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CSC 554 (Spring 2018)

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CSC 554 Project Management

Business Case: Feasibility Report

Project #1

1. Description

Development of a general purpose academic survey system (an appropriate name yet to be thought of) that faculty at any school can use to collect students' feedback on various questionnaires (given from time to time) related to their classes and monitor their progress. Students should be able to fill in the questionnaire during the class time only to ensure that there is no interaction amongst students. Respondent names must not be available to the faculty but there should be some mechanism of knowing that a particular series of questionnaires are filled by the same student.

2. Economic Feasibility

2.1. Benefits

2.1.1. Tangible Benefits

- Hardware/Software installation fee
- Initial license fee ($10 per student, rounded to nearest hundred)
- Yearly license renewal fee ($10 per student, rounded to nearest hundred)

2.1.2. Intangible Benefits

- Likelihood of more schools using services
- Likelihood of selected schools coming back for additional services
- Improved customer/civilian outlook of company
- Employees' skill diversity grows

2.2. Costs

2.2.1. Tangible Costs

2.2.1.1. One-Time Tangible Costs

- Hardware/Software/Miscellaneous supplies (5 employees)
  $250 for laptop computer per employee ($1,250)
  $200 for Windows 10 license per employee ($1,000)
  $500 for Microsoft Visual Studio licence (5 free included)
  (**$2,750** total)

2.2.1.2. Recurring Tangible Costs

- Payroll for employees (5 employees)
  $50,000/year, (**$250,000/year** total)

- Insurance for employees (5 employees)
  $500/month per employee, $6,000/year
  (**$30,000/year** total)

- Employee Supplies (5 employees)
  $200/year for office supplies per employee
  (**$1,000/year** total)

- Cloud server ownership
  $300/month, (**$3,600/year**)

- Company website and domain
  Wordpress $25/month, (**$300/year**)

- Company building rent
  (1,900sq ft x 10 = **$19,000/year** total)

- Power for company
  ~(**$1,500/year**) in electricity

- Internet for company
  $225/month, (**$2,700/year**)

2.2.2. Intangible Costs

2.2.2.1. One-Time Intangible Costs

- Some stakeholders will be unmotivated to change systems

2.2.2.2. Recurring Intangible Costs

- Worse outlook of company for each bug/problem with the system

2.3. Economic Evaluation

The total budget of the project is equal to (one-time tangible costs + (recurring yearly costs / duration of project)). Thus the budget is equal to (2,750 + (308,100 / 4)) = $79,775. The yearly license should go for $10 for each student that will have access to the software (even if they do not use it). So for example, at a institution of 10,000 students the yearly license will be $100,000. The number of students should be rounded to the nearest hundred place (Rounding up at 50) e.g. 1,672 students will round to 1,700 for a yearly license of $17,000. Therefore all increases and decreases in student population should be noted by all parties involved for appropriate price increase or decrease. In the case that there is less than 50 students, it will be exactly the amount of students using the system. Any required hardware installation should have a standard

charge per room and the cost of the hardware as an additional charge for each machine added. For software installation, the same idea should follow but at a reduced price. To break even for the project in one year, combined institutions will have to buy licenses for around 8,000 students. If at least 2,000 are licensed by the end of year one then there is a payback period of four years with an ROI of 25% at the end of five years. The more students the company can get to have a license, the higher the ROI will be and the shorter the payback period will become. If this is the only project for the company, to keep the company afloat at its current spending, combined institutions will have to buy licenses for around 31,000 students. That is no small task. No doubt extra money would have to be put into a more serious advertising and soliciting campaign to make that happen. If the company can guarantee at least 1,600 student licenses to break even and preferably more to make profit, this project is economically feasible.

3. Technical Feasibility

A well-trained, competent staff of software developers should be prepared to take on the project of creating school academic survey system. Every employee should have gone through training (either through on-the-job training or higher education) and each should have the skill and know-how to get the job done for their respective position. The school will provide necessary installation fees if necessary that will cover all hardware/software and personnel salary for the installation. All other costs will be covered by the yearly license fee for each school. Hardware, software and other miscellaneous tools are made available to all employees to create, install and maintain the hardware and software required by the system being created. If all employees meet these conditions and all other conditions are met then this project is technically feasible.

