TABLE OF CONTENTS

[CHAPTER 2: FEASIBILITY STUDY 2](#_Toc3842457)

[1.0 INTRODUCTION 2](#_Toc3842458)

[1.1 ORGANIZATIONAL FEASIBILITY 2](#_Toc3842459)

[1.2 TECHNICAL FEASIBILITY 2](#_Toc3842460)

[i. Technical Requirements Table 3](#_Toc3842461)

[1.3 ECONOMIC FEASIBILITY 4](#_Toc3842462)

[1.3.1 Capital/Initial Costs 4](#_Toc3842463)

[1.3.2 Development Costs 4](#_Toc3842464)

[1.3.3 Operational Costs 5](#_Toc3842465)

[ii. Operational Cost Table 5](#_Toc3842466)

[1.3.4 Benefits 5](#_Toc3842467)

[iii. Benefits Table 6](#_Toc3842468)

[1.3.5 Cost-benefits evaluation 6](#_Toc3842469)

[iv. Net Profit Table 7](#_Toc3842470)

[i. NPV Table 8](#_Toc3842471)

[1.4 RISK ANALYSIS 8](#_Toc3842472)

[ii. Risks Table 9](#_Toc3842473)

[1.5 SCHEDULE FEASIBILITY 9](#_Toc3842474)

[iii. Critical Path Table 10](#_Toc3842475)

[iv. Gantt Chart 10](#_Toc3842476)

[1.6 OPERATIONAL FEASIBILITY 10](#_Toc3842477)

[1.7 STAKEHOLDER ANALYSIS 10](#_Toc3842478)

[1.8 CONCLUSION 11](#_Toc3842479)

# CHAPTER 2: FEASIBILITY STUDY

## INTRODUCTION

Feasibility study refers to the study, done by the researchers or development team to evaluate whether the resources available are right to implement a particular project, in other words it is a study to find out whether the system is worth implementing within the given resources (time, money, labour, etc.). According to *Ian Sommerville (2008),* the results of the feasibility study should be a report that recommends whether or not it is worth carrying on with the system development process.

To come up with a clear feasibility study report that the analyst or the decision makers may depend upon to make a continue or halt decision, the researcher has to conduct Organizational, Technical, Economic, Schedule and Operation feasibility study.

## ORGANIZATIONAL FEASIBILITY

The aim of organizational feasibility study is to answer questions like, does the proposed system contribute to the overall objectives of the organization. It focuses mainly on how people within the organization will adapt to this planned organizational change. How will people and the way they do their jobs be impacted? Will they accept this change willingly? Will business be disrupted while the proposed solution is implemented?

Statistics of students who are using mobile phones states that students spend many hours per day on their mobile phones and the number of organizations which adopt and develop the mobile version or their system for their users, it clearly shows that people will easily and quickly adapt to the GZU Student Portal mobile application and also the fact that the web version of the GZU Student Portal will remain un touched and functioning the project is organizationally feasible.

## TECHNICAL FEASIBILITY

At this stage, the analyst is more concerned about knowing the technical requirements such as hardware, of the proposed system and are then compared to the technical capability of the organization. The systems project is considered technically feasible if the internal technical capability is sufficient to support the project requirements. *Rosenblatt (2014)* stated technical feasibility as the need for technical resources to accommodate the development, purchasing, installing and operating the system to be developed. The essential questions at this stage are:

* Is the project feasible within the limits of current technology?
* Does the technology exist at all?
* Is it available within given resource constraints?
* Is it a practical proposition?
* Manpower- programmers, testers & debuggers
* Software and hardware
* Are the current technical resources sufficient for the new system?
* Can they be upgraded to provide the level of technology necessary for the new system?
* Do we possess the necessary technical expertise, and is the schedule reasonable?
* Can the technology be easily applied to current problems?
* Does the technology have the capacity to handle the solution?
* Do we currently possess the necessary technology?

Below is a tabulation of all the technical requirements and a column stating if the requirement is available or can be acquired in time.

1. Technical Requirements Table

|  |  |  |  |
| --- | --- | --- | --- |
| REQUIREMENT | QNTY | DESCRIPTION & SPECIFICATION | AVAILABLE |
| *Hardware* | | | |
| Laptop | 1 | Dual Core +  2 GB Ram  For the system developer | Core i5  12 GB Ram |
| Remote Server | 1 Account | For hosting the backend of the system  1 Shared or Dedicated hosting serve | Yes |
| Backup Media | 2 | 500 GB External Hard drive and 4 GB Flash drive | 1 TB  16 GB Flash drive |
| Network Software and Protocols | -- | For system to communicate  TCP/IP  HTTP(S)  FTP | Yes |
| *Software* | | | |
| Operating System | 1 | Windows 7, Mac OS or Linux | Windows 10 |
| PHP | 1 | PHP 5+ | PHP 7.3 |
| PHP Local Server | 1 | XAMMP, MAMP or LAMP | XAMMP |
| NODE JS | 1 | Node JS, NVM and NPM | Node JS |
| NPM Packages | -- | Ionic | Yes |
| Laravel Framework | -- | Laravel 5.7 for Backend | Yes |
| Android Studio | 1 | Android Studio | Yes |
| *Technical Personnel* | | | |
| Programmer | 1 | Front and Backend programmer | Yes |
| Tester & Debugger | 1 | Programmer | Yes |
| System Security | 1 | Programmer | Yes |
| UI Designer | 1 | User Interface Designer | Yes |
| Trainer | 1 | Users trainer | Yes |

