Versioning Tool (as git)
8	Reports, follow-ups, future plans	5 days	BA SA	PM PDM	MS Word, LibreOffice, Latex, PM Software, Versioning Tool (as git)

- Project manager (PM)
- Software developer (SD)
- System architect (SA)
- Product Manager (PDM)
- Business Analyst (BA)
- Team Leader (TL)
- Quality Assurance Engineer (QA)

According to the schedule presented above, the expected time of the development is 88 days, plus 15 days reserve, makes it 103 days.

5.3 Economical proof

It is actual in economy to bring economical proofs for the IT projects, based on the specific of the concurrencies in economic relationships, which suppose a wide research space. In the conditions of a low degree of determination of the marketing environment, of high prices' volatility, decreased degree of prognoses depth, a common business-plan doesn't allow the exact foreseeing of the final results of the business. In this context, one of the basic instruments is choosing the methods, the right positions and indices for the economical proofs.

Realization of this goal, conditions a large number of scientific research, subordinated to the primary goal and formulated with the help of the following objectives:

a) Studying the theoretical and methodical aspects of the business-planning in the conditions of the concurrency on the market;

b) Systematization, determining the methodology and specifying the indices for the economical proofs of the business-plans in IT;

c) Study and analysis of the actual practice of economical proofs of the business-plans for IT in Republic of Moldova;

d) Developing methodological concepts of the proofs of the decision of investment in the conditions of risk and incertitude;

e) Studying the evaluation criteria of the business-projects' efficiency and elaboration of a mechanism of complex evaluation of these.

5.3.1 Material and non-material expenses

Direct materials' cost is the cost of direct materials which can be easily identified with the unit of production. For example, the cost of glass is a direct material cost in light bulbs manufacturing.

The manufacture of products or goods requires material as a prime element. In general, these materials are divided into two categories: direct and indirect materials. Direct materials are also called productive materials, raw materials, raw stock, stores and only materials without any descriptive title. The direct material for a developer serves their working computer, and other devices such as flash drive CD-r and others.

For any specific project is required to execute the required amount forecast financial resources to purchase materials needed for the project. In table 5.2 and 5.3 below are presented the material and non-material expenses that arise during development

Table 5.2– The expenses on the materials used in the project development

No.	Name	Unit's price, MDL	Required Quantity, units	Sum, MDL
1	PC	10450	3	31350
2	Mouse	250	1	250
3	Keyboard	700	1	700
4	USB Flash	321	1	321
5	Battery AA	9	6	54
	Total			32675

In non-material expenses will be included tools used in development cycle of the project: project management software (in this case doBamBam) , versioning tool (SpringLoops) both used for discussing issues, planing and monitoring code of the project. Expenses for using remote machines with different distros installed for testing purposes will also be included.

Table 5.3 –Non-material expenses

Nr.	Name	Measure	Price	Quantity	Totally
1	Remote machine	MDL/3xMonths	68	6	408
2	doBamBam	MDL/month	952	3	2856
3	Springloops	MDL/month	196	3	588
	Total				3852

Direct expenses (Table 5.4) will include logistic products that will be used for development cycle of the project.

Table 5.4 - Direct materials costs

Nr.	Name	Price per unit	Quantity	Totally
1	Office paper (500 sheets)	47	1	47
2	Pen	12	4	48
	Total			95

Conclusion: In table 5.3 are indicated materials' expenses for this project. In table 5.4 are described non-material expenses. The total expenses for material and non-material actives used for the development of this project are 3947 lei.

5.3.2 Salary expenses

Employees are paid for their work according to the tariff plan presented in Table 5.5. In the table there is also included the working period of each specific worker.

Table 5.5: Salary expenses

Nr.	Position held	Amount of work (days)	Individual price (MDL/day)	Sum, MDL
1	System architect	20	800	16000
2	Project - manager	88	800	70400
3	Product - manager	13	400	5200
4	Software developer	71	500	35500
5	QA Engineer	20	350	7000
6	Business Analyst	8	600	4800
	Total pay off for all the workers			138900
	Social fund (23 %)			31947
	Medical assurance (4 %)			5556

In Table 5.4 are represented all spent resources for paying employees and taxes. To make it more explicit, here i comes the formula in base of which was calculated:

F_{rm} = 16000 + 70400 + 5200 + 35500 + 7000 + 4800 = 138900 (MDL) (1)

Where Frm is Fondul de Retribuire a Muncii, and on its basis it's calculated the FS:

$FS = Frm*Cfs$ (2)

Where *FS* is the sum of the contributions for the Fondul Social (FS) and C_{fs} is contribution quota for the state mandatory social assurance, approved each year by the Law of Budget of state (in 2012 – 23%).

