PharMed

**Sample Only**

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Final Report

Revision 2.0

**1. Problem statement and approach**

PharMed set out to create a business model for a start-up pharmaceutical market-research firm. Our task in this modeling project was to explore the viability of starting such a medical research company, and model its revenue and profit behavior over the next twelve years. As stated in our proposal, pharmaceutical companies routinely employ outside agencies to develop detailed reports on competitors’ efforts to develop, patent, and market drugs in various therapeutic areas of health concern—such as cardiovascular problems, oncology, and haematology—and predict how such activities will impact their own share of the global pharmaceutical market. Industry decision makers rely on such information in posturing and pricing their own products. As a result, a medical research industry devoted to this type of market research has emerged that relies on a combination of publically available records, such as those found at the US Patented and Trademark Office (USPTO) and at the Securities and Exchange Commission (SEC), as well as proprietary market research conducted by staff medical professionals and analysts in the form of targeted market studies. When primary research is required, market research firms will form targeted focus groups composed of medical professionals in order to elicit the necessary information, for which service the members of the research panel will receive an honorarium. The data from the focus groups and other research will be performed by combination of staff analysts and epidemiologists and overseen by a product manager. Finally, the answers to the questions will be delivered to the pharmaceutical company in the form of a report. The medical market research company is paid based on the number of reports successfully delivered.

The number of reports requested of the medical market research industry by the pharmaceutical companies is directly correlated with the pharmaceutical market size. Historic information on the international market size for various therapeutic areas of health concern—such as cardiovascular problems, oncology, and haematology—are publically available, and some predictive models of future market size by therapeutic area are routinely established or forecast by government health agencies and other entities based on growth in disease prevalence, current and expected disease incidence, licensing, FDA approvals , dietary factors, actuarial tables, and other factors.

PharMed’s model successfully predicts the revenue, profit, and hiring requirements for such a start-up medical market-research company. We accomplished this by creating a proprietary methodology that utilizes therapeutic area market size forecast data as an input stream. We then applied an industry defined average percentage to that dollar figure to determine how much of that market is spent on research and development. We named this percentage Global Market RD Budget in our model. From there, we applied an estimated percentage named RD External Report Budget to determine what percentage of the global pharmaceutical market is spent on reports. We then applied our estimate of PharMed’s market penetration of those dollars to determine the number of reports that we will sell across our client portfolio (see appendix 1). In Essence, we have two markets present in our model: the global pharmaceutical market, broken out by therapeutic area and the global market for market research reports also broken out by therapeutic area. Notwithstanding the existence of estimates for future market size, the model user is free to supply his own expected pharmaceutical market size by therapeutic area over the course of the next twelve years as a basis for evaluating the expected revenue of the medical market research company (see Description of scenarios). The user may also supply estimates for how effective the sales staff at PharMed will be in capturing market share in the medical market research industry.

**2. Descriptions of scenarios**

As noted in the Problem statement and approach section of this final report, our task was to model a start up medical market research company and effectively predict its revenue, profit, and hiring stream. In this section, you will find a granular description of two of the scenarios that PharMed created and tested. We have provided a list of general assumptions that apply to both scenarios as well as scenario specific assumptions for each of the aforementioned scenarios:

*General scenario assumptions:*

* We assumed that you can model pharmaceutical companies external report budget
* Inflation rate is constant over twelve year span
* Income tax rate is constant over twelve year span
* Main expenses for the business: salaries are at a constant acceleration rate
* Commission rate thresholds are constant for all twelve years
* We assumed that the market drives the number of reports that PharMed will generate
* We assume that once an employee is hired by PharMed, they remain employed by the company- no attrition built into the model

*Scenario 1*- In scenario 1, the global economy is in recession. Not withstanding the recession, all fourteen therapeutic area markets are performing as expected and markets are growing at forecasted industry rates. We have made the following assumptions in this scenario:

* The global market size by therapeutic area will expand and shrink over the next twelve years the same way that it did over the previous twelve years
* We assumed that PharMed’s market penetration will grow at a constant one percent rate for the first four years and then grow at a constant two percent rate for the next five years after which it remains flat until year twelve.
* We assumed that we can hire analysts and sales people in the current recession at lower rates than in scenario 2.
* We assumed that PharMed can be aggressive in hiring so that it can support development of reports for therapeutic areas with a global market size of fifty billion dollars or more.
* We assumed that we can charge fifty thousand dollars per report in year one.