The availability column clearly shows that technically, the proposed system is feasible and that the developer has everything needed in terms of technical feasibility hence the decision to proceed given other studies agrees.

## ECONOMIC FEASIBILITY

Is the proposed system economically justifiable? This is one of the most important question that an organization need a clear answer to, whenever they need to implement a new system or to evaluate an alternative in terms of whether funds and resources exits to support the project *Jack T. Marchewka (2003).* As defined by *Matthew J. Franchetti (August 23rd 2011),* economic feasibility study is the financial evaluation of the project to analyze alternatives. Steps such as cost benefit analysis, return on investments and risk analysis are to be thoroughly taken in order to answer the above question.

The first step in assessing if the project is economically viable is to determine the following costs; The capital cost, development costs, operating costs and operating revenue among other financial activities.

### Capital/Initial Costs

These are costs incurred when acquiring or purchasing assets that are used in development of the system up to deployment and normally they are non-recurring and used to purchase fixed assets.

Based on the current resources and the cost incurred by the developer, the breakdown of the initial investment or capital costs are as follows,

* Hardware (Laptop and External drives) - ***$1, 450***
* Shared hosting account - ***$30***

To kick start the proposed system it requires ***$1, 480 USD***

### Development Costs

After the capital cost have been calculated, the researcher has also to conduct a development cost analysis which includes the salaries and other employment costs of the staff involved in the development project and all costs associated. *Ian Sommerville (2015)*, state that there are three parameters involved in computing the total cost of a software development project which are:

* Hardware and software costs including maintenance
* Travel and training costs
* Effort costs (the costs of paying software engineers).

Development costs as stated above, includes the following:

* Travelling and training costs - ***$1300***
* Testers and Debuggers - ***$1500***
* Material costs (telecommunication and electrical costs) - ***$255***
* Effort Costs - ***$1050***

The development costs of the proposed system totals to ***$4, 105 USD.***

### Operational Costs

The calculation of development costs brings us to the operational cost section which according to McGraw Hill consist of the costs of operating the system once it has been installed and whatis,techtarget.com defined operational costs as the document of the prices of running a system on a day-to-day basis. Which means, they are cost that begins after the deployment of the system. The forecasted operational costs of the proposed systems are outlined in the table below

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Operational Cost | YEAR 0  US ($) | YEAR 1  US ($) | YEAR 2  US ($) | YEAR 3  US ($) |
| System Maintenance | -- | 4, 800 | 4, 000 | 4, 000 |
| System Security Checks | -- | 4, 200 | 4, 200 | 4, 200 |
| Training Costs | -- | 600 | 300 | 300 |
| Online server costs | -- | 368.8 | 368.8 | 368.8 |
| TOTAL | **--** | **9, 968.8** | **8, 868.8** | 8, 868.8 |

1. Operational Cost Table

### Benefits

A quality, convenient and user friendly product is a great asset to any business or Organization. However, without the ability to offer benefits or generate profits, the product will offer little value and on this section, the researcher is going to put down the list of benefits and quantify to monetary value the benefits that the proposed system will bring to the organization*. McGraw Hill* categorizes the benefits of a software project as follows:

* **Direct Benefits** – which accrue directly from the operation of the proposed system for example, reduction of salaries
* **Assessable indirect Benefits** – generally secondary benefits, such as reduction in error rate which in turn reduce user’s complaints
* **Intangible Benefits** – these are mostly long term benefits that might be difficult to quantify.