4. Operational Feasibility

To ensure operational feasibility, the proposed system must be reliable, maintainable, supportable, usable, producible, sustainable and affordable. With proper, professional coding and documentation standards the system can be easily maintainable, supportable, producible and sustainable even if the creators of the system are not present anymore. Proper testing and investigation/planning into human/computer interaction and interfaces the system will ensure that the system is reliable and usable. With a smaller team where efficiency is optimum, the price can be affordable for all customers and stakeholders involved. Following these guidelines, operational feasibility can be achieved for the project.

5. Schedule Feasibility

Looking at the normal schedule conditions for a typical software development company, it is hard to suggest there will be schedule feasibility. Seeing that there will be a requirements and design phase of 2-4 weeks, a planning and development phase of 3-6 months and a testing phase of 3-6 weeks, it is possible to meet schedule feasibility under the right conditions. If no team members were to leave, fall ill or fall in productivity this project can in theory just make the timeframe for schedule feasibility. However, if

there is any change in scope or any problems at all, either with personnel, technology, logistics or business practices, there is no chance to meet the schedule feasibility for the project in the four month window. Another problem to keep in mind is that the faster the project is completed there will be an increased likelihood of bugs and problems.

6. Overall Risk

- Not enough licenses could be purchased to make profit
- Scope changes or any other mishaps could cause schedule infeasibility
- System has potential to be too confusing for customers to use
- System has potential to have too many bugs to be used properly
- System has potential to be difficult to install hardware-wise or software-wise
- System has potential to be incompatible with some schools' systems
- Customers may not want to pay higher fees depending on cost of development

7. Conclusion

This project has the possibility to fail certain types of feasibility depending on outcomes and situations. For economic feasibility, the company has to assert that more than 1,600 students will be licensed to use the software by the end of year one. If that condition is not met then, a total of more than 3,200 students will have to licensed by the end of year two and so on. If that condition is not met then economic feasibility cannot be met. As for schedule feasibility, if everything goes according to plan and there are no delays the company can make the four month deadline. However, if there are multiple delays it seems improbable that schedule feasibility will be met. There is a lot of risk involved in this project but the potential benefits can be high if a large number of students that will take up a license can be guaranteed.

Project # 2

1. Description

PennDOT needs a system to avoid / minimize traffic delays on Route 222 between Fleetwood and Temple, Pennsylvania.

2. Economic Feasibility

2.1. Benefits

2.1.1. Tangible Benefits

- First up-front payment for contract (25% = $116,235)
- Second first day payment for project (25% = $116,235)
- Third midway payment halfway through project (25% = $116,235)
- Last payment after contract is completed (25% = $116,235)

2.1.2. Intangible Benefits

- Increased likelihood of another contract for PennDOT
- Increased civilian opinion of company
- Faster overall employee commute in area
- Less to no traffic delays for employees under everyday conditions

2.2. Costs

2.2.1. Tangible Costs

2.2.1.1. One-Time Tangible Costs

- Payroll for employees (for 10 employees)
  $45/hr, 8 hour days, 5 days a week, 4 months for project
  $28,800 per employee (**$288,000** total)

- Insurance for employees
  $500/month per employee
  $2,000 per employee (**$20,000** total)

- Power for machinery (jackhammers, trucks, steamrollers, etc.)
  $2.945/gallon diesel
  ~0.2 gallons burned per hour ~1.6 gallons burned per day
  10 employees: ~16 gallons per day ~80 gallons a week
  1,280 gallons total ($3,769.60 total in diesel)
  $1/day in electricity per employee
  10 employees: $10/day, $200/month ($800 total in electric)
  ($3,769.60 + $800 = **$4,569.60** total for power)

