Rockgym

**Sample Only**

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Final Report

Version 3.0

**1. Problem statement and approach**

In this paper will discuss the purpose of the project, the steps we took to come up with the project, the steps we took to build the model, why we chose to model our project the way we did, and what we were trying to accomplish.

The purpose of this study was to develop a model that would project a company’s profits and ability to expand to new locations based on varying revenues and costs, especially advertising. Many startup companies that try to promote their product and grow their business face a similar problem. Because one of our team members had experience and knowledge about a rock climbing business, we chose to use this company for our model. However, the costs and revenues we described and used in the model were often generic, so this model could easily be adopted by other businesses.

Another purpose of this study was to model temporal response in a real-world business situation. We felt as though temporal response was a very common and realistic aspect of the business world, thus implementing it in our project was a must. In our model, the effects of advertising (both radio and newspaper advertising) changed over time. For example, running a radio ad had a large effect on attracting new climbers the month the advertisement was placed, but the next month it resulted in fewer new people attempting to try the sport out. Even less new climbers came to the gym the following month, until the effect of the advertisement disappeared. When a business must consider the effect of advertising and also factor in their advertising schedule, the calculations can get quite complicated. The different forms of advertising in our model also differed in terms of their costs and their impacts on students and adults in order to simulate a real life example. When we designed our project, our goal was to create a complex but easy-to-use model that could take in various personal inputs and return a wide range of outputs, such as different costs and revenues. We feel that our model simplified a typically complex concept.

The first and most important step in creating our model was planning. There were a number of things about the project in general that we had to consider: what type of business and what aspect of that business we would model, and what would be the inputs, the parameters, and the outputs. These were preliminary ideas, because we didn’t know how everything would work out until we actually started to build the model. In the initial project proposal we documented our preliminary ideas, however we expected that further fine-tuning would be required.

We started by creating a simplified version of the model using our initial ideas. Because this model was designed to be incomplete, this was not a particularly difficult process. However, after plugging in some numbers, as well as getting feedback from the course instructors, we realized our model was lacking some key aspects. Specifically, there were some concerns over whether it was actually a “model” and not just a tool. In the proposal we also failed to have an input stream and we struggled with the concept of parameters and input streams. After a discussion with the professor about how we could incorporate input streams into our model and how to ensure that we are not building a tool but a model, we made some changes to the dynamics of the model. We added input streams where the user may specify in each month of the year whether he/she is planning to run a radio ad, a newspaper ad, or pursue an expansion. We also added more parameters and removed others, with the approval of the professor.

With these new ideas, we repeated the previous steps. We plugged in numbers and tried to create a simplified version of our final model. This time, the results made sense and we realized that we could move forward. Unlike in our first attempt, where the results showed unrealistically huge profits for the rock gym, this version of the model depicted the real life scenario much better. We could see that in some months the gym was not making enough profits to expand, but they were able to expand one time during the year.

Before creating the final model, we then had to think about how best to present it. This included decisions about the number of tabs, the content within the tabs, the layout of the content, and the color-coding of the data. We felt that this was especially crucial because the model must be readable and easy to use for someone not trained in spreadsheet modeling. To design the model layout, we used pencil and paper and drew sketches of how we would like the model to look. We also used some trial and error with the layout and with the color-coding. Once we were happy with the design, we began to create the model.

Creating the model was not too difficult because of the preliminary model we had already developed and all the planning that we had done. Model-building was mostly a process of extending previous ideas and adding components that were previously left out. We spent as much time developing a professional look for the model as we did plugging in numbers. As mentioned earlier, the presentation was very important to us.

Error-checking was next. We inputted different numbers into each parameter and input stream to see if any of these would break the code. We double- and triple-checked to see if there were any errors resulting from incorrect references or improper formulas. During the review process we noticed that we used direct cell references in some formulas. We rewrote them and in many of the cases we used the offset formula.

After checking to make sure the numbers were correct, we made sure the model met the project specifications. This required an extensive review of our Excel document checklist. We also checked to make sure the model made sense logically. In other words, we made sure that everything operated the way it “seemed” like it should. For example, we thought about the color scheme and whether the separation of output streams onto different tabs was logical. After reviewing these aspects, we actually made a few changes we felt were necessary.