Below is the tabulation of the estimated benefits that a GZU portal mobile application will bring to the stakeholders involved in the application. *(Number of total students at GZU is one of the variable the researcher used to estimate the benefits)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Benefit | Year 0 | Year 1 | Year 2 | Year 3 |
| *Direct Benefits* | | | | |
| Increase student applicants *(8%,10%,15% \*3445 )* | -- | 5, 512 | 6, 080 | 10, 335 |
| Decrease communication gap between the university and the students *(18,030 \* 0.75)* | -- | 13, 523 | 18, 030 | 18, 030 |
| Instant Updates and notification | -- | 13, 523 | 18, 030 | 18, 030 |
| Better Earth (Eliminate paperwork) | -- | 3, 000 | 3, 445 | 3, 445 |
| Easy access and sharing of Academic results | -- | 9, 015 | 10, 000 | 10, 000 |
| Activity data collection and data analysis | -- | 3, 445 | 13, 523 | 18, 030 |
| Staying connected *(0.30)* | -- | 5, 409 | 10, 818 | 18, 030 |
| Easy time table integrated with device calendar | -- | 1, 803 | 1, 803 | 1, 803 |
| Reduces registration queues hence save time | -- | 9, 015 | 18, 030 | 18, 030 |
| *Assessable indirect Benefits* | | | | |
| Improve brand image | -- | 1, 000 | 1, 500 | 2, 000 |
| Increased international market share | -- | 248 | 373 | 622 |
| *Intangible Benefits* | | | | |
| Increased organizational flexibility | -- | 1000 | 1, 500 | 2, 000 |
| Increase organization’s goodwill | -- | 1000 | 1, 500 | 2, 000 |
|  | -- |  |  |  |
| Total | **--** | **67, 493** | **104, 632** | **120, 555** |

1. Benefits Table

Once we have estimated all the cost and benefits, it’s time to the look for the overall viability of the project in relation to Organizational business goal by forecasting the cash flow, at this stage according to McGraw Hill the researcher will look at when the expenditure and income will take place.

Income

Expenditure

Time

*Typical product lifecycle cash flow (McGrahill).*

### Cost-benefits evaluation

In the following section, the researcher will use some of the cash flow forecasting techniques which are Net profit, Payback period, Internal rate of return (IRR) and Net present value (NPV) to bring out the clear picture of business value of the proposed system and the research will mention also the benefits and drawbacks of depending on each of the cash flow techniques stated.

#### Net Profit

Net profit refers to the difference between the total costs and the income over the life time of the project McGraw Hill.

|  |  |
| --- | --- |
| YEAR | CASH FLOW ($) |
| 0 | -5, 585 |
| 1 | 67, 493 |
| 2 | 104, 632 |
| 3 | 120, 555 |
| Total | **287, 095** |

1. Net Profit Table

The benefit of using this technique is that, it is very simple to calculate. However, it doesn’t take into account the risk and timing of the cash flows hence the need to use other techniques.

#### Payback Period

This is the amount of time required for a project to recover the initial costs which totals to **$5, 585,** normally the viable project will give a shorter payback period**.** The formula for calculating the payback period in years is:

Not prone to small forecasting errors and easy to calculate are some of the benefits of using this technique. Its drawback is that; it ignores the overall profitability of the project such as income or expenditure once the project has broken even.

The above methods are recommended for a quick assessment of profitability. However, if large capital expenditures are involved, it should be followed a mere vigorous financial analysis such as IRR and NPV.

#### Internal rate of return (IIR) and Net present value (NPV)

III and NPV techniques are both discounted cash flow techniques for determining profitability. Currently most companies are using the IIR or 12 – 15% which the researcher will also going to use for this project

The formula for NPV is:

Each cash inflow or outflow will be discounted back to its Present Value (PV). Then sum them.

Therefore:

* t – the time of cash flow
* N – the total time of project
* r – the discount rate (12%)
* Ct – net cash flow

|  |  |  |  |
| --- | --- | --- | --- |
| YEAR | CASH FLOW | DISCOUNT FACTOR @ 12% | DISCOUNTED CASH FLOW |
| 0 | -5, 585 | 1.000 | -5, 585 |
| 1 | 67, 493 | 0.8929 | 60, 264 |
| 2 | 104, 632 | 0.7972 | 83, 412 |
| 3 | 120, 555 | 0.7118 | 85, 811 |
| Net Profit | **287, 095** | **NPV** | **223, 902** |

1. NPV Table

The internal rate of return (IRR) is a capital budgeting metric used to decide whether an organization should make investments. It is an indicator of the efficiency of an investment, as opposed to net present value (NPV), which indicates value. A viable project gives higher IIR than that could be earned by alternative investments, in this case 12% which the banks are giving annually when invested.

The internal rate of return is defined as any discount rate that results in a NPV of zero for a series of cash flow. In other words, the project will give value to the company if IIR is greater than the project’s initial costs of capital.

The formula is:

And the calculation shows that the IIR is more than 1258.12%.

As shown in the above, the IRR is more than 100% and the NPV is 223. 902. The fact that the IRR is greater than the 12% and the fact that the NPV is positive indicates that the project is a good financial decision.

## RISK ANALYSIS

At this section, the analyst is more concerned with identifying risks that are associated with developing and deploying the project and drawing up plans to minimize their effect. Ian Sommerville (2015) postulate that, this is a very crucial step because of the inherent uncertainties in software development which comes from loosely defined requirements, changes of requirements, difficulties in estimating the schedules and the resources required and difference in individual skills of the members of the team.