$FS = 138900 * 0.23 = 31947$ (lei)   (3)

$AM = F_{rm} * C_{am}$ (4)

Where AM is Medical Assurance and Cam is medical assurance quota approved each year by the Law of Budget for state medical assurance (in 2014 – 4%).

$AM = 138900 * 0.04 = 5556$ (lei)   (5)

The sum F_{rm} + FS +AM will be the total expense for work retribution.

$Total = 138900 + 31947 + 5556 = 176403$ (lei)   (6)

Retirement fund consists 6% of gross income and is calculated by following formulae:

$$Retirement\ fund = Gross\ income * 6\% = 138900 * 0.06 = 8334\ (lei)$$

Social fund consists 23% of the gross income and we obtain it from following calculations:

$$Social\ fund = Gross\ income * 23\% = 138900 * 18\% = 31947\ (lei)$$

Indirect expenses

The fixed means pay-off is the partial loss of the consumable properties and value of the means during their usage, influenced by different factors and the increase of the work productivity.

For computing electricity usage will be considered that the PC uses 650W per working hour (8 hours per day * 83 usage days, 664 hours). There are 3 computers, so it will make:

*Total power usage =(3 * 400 * 664) / 1000 = 796.8kW*

Table 5.6: Indirect expenses

Name	Measure	Quantity	Price	Total
Internet services	months	4 months	200	800
Sublime Text IDE			Free	
Energy consumed	KW	796.8	1.58	1258.95
Total				2058.95

5.3.3 Wear calculation

Table 5.7 shows the wear of equipment that is used for the execution of this project. Each piece of equipment in the following table has partial loss of consumable properties and value of means during its usage, influenced by different factors and the increase of work productivity.

Table 5.7: Fixed means pay off and non-material actives used in the design process

Year	Initial Value	Annual usage sum	Gained usage sum	Balance Value
	27540			18843
1st year of wear	27540	6411	6411	21129
2nd year of wear	27540	6411	12822	14718
3rd year of wear	27540	6411	19233	8307

From Table 5.5 we can see equipment usage, and price for it. Usage is computed as follows:

	Year usage = (Initial Value - Remaining Value) / Time	(5.1)
	Gained Usage = Year Usage * Time	(5.2)
	Balance Value = Initial Value – Gained Usage	(5.3)

5.4 Project Cost

Tabele 5.7 – Summary calculation related to the project

Computing Articles	Value	%
Material expenses, lei	32675	17.85%
Non – material expenses	3852	2.10%
Salary expenses, lei	138900	75.86%
Ware expenses lei	6411	3.50%
Utilities (electric energy and internet), lei	1258.95	0.69%
Total	183096.95	100%

Financial results:

Project "Shelly" will have Net Turnover (CA) 350000. Gross profit is calculated by subtracting from gross income the project cost :

$Gross\ profit = 350000 - 183096.95 = 166903.05 (MDL)$ (5.4)

Gross Turnover will be 420000 MDL and is calculated in the following way:

$Gross\ Turnover =\ Net\ Turnover + VAT\ =\ 350000\ +\ 20\%\ =\ 420000(MDL)$

Tax amount is calculated according to the following formulae, assuming that Shelly is developed by a legal pers

$Tax\ amount =\ Gross\ Profit * 12\% = 166903.05 * 0.12 = 20028.37\ (5.5)$

Net profit is calculating by subtracting tax amount form gross income:

$Net\ profit = 166903.05\ -\ 20028.37 = 146874.68\ (MDL)\ (5.6)$

Rentability of the project will be 80.22% and it is calculated in the following way:

$Rentability\ rate = Net\ profit \frac{100\%}{Project\ Cost} = 80.22\%\quad (5.7)$

5.5 Conclusion

Due to the fact that few people are involved full time (8 hours) on the initial stage of the project, technical and architectural may vary without major impact on price of development.

Money invested in this project can be covered in a longer period, with donations that may come from developers who will use this project.