*Scenario 2*- In this scenario, we assumed that the global therapeutic area market sizes were greatly impacted by the recession such that most markets remained flat over our twelve year forecast period. That being said, we wanted to model what would happen when a major drug in a specific therapeutic area lost patent protection. This phenomenon is known in the pharmaceutical industry as generic erosion. Our research showed that generic erosion had a significant negative impact on the size of the respective market and we have used our model to show the financial impact of such an event on PharMed’s revenue and profit behavior over our forecast period. For this exercise, we chose the cardiovascular therapeutic area as our generic erosion stream.

* We assumed that the cardiovascular therapeutic area behaved normally until year three which is when a major drug lost patent protection.
* We assumed that the global markets for all other therapeutic areas remain flat over the twelve year period
* We assumed that PharMed market penetration into the reports market grows at a modest .3% per year
* We assumed that being a newer business, we have to pay analysts and sales people more than we would in scenario one to get them to work for us.
* We assume that PharMed must be conservative in the number of reports that it offers and looks to sell to Pharmaceutical companies in therapeutic areas whose global market size is at least 80 billion dollars
* We assumed that we would have to pay more for employees given the start-up nature of the company
* Finally, being a new company, we assumed that we would able to charge, 30K per report which is less than current market averages in the medical market research report market

There were several key differences between scenarios 1 and 2. In scenario 1, the global pharmaceutical market seizes grew and shrank as would be normally expected of these markets based on patents, launches of new drugs etc. In scenario 2, we changed this input stream to be flat across all therapeutic areas except cardiovascular which we allowed to act normally until year three at which point we forced a patent expiry of one of the major cardiovascular drugs. As a result of this, we saw the dollar size of the market research reports market shrink drastically in year 3 and then remain constant for the remainder of our forecast period. As the pharmaceutical therapeutic area market sizes are impacted by both economic and industry factors like patent protection loss, the ripple effect becomes really impactful.

By modeling these types of scenarios, PharMed will successfully be able to predict revenues and profit behavior of the company in spite of industry hurdles. When said hurdles are not accounted for we have shown that they have a gross negative impact market size estimates both of the pharmaceutical global market size, the size of the market research reports market and ultimately on company revenues and profits.

3. **Conclusions of the study**

*Result of the two scenarios.* This was a great project for PharMed to be able to model. In our research, we found that companies struggle with these exact subjects which made the research and modeling much more interesting and impactful for PharMed. We concluded that even with modest market penetration assumptions on PharMed’s part and a conservative market outlook, the business is a viable opportunity as demonstrated by its year 12 ten percent profit margin in Scenario 2. By working through several test scenarios, PharMed was able to gain a broad understanding of the key drivers of profit maximization for the company. We also determined that the complexity of launching a company like this was far greater than we had ever imagined. There were many moving parts that we just simply had to omit from our model to simplify it for the scope of our project. That being said, we were encouraged to see that we have the capability to model very complex scenarios in an efficient and predictable way that we can use to orient our company strategy. We felt that that was one of our key take aways from the project.

In Scenario 1 the company had an explosive start with more than 4.7 million dollars in sales in year one. These sales were divided between the cardiovascular and central nervous system therapeutic areas. Once some of the other therapeutic area market sizes reached our minimum market size threshold, the sales and revenue began to spike. By year three, we were actively commercializing and selling products for cardiovascular, central nervous system, oncology, immunology, and ant-infectives. The growth in revenue rose from 4.7 million to 23.2 million. This represents a significant growth based on these markets meeting our minimum threshold. By year twelve, PharMed revenues were at 177.8 million dollars which was a tremendous growth for such a short period of time. This was accomplished with a modest 1 percent per year growth in penetration of the market for market research reports.

We also noted that during this growth phase, the company enjoyed healthy profit margins between 20 and 27 percent. To accomplish this type of rapid growth, our staff grew from a start-up team of 13 individuals to a fully functioning organization of 341 employees in year 12 of our forecast period. Much of this was weighted toward our sales staff with 72 full time sales people in year 12. This was a very impactful metric for us. Considering that our assumption was that the business is launching in a recession, we felt very optimistic about the overall revenue and profitability of PharMed in Scenario 1. We also noted that even with the fluctuations in our hiring stream, based on our replenish rates for capital equipment (computers), we spent a grand total of 317 million dollars buying and replacing computers. We were able to clearly see some things in the model that we would manage more effectively.