- Insurance for equipment
  $100,000 in coverage required
  Rate is $1,500/month (**$5,000** total) w/ $500 deductible

- Renting/Leasing unowned heavy machinery
  $100,000 required in leasing equipment
  Rate is $2,315/month (**$9,260** total)

- Manual tools (hammers, levelers, shovels, etc.)
  $50 per employee (**$500** total)

- Safety equipment/materials (cones, flares, signs, etc.)
  $50 per employee (**$500** total)

- Personal safety equipment (hard hats, goggles, gloves, etc.)
  $50 per employee (**$500** total)

- Machinery, tool and safety equipment repair/replacement
  $500 deductible on insurance (**$500** total)

- Gathering or renewing all required permits
  $1,152/annually, $96 monthly (**$384** total)

- Removal/Disposal of old roadway and road accessories
  $1.00/sq ft (width of road by distance of road)
  24 ft wide by 6 miles (31,680 ft) = 760,320sq ft
  (**$760,320** total) **if total road rework is the plan**
  Problem areas equal traffic light intersections (5)
  Intersections = (24x24=576sq ft)*5 = 2,880sq ft
  (**$2,880** total) **if intersection only rework is the plan**

2.2.1.2. Recurring Tangible Costs

NO RECURRING TANGIBLE COSTS

2.2.2. Intangible Costs

2.2.2.1. One-Time Intangible Costs

- Bottlenecked, delayed or detoured traffic for project duration
- Slowed traffic for project duration

2.2.2.2. Recurring Intangible Costs

NO RECURRING INTANGIBLE COSTS

2.3. Economic Evaluation

Going with the intersection only rework plan would seem the most likely as it would cost the least to all parties included and would highly improve the chances of meeting all other types of feasibility, most importantly noting schedule feasibility. The total cost of that plan will come to approx. $332,100. The top quartile of contractors receive around 40% ROI which comes around $132,840. That being said, the company should ask for a total price of $464,940 for the contracting job with intersection rework only. Therefore, the company should ask for $116,235 at each step of the project. Each step of the contract being a first upfront payment, first day payment, mid-job payment and payment once the whole job has been completed.

3. Technical Feasibility

A well-trained, competent staff of handiman laborers should be prepared to take on the PennDOT contract. Every employee should have gone through training (either through on-the-job training or trade school training) and each should have the skill and know-how

to get the job done for their respective position. PennDOT will provide necessary traffic equipment such as traffic lights, signs, etc. and the first up-front payment plus the first day payment from PennDOT will cover a majority of the cost of all remaining required resources such as payroll and miscellaneous equipment. PennDOT will pay the remainder of the payment plus labor throughout project completion which will cover any remaining expenses. If all employees meet these conditions, all other conditions are met and all resourced can be obtained then this project is technically feasible.

4. Operational Feasibility

Even with PennDOT collusion, there can only be speculation on how well the proposed system will work in reality to decrease traffic delays before being made. However, there should be a set framework on what the percentage drop in traffic delays should be in order to the show success vs failure of the contract. Minimizing traffic is the goal and can be done through multiple ways such as adding more lanes to the road that gives faster traffic a chance to pass slower traffic, the removal/addition of traffic lights in certain spots or additional road configurations in certain areas. If a study is done on where, why and how the traffic problems occur then it will be feasible to decrease traffic delays by some percentage and have a successful project. This study should fall to the responsibility of PennDOT but some consideration of feasibility and cost should fall onto the company as well. Since the company is under contract and wants to look out for its company image as well as the safety of all stakeholders using the solution, the project will have increased additional requirements of maintainability, reliability, sustainability and usability after completion i.e. longevity and resilience to normal wear and tear or uncontrollable acts or accidents. If going by industry standards an affordable and easily producible solution is possible through the project. Thus, a roadway that decreases traffic delays is operationally feasible if all the previous guidelines are followed.