Once the model was complete, the final steps were to put the model’s processes into words. To do this, we revisited all of our original ideas, as well as proceeding through our model step-by-step. The user guide and reference guide required careful attention. Ease-of-use for our model depends on these documents more than anything.

**2. Descriptions of scenarios**

We will discuss the two different scenarios presented by our model and the major differences between the two. One of the differences between the two models is the price of admission for both students and adults. Other differences are the timing of the radio advertising campaigns and the timing of the newspaper advertising campaigns. Finally, Rockgym’s expansion policy also differs in the two scenarios.

In the first scenario, Rockgym charges $25 for adults and $23 for students. This is on a per-visit basis. Radio and newspaper advertising campaigns are launched on an alternating basis. For example, Rockgym uses radio advertising in January, newspaper advertising in February, radio advertising in March, and so on. This continues for an entire year. Finally, Rockgym chooses to expand twice during the 12-month period. They expand 6 months into the process, and another 6 months after that (June and December).

In the second scenario, we changed the admission prices so that they are the same for both adults and students; both are charged $24 on a per-visit basis. Radio and newspaper advertising campaign choices are also different. In the second scenario, Rockgym chooses to launch separate radio campaigns for six consecutive months to start the 12-month period. After those six months, they switch to newspaper advertisements for the remaining six months. In other words, from January to June, they are running radio ads, and from July to December they are running newspaper ads. Finally, similarly to the first scenario, they choose to expand twice during the 12-month period. However, the timing is different. In the second scenario, instead of expanding once every six months, Rockgym expands to two new locations in the last month, and never in the 11 months prior to that.

To restate the purpose of our model: “The purpose of this study was to develop a model that would project a company’s profits and ability to expand to new locations based on varying revenues and costs, especially advertising.” We feel that the two scenarios help us achieve the purpose of the study. To show why, we will break down the statement of purpose piece by piece. In terms of our model projecting a company’s profits and ability to expand, the scenarios allow for changes in the expansion input stream. For example, in the first scenario, we have the company expanding in June. If Rockgym weren’t capable of expanding that early, it would be evidenced by a significant deficit in the company’s bottom line (on the “Expansions” tab). Examining the second part of the statement that our model is based on varying revenues, the two scenarios account for this variance. The key is that the differences in the admission prices have a very large impact on revenues, and therefore profits and the ability to expand. However, the difference is more complex than just adding a certain amount of revenue per every marginal dollar we add to the admission prices. Adults and students respond differently to the advertisements, so the way in which Rockgym segments the pricing strategy has a varying impact on revenues. For example, if Rockgym made the student price particularly cheap, radio advertising would be less important because it is particularly effective at bringing in students. One thing to keep in mind, though, is that we did not factor in a demand curve based on the price of admission. In the real world, the price of admission would have a significant impact on the number of admissions. However, for the sake of simplicity in this model, the only impacts on the number of admissions are the advertising campaigns. Finally, let’s look at the final section of the statement of purpose, which reads, “based on…costs, especially advertising.” Variances in costs based on Rockgym’s management decisions have an impact on their bottom line and their ability to expand. This is shown by their advertising choices. As you may recall, according to our model, radio advertising is more expensive than advertising through the newspaper. In the first scenario, the two types alternate. However, in the second scenario, Rockgym uses all radio advertising for the first six months. This, of course, leads to an increase in costs, but also builds the customer base more quickly. Based on how the user inputs advertising plans into our model, the impact on the bottom line is affected in very complex ways.

**3. Conclusions of the study**

Regarding the business conclusions we arrived at through the two scenarios, the first aspect we’d like to discuss is the impact of the two different scenarios on the costs of Rockgym. Because both scenarios involved the same number of total advertising campaigns, and the same number of each type of campaign, the total costs for the 12-month period were the same for both scenarios. However, in the second scenario there was significantly more radio advertising during the first six months. This meant that Rockgym incurred much of their costs earlier, since radio advertising was more expensive in the scenarios.

The next aspect to draw conclusions from is the differences in admissions between the two scenarios. The impact of the varying advertising campaign strategies is manifested in the AdultIncreasePercentage and StudentIncreasePercentage rows under the “Admissions” tab. In Scenario 1, for both adults and students, the percentage increases essentially alternate between high and low, although the amounts may differ slightly. The reason the numbers aren’t the same throughout is because of the convolve function and the decreasing effects over time. In Scenario 2, the increases start out very low for adults for the first six months but then get high for the last six. The opposite happens for students. This, again, is because of the heavy radio advertising during the first six months.