In Scenario 2 we assumed that the global pharmaceutical market sizes were greatly impacted by the recession such that all therapeutic areas remained flat over our forecast period with the exception of cardiovascular. We assumed that cardiovascular would experience growth in years 1 and 2 but then have a major drug go off patent in year 3. This generated a 25 percent decrease in the overall market size of the market. After year 4, cardiovascular remained flat for the remainder of our forecast period. At this same time, we projected a modest .3 percent per year growth in PharMed’s penetration of the market for market research reports. Even with the 25 percent decrease in the cardiovascular market size, we were able to grow a modest three hundred thousand dollars between years three and four. This was the period when the key cardiovascular drug lost patent protection and generics entered the market. We had negative net income for years 1 through three and then in year four, we finally made money. After year 4 our revenues continued to increase over the forecast period based on our acceleration of PharMed’s penetration rate which in year 12 was a conservative 3.6 percent of the total market for market research reports.

With the projected slow in the market, our final head count was only 22 people compared to Scenario 1 with 377 employees. Our year 12 revenue reached a lofty 7.3 million dollars compared with Scenario 1’s 177.8 million dollars. Even with this disparity in revenue between Scenario 1 and Scenario 2, because our model is driven by the global pharmaceutical market sizes for each therapeutic area, when those markets were impacted, our hiring stream and expenses adjusted accordingly based on the ripple principle. Building the forecast model this way allowed PharMed to achieve a 10 percent profit margin in year 12. We felt like this confirmed the viability of the opportunity for PharMed.

*Recommendations.* Based on our observations of the various scenarios that we tested, we recommend that PharMed move ahead with the launch of the business. Even in the event that global pharmaceutical market sizes remain flat, the company would still be profitable. In real life, global pharmaceutical markets fluctuate up and down but they almost never remain flat or go away. As long as diseases exist in the outlined therapeutic areas of interest, these markets will continue to grow over time with new drugs entering the market as others come off patent which means that there will be opportunity for PharMed to capture a share of their reports spend.

We also recommend that PharMed manage their costs closely. If they can increase the numbers of reports that each employee can handle producing and increase the sales quota per employee gradually over time, already robust margins could grow drastically. Admittedly, we did not account for every possible expense that could occur but given the scope of this particular assignment, we feel very confident launching the business.

**4. Budget and schedule performance**

The data in table 1 represents the final proposal revision (Revision 2.0) with budget allotments and due dates. We updated this based on necessary revisions to our project.

Table 1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Activity | Proposed Due Date | Actual Completion Date | Budgeted Time Required (in hours) | Actual Time Required (in hours) |
| *Planning* |  |  |  |  |
| Define the Problem | 12/1/2010 | 12/1/2010 | 10 | 13 |
| *Modeling* |  |  |  |  |
| Launch Development of model | 12/8/2010 | 12/8/2010 | See Modeling Total | See Modeling Total |
| *Execution* |  |  |  |  |
| Scenario Development | 12/12/2010 | 12/12/2010 | See Modeling Total | See Modeling Total |
| Scenario 1 Test and Analysis | 12/12/2010 | 12/12/2010 | See Modeling Total | See Modeling Total |
| Scenario 2 Test and Analysis | 12/12/2010 | 12/12/2010 | See Modeling Total | See Modeling Total |
| Functional Model | 12/13/2010 | 12/13/2010 | See Modeling Total | See Modeling Total |
| Final Analysis and Test of Scenario | 12/13/2010 | 12/13/2010 | See Modeling Total | See Modeling Total |
| Modeling Total |  |  | 36 | 40 |
| *Documents* |  |  |  |  |
| Midpoint Status Report | 12/15/2010 | 12/15/2010 | 5 | 8 |
| Final Report | 12/15/2010 | 12/15/2010 | 8 | 10 |
| User guide | 12/15/2010 | 12/15/2010 | 5 | 5.5 |
| Reference Guide | 12/15/2010 | 12/15/2010 | 4 | 4.5 |
| Documents Total |  |  | 22 | 28 |
| *Final Submission* | 12/16/2010 | 12/16/2010 |  |  |
| Total Hours Invested |  |  | 77 | 109 |

To say that this project took a herculean effort to finish on time would be a drastic understatement. We initially thought that the planning/proposal process would flow much smoother than it actually did. We kept finding ourselves wanting to gravitate to creating a tool which was not the assignment. We ultimately exceeded our planning budget by three hours and even that was a stretch. The largest reason for that was the fact that our initial proposal was not approved which caused us to have to re-visit our model and re-work our initial conjecture. We were finally able to successfully develop a viable model but we were not able to submit a proposal in time to receive project approval.