5. Schedule Feasibility

Depending on what solution is decided to minimize traffic delays along the selected route, the project may not be able to be completed within the four month time window. If considering to add additional lanes to the road, the project will not be scheduly feasible as that undertaking will take years to complete. If the solution considered requires only removing, adding or moving traffic equipment then the project will be schedule feasible. In the end, the project can have schedule feasibility if the proposed solution is not large in scale enough to involve road expansion or similar features. The conditions of schedule feasibility assumes that all studies and planning for the required construction/traffic problem areas have been completed by PennDOT. If these undertakings have to be completed by the company, schedule feasibility will most likely not be met in most cases. Last weather and other setbacks may push back the completion time of the project, , thus compromising schedule feasibility. If the contract in question has been thoroughly investigated, analyzed and planned by PennDOT and only covers problem areas and not the whole stretch of route 222, then this project is schedule feasible assuming there will be limited and minor scope changes with limited and minor setbacks of any nature.

6. Overall Risk

- Potential for machinery and equipment to break and need repair/replacement
- Potential for safety equipment to break/be lost and need repair/replacement
- Potential workers compensation for workplace accidents
- Potential for legal action and costs from/against motorist/civilians/workers

7. Conclusion

If PennDOT plans to only rework the intersections in this project it is not only feasible in all aspects, it is lucrative as well with a 40% ROI totaling $131,240. However, if PennDOT wishes to rework the whole distance from Fleetwood to Temple there is no way it will meet schedule feasibility in the four month time frame of the project. Planning and analyzing the traffic areas should also be taken into account as well as scope changes/setbacks when considering the if this project will be feasible in the set time.

Project # 3

1. Description

Development of a class attendance system that can be used at Kutztown University. Students present in a class should be able to mark their presence using computers. Faculty should be able to generate various reports about students' absence.

2. Economic Feasibility

2.1. Benefits

2.1.1. Tangible Benefits

- Initial license fee ($250 per registered course)
- Yearly license renewal fee ($250 per registered course)

2.1.2. Intangible Benefits

- Likelihood of more schools using services
- Likelihood of selected schools coming back for additional services
- Improved customer/civilian outlook of company
- Employees' skill diversity grows

2.2. Costs

2.2.1. Tangible Costs

2.2.1.1. One-Time Tangible Costs

- Hardware/Software/Miscellaneous supplies (5 employees)
  $250 for laptop computer per employee ($1,250)
  $200 for Windows 10 license per employee ($1,000)
  $500 for Microsoft Visual Studio licence (5 free included)
  (**$2,750** total)

2.2.1.2. Recurring Tangible Costs

- Payroll for employees (5 employees)
  $50,000/year, (**$250,000/year** total)

- Insurance for employees (5 employees)
  $500/month per employee, $6,000/year
  (**$30,000/year** total)

- Employee Supplies (5 employees)
  $200/year for office supplies per employee
  (**$1,000/year** total)

- Cloud server ownership
  $300/month, (**$3,600/year**)

- Company website and domain
  Wordpress $25/month, (**$300/year**)

- Company building rent
  (1,900sq ft x 10 = **$19,000/year** total)

- Power for company
  ~(**$1,500/year**) in electricity

- Internet for company
  $225/month, (**$2,700/year**)

2.2.2. Intangible Costs

2.2.2.1. One-Time Intangible Costs

- Some stakeholders will be unmotivated to change systems

2.2.2.2. Recurring Intangible Costs

- Worse outlook of company for each bug/problem with the system

2.3. Economic Evaluation

The total budget of the project is equal to (one-time tangible costs + (recurring yearly costs / duration of project)). Thus the budget is equal to (2,750 + (308,100 / 4)) = $79,775. The software license should charge per course using the system and not per student. The rate of each course should be $250 (even if they do not use it). So for example, at a institution with 350 yearly registered courses the yearly license will be $87,500. To break even for the project in the first year, combined institutions will have to buy licenses for around 320 courses. If at least 80 courses are licensed by the end of year one then there is a payback period of four years with an ROI of 25% at the end of five years. The more courses the company can get to have a license, the higher the ROI will be and the shorter the payback period will become. If this is the only project for the company, to keep the company afloat at its current spending, combined institutions will have to buy licenses for around 1,250 courses. That is no small task. No doubt extra money would have to be put into a more serious advertising and soliciting campaign to make that happen. If the company can guarantee at least 64 course licenses to break even and preferably more to make profit, this project is economically feasible with the set benefits and costs.