Scenario 1 has more adult admissions for each of the 12 months. On the other hand, in Scenario 2, there are more student admissions for each of the 12 months. In Scenario 2, because of the heavy radio advertising in the first six months, Rockgym builds a strong base of student admissions at first. Therefore, even though the percentage increases are smaller during the second half, admissions increases are still high.

The changes in admissions also lead to effects on revenues. In Scenario 1, revenues are higher for adults throughout, and in Scenario 2 they are higher for students. Overall, the total revenues are higher in Scenario 2. This is because of more total admissions, but also because the increase in one dollar in the student admission price is more beneficial than the decrease in one dollar for the adult admission price is detrimental. This is because there are more student admissions than adult ones, so equal pricing produces more revenue, as opposed to charging adults more.

Finally, we can look at the “Expansions” tab to draw some more conclusions about the two scenarios. Total expansion costs for the 12 months are the same for both scenarios. Because revenues are higher in Scenario 2, cumulative profits are higher. In Scenario 1, Rockgym experiences a deficit after June because they expanded before they had the money to do so. Even in Scenario 2, they wouldn’t have had the money to afford the expansion. In Scenario 2 Rockgym never spends more money than it has, although it does spend a significant amount of cash in the month of December because of the two expansions. In both scenarios, the earliest Rockgym could have expanded without being in the red would have been July.

Looking at the model as a whole, we can draw a few general conclusions. First of all, the pricing strategy for a business such as Rockgym that relies entirely on admissions for revenues can be very important. In our case, just changing the cost of admissions by one dollar for each type of member had large effects on revenue. Secondly, timing (in our case, for the advertising) can be crucial. In Scenario 2, by building up a large base of student admissions through the use of heavy radio advertising, Rockgym was able to increase profits. Finally, despite slight changes in advertising strategies and pricing, it took both scenarios a while to be able to build up the cash reserve to afford an expansion.

**4. Budget and schedule performance**

Budget:

|  |  |  |
| --- | --- | --- |
| Stage | Scheduled Hours Per Team | Actual Hours Per Team |
| Planning: defining model and project ideas |  10 | 10 |
| Modeling: inputting data, performing calculations |  30 | 15 |
| Writing Midpoint Status ReportWriting Final ReportWriting User GuideWriting Reference Guide |  3 12 5  5 | 2855 |
| Execution: error-checking and ensuring documents meets specifications |  30 | 10 |
| Total Hours |  95 | 55 |

We generally overestimated the time required to complete the steps of our project. In fact, only the planning, user guide, and reference guide took as much time as we thought they would, and we completed the other parts of the project earlier than projected. The parts that we overestimated most were the modeling and execution stages.

The reason our modeling took only half as long as we thought it would was because of our excellent planning. Our plans were very specific about what features the model should have, how it would look, etc. Once it came time to actually create the model, it was easy to just plug in numbers using the specifications we had already developed. We also found it helpful that both of us participated in making the model and creating the spreadsheet together. Since both team members understood the underlying concepts it was easier to divide the remaining parts of the project: the final report, user guide, and reference guide. Once our model was created, we spent more time making revisions and minor updates. We did this separately so that we could both examine it from a different angle and we communicated our suggestions through email.

Our execution stage was also overestimated in terms of hours required. This was also a ripple effect of our good planning. Because our planning was solid, our modeling stage was simple and mostly error-free. Therefore, when error-checking, we found very few errors and did not have to spend a lot of time correcting them. Most of our execution stage was spent making sure the documents met specifications, a particularly difficult task.

Schedule:

|  |  |  |
| --- | --- | --- |
| Schedule | Scheduled Date | Actual Date Completed |
| Word Document Checklist | 10/08/09 | 10/08/09 |
| Course Project Proposal | 10/08/09 | 10/08/09 |
| Start working on Model | 10/15/09 | 10/15/09 |
| Review and request computational capabilities, if needed | 10/29/09 | 10/22/09 |
| Excel Document Checklist | 10/29/09 | 10/27/09 |
| Mid-Point Status Report | 10/29/09 | 10/27/09 |
| First Scenario Discussed | 11/05/09 | 10/29/09 |
| Second Scenario Discussed | 11/12/09 | 10/29/09 |
| Initial Model Completed  | 11/26/09 | 11/18/09 |
| Testing Model | 11/30/09 | 11/21/09 |
| Reference Guide Draft | 12/03/09 | 11/23/09 |
| User Guide Draft | 12/03/09 | 11/23/09 |
| Project Report Draft | 12/07/09 | 11/22/09 |
| Reference Guide Completed | 12/12/09 | 11/30/09 |
| User Guide Completed | 12/12/09 | 11/30/09 |
| Project Model Completed | 12/12/09 | 11/28/09 |
| Final Report Completed | 12/17/09 | 11/26/09 |
| Project Completed and Submitted | 12/17/09 | 12/17/09 |

Not only did we complete tasks in less time than anticipated, we also generally finished our assignments well before we planned or when they were due. Our first few assignments, such as the Word document checklist, the project proposal, the Excel document checklist, and the mid-point status report, were generally finished at around the scheduled time. However, we got an early start on our model-building and that allowed us to complete many of the other tasks ahead of schedule. For example, we discussed our two scenarios weeks early. As a result, we completed our initial model draft eight days before we had planned. This allowed us more time to test our model, make revisions, and finalize it early. Also, since we had to wait to complete the model before we could work on our reference guide, user guide, and final report, we finished those ahead of schedule as well.

We certainly heeded the professor’s warnings about not getting behind schedule on the project. We were actually well ahead of schedule almost the entire time!

**5. Lessons learned**

We have learned five lessons while completing this project and we hope to be able to relay this to future projects we will work on.

We feel that we should have developed a more complex problem initially. Our original proposal was too basic and ended up making our project more of a tool than a model. The explanation for this was the fact that it was stressed in class that we should try to avoid real work projects because that would result in a more complicated model; one that might be too hard to carry out in such a short time. We, however, simplified our model too much. We didn’t understand the complexity required to make a powerful model that can take in a number of inputs and parameters and produce relevant outputs. We simply designed an idea that would calculate a few figures without allowing for the input of different streams. Because our initial proposal was lacking, we essentially had to go back to the beginning and revisit the entire idea before proceeding with any further work. Even though we ended up completing the project well ahead of schedule, the major overhaul and redesign was an unnecessary step that could have been avoided.

Another lesson we learned was that, especially for the first few steps, our error-checking was not thorough enough. We lost points on several assignments for silly mistakes that could have been avoided, such as hyperlinks present in the document, incorrect fonts, extra spaces between paragraphs, and wrong alignments. A good method would have been to write each file completely the first time, then have the writer go back and double-check for errors while closely following the word document checklist to make sure all requirements were met. This should have been followed by the other team member checking for errors again. Finally, the original writer should have checked for errors a third time. Although this would have been a laborious task, it would have prevented us from making mistakes and losing points. It is, however, hard for some people to be so specific.

We should have developed a more accurate schedule and a more accurate budget for our project although this ended up not being a terrible thing. Both of these aspects tended to grossly overestimate the amount of time required for certain aspects of the project. Specifically, we overestimated how long it would take to start to produce the model. Once we easily finished ahead of schedule, there was a ripple effect that made the rest of our assignments also be completed early. Again, finishing ahead of schedule isn’t a bad thing. However, the schedule became useless once the dates were all wrong and could not be used as a reference to keep us on track.

We should have come up with a more efficient way of managing the workload and determining who was responsible for what. In some cases, we had a duplication of effort that wasn’t really required. Although we did describe who would be responsible for what in our midpoint status report, we were not specific enough. This led to some complications later on. For example, we did not specify who would be responsible for designing the two scenarios. The end result was that we both came up with multiple scenarios and we had to dispose of some.

Finally, we learned a lot of little things involving working with Excel more efficiently. As we were creating the model, we used some techniques that were more labor-intensive than they had to be. Although everything in the model is automated, the way in which we inputted values and rows into the tabs was often done more by hand than was necessary. However, we did not make any egregious errors, and given the fact that we’re still in the process of learning how to be effective spreadsheet modeling managers, we did pretty well.

Overall, we did some things very well and some things not so well. The project flowed smoothly because of our willingness to do the work ahead of schedule and do everything correctly. However, that doesn’t mean that everything went off without a hitch. If we had to do this project again, we feel that we’ve learned enough from our mistakes to do it flawlessly.