Using the project risk matrix and the categories Project risks – affects schedule and resources, Product risks – affects quality and performance of the product and Business risks – affects the organization, the researcher come up with the following conclusion in relation to project risk:

Risk level Key:

* H – High
* M – Medium
* L – Low
* -- – Very Unlikely

|  |  |  |
| --- | --- | --- |
| RISK | LEVEL | MITIGATION |
| *Project risks* | | |
| Hardware Unavailable and Failure | L | Avoid - Backup media in place |
| Requirements Changes | H | Avoided – extensive research conducted |
| Size Underestimate | L | Control – Hire more developers |
|  |  |  |
| *Product risks* | | |
| Tools Underperformance | L | Avoid – Backup and continue monitoring |
| Wrong Platforms | L | Control – Continuous testing |
| *Business risks* | | |
| Technology Change | L | Control – Keep up to date with new technologies and better way to develop |
| Not accepted | H | Control – Keep target users in the loop |

1. Risks Table

The above table shows that the proposed system has a low risk level hence in favor of proceeding with the development of the project.

## SCHEDULE FEASIBILITY

Even the best viable and most profitable project can fail if it does not meet the deadlines, *Ian Sommerville (2015)* puts delivering the software to the customer at the agreed time as one of the success criteria of a software project. In scheduling feasibility, an organization or a project team estimates how much time the project will take to complete.

Schedule feasibility of a project can be shown using the Gantt chart and Critical path. The following is the work plan of the GZU Student Portal mobile application development.

#### Critical Path

This is a way of showing activities that cannot be started before the completion of the ones before it, that is, they will be executed in sequential

|  |  |  |
| --- | --- | --- |
| TASK | DUE DATE | DAYS |
| Ideation | 03/12/2018 | 7 |
| Market Research | 10/12/2018 | 7 |
| Prototype | 24/12/2018 | 14 |
| Proposal | 15/03/2019 | 7 |
| Feasibility Study | 18/03/2019 | 3 |
| Planning | 25/03/2019 | 7 |
| Design (UI/UX) | 01/04/2019 | 6 |
| Coding | 08/04/2019 | 7 |
| Testing | 16/04/2019 | 8 |
| Implementation | 20/04/2019 | 4 |
| Maintenance | Ongoing | -- |

1. Critical Path Table

#### The Gantt Chart

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Phase | Weeks | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Proposal |  |  |  |  |  |  |  |  |  |
| Feasibility Study |  |  |  |  |  |  |  |  |  |
| Planning |  |  |  |  |  |  |  |  |  |
| Design (UI/UX) |  |  |  |  |  |  |  |  |  |
| Coding |  |  |  |  |  |  |  |  |  |
| Testing |  |  |  |  |  |  |  |  |  |
| Implementation |  |  |  |  |  |  |  |  |  |
| Documentation Maintenance |  |  |  |  |  |  |  |  |  |

1. Gantt Chart

## OPERATIONAL FEASIBILITY

This assessment involves undertaking a study to analyze and determine whether and how well the organization’s needs can be met by completing the project. Operational feasibility studies also analyze how a project plan satisfies the requirements identified in the requirements analysis phase of system development.

Extensive research, involvement of staff and students in the development stage proves that the project will be well accepted by both the students and the staff. Also taking feedback from the few selected testers will make the project a success.

## STAKEHOLDER ANALYSIS

McGraw Hill defined stakeholders as the people who have stake or interest in the project, and further state that the researcher should identify them as early as possible because they need to be an adequate communication channels with them right from the start.

Generally, stakeholders fall under 3 categories, Internal to the project team (Internal) – those who are under direct managerial control of the project leader (Middle), External to the project team but internal to the organization and External to both the project team and the organization (External).

The following is the list of the stakeholders and their interest on the GZU Student Portal mobile application.

* **Students** – these are the main users of the application; they will get the application from the app store
* **GZU Administrators** – these will fund and give the final decision on developing and changes to the proposed system
* **Lectures** – These will post critical notification
* **GZU IT department** – these will be responsible in maintaining, implementing and taking care of the issue regarding the mobile application usage and also manage the backend
* **Developer, debuggers and testers** – these will keep running tests to make sure that the system is running as intended.
* **GZU Finance department** – they will be responsible for all the financial transaction processed within the mobile application
* **Other state universities** – these will be the competition to the development of the mobile application for students
* **Parents or Guardians** – they will be able to view the results

## CONCLUSION

More than four extensive studies including risk analysis, thorough researches, the researcher can safely conclude that, the proposed system is viable and will guarantee benefits to all the stakeholders involved. As stated in the critical path section, the next phase will be the planning phase.