3. Technical Feasibility

A well-trained, competent staff of software developers should be prepared to take on the project of creating school attendance system. Every employee should have gone through training (either through on-the-job training or higher education) and each should have the skill and know-how to get the job done for their respective position. All costs will be covered by the yearly license fee from each school that purchases a yearly license for its courses. Hardware, software and other miscellaneous tools are made available to all employees to create, install and maintain the hardware and software required by the system being created. If all employees meet these conditions and all other conditions are met then this project is technically feasible.

4. Operational Feasibility

To ensure operational feasibility, the proposed system must be reliable, maintainable, supportable, usable, producible, sustainable and affordable. With proper, professional coding and documentation standards the system can be easily maintainable, supportable, producible and sustainable even if the creators of the system are not present anymore. Proper testing and investigation/planning into human/computer interaction and interfaces the system will ensure that the system is reliable and usable. With a smaller team where efficiency is optimum, the price can be affordable for all customers and stakeholders involved. Following these guidelines, operational feasibility can be achieved for the project.

5. Schedule Feasibility

Looking at the normal schedule conditions for a typical software development company, it is hard to suggest there will be schedule feasibility. Seeing that there will be a requirements and design phase of 2-4 weeks, a planning and development phase of 3-6 months and a testing phase of 3-6 weeks, it is possible to meet schedule feasibility under the right conditions. If no team members were to leave, fall ill or fall in productivity this project can in theory just make the timeframe for schedule feasibility. However, if there is any change in scope or any problems at all, either with personnel, technology, logistics or business practices, there is no chance to meet the schedule feasibility for the project in the four month window. Another problem to keep in mind is that the faster the project is completed there will be an increased likelihood of bugs and problems.

6. Overall Risk

- Not enough licenses could be purchased to make profit
- Scope changes or any other mishaps could cause schedule infeasibility
- System has potential to be too confusing for customers to use
- System has potential to have too many bugs to be used properly
- System has potential to be difficult to install hardware-wise or software-wise
- System has potential to be incompatible with some schools' systems
- Customers may not want to pay higher fees depending on cost of development

7. Conclusion

This project has the possibility to fail certain types of feasibility depending on outcomes and situations. For economic feasibility, the company has to assert that more than 64 courses will be licensed to use the software by the end of year one. If that condition is not met then, a total of more than 128 courses will have to licensed by the end of year two and so on. If that condition is not met then economic feasibility cannot be met. As for schedule feasibility, if everything goes according to plan and there are no delays the company can make the four month deadline. However, if there are multiple delays it seems improbable that schedule feasibility will be met. There is a lot of risk involved in this project but the potential benefits can be high if a large number of courses that will take up a license can be guaranteed.

Overall Conclusion

After analyzing all the projects and testing their feasibility, there is one project that stands out above the rest. Project 2 stands out as the winner for multiple reasons. It contains substantially less risk than the other two projects which benefits rely solely on how many licenses can be sold. Yes project 1 and 3 have the potential to have a higher ROI than project 2 but that is assuming the number of licenses sold (around 2,300 student licenses for project 1 and 90 course licenses for project 3). However, this does not account for the payback period which for the projects. The previous numbers put project 1 and 3 between a three and four year payback period. Project 2 gets a steady 40% ROI after the project is completed in four months with the payback period being around 2-3 months. Thus with less risk and a guarantee of 40% ROI within four months, project 2 is the choice for best project for the company to undertake.

Works Cited

Projects 1 & 3

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Optimum team size for software development
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https://www.thebalance.com/what-it-costs-to-rent-a-building-space-2890493

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https://blog.capterra.com/learning-management-software-costs/

Project 2

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