Once we got past the skeleton of our model and into some of the more complex modeling, we encountered many obstacles that we didn’t expect. We found that our first four revisions of the model were far too complex and really not user friendly. This was also a problem because we had to keep revising and simplifying over and over again. This ate up many of our budget hours as well. We had added a Balance Sheet, Statement of Retained Earnings, and a Cash Flows Statement only to decide later that we really didn’t need to incorporate them in our model as they did not impact the primary function of the model. Each of these sheets required extensive modeling. This drove up our modeling budget as well.

Our documents allotment was grossly underestimated as well. We really thought that the documents would take us the least amount of time. While they did take us less time than the modeling itself, with all of the requirements from our documents checklist, we found that after all appropriate revisions were complete, we had far exceeded the budget.

**5. Lessons learned**

*Invest the time in the planning stage.* Our team was so excited to begin to apply some of the modeling techniques that we garnered from class that we really rushed the project into production. Our haste to begin the fun stuff backfired when our proposal was not approved. We had to go back to the drawing board and re-think the initial problem. There were several problems with our initial model but the biggest problem we had was the fact that it was more of a tool than a model. We ultimately had to abandon that idea and move toward a more traditional model. The key take away there is: spend the time in the planning stage. If we had to go back and build the model again, we would have spent much more time in the planning stage, mapping out all of the possible obstacles that we would have to overcome and creating a strategy to overcome those in the process. As we stated in the Budget and schedule performance section of this final report, we encountered many challenges both with modeling as well as with business complexities. If we had allotted appropriately for more time, we would have been able to really iron out any wrinkles in the project prior to launch.

*Keep the model as simple as possible.* We built our model based on a start-up business for the medical market research industry. This is an industry that is very complex with many moving parts. It was very easy for PharMed too get wrapped up in the complexities and burn through budget hours. Before our final revision, we had exceeded our sheet allotment by three sheets. We had to simplify. What we discovered when we did this was that the model was actually more effective at what we initially created it for. It was a pleasant surprise. The moral of the story: keep the model simple.

*Build in time for the unexpected.* It is absolutely essential that you build in enough time for the unexpected to happen. We had the misfortune of saving the most up to date revision of our model on one of our team member’s desktops. That evening on his way home, he swung by church for choir practice. His laptop bag was on the stage close to where some children were eating and somehow, his laptop ended up swimming in a two liter bottle of Coke. We had to re-do all of the modeling that we had done that week. Two lessons to be learned form this experience: make sure that you save the model to a shared file like googledocs and make sure to allow yourself enough time to compensate for unexpected circumstances that may happen like this one. We never would have imagined that this could have happened but it did. Fortunately, we had saved an earlier revision on another team members desktop from which to begin rebuilding.

*Work with the model as much as possible before deciding on your scenarios.* We found that it would have been easy to just select two scenarios and use those for our submission but by running through dozens of them we were able to find errors in modeling that we corrected. It also helped us to think through the complexity of the model in terms of real life implementation. This was particularly insightful as each team member made a suggestion of a potential problem that they had encountered or observed in their own professional careers. We then used the model to test how PharMed would do given the changes. This was a really fun exercise.

*Use a central document location like googledocs.* We finally determined that we had to do this because our team is in the world and didn’t have regular class meetings on campus. Because of this, we initially were doing double duty until we centralized the saved versions of both the model and documents. Once we accomplished this, it was smooth sailing for us.

*Make sure to save and use your corrected homework assignments.* We found that the library of homework assignments that we did were extremely helpful for us in designing and building our model. We found ourselves going back to them as a reference several times throughout the project to think through different ways of solving problems that we encountered.

*Use more graphs while building the model*. We found that the use of charts and graphs driven by the data from the model allowed us to really hone in on key points of interest in different scenarios that we evaluated with the model. At one point we had graphed the capital equipment purchases, the hiring streams, the sales, the market growth, and the generecization of the cardiovascular market just to kicks. One thing that we would have liked to model and chart given more time would be the launch of some drugs in certain therapeutic areas and how those look compared to the drugs going off patent in the same therapeutic areas. That would be a really great contrast exercise. Moral of the story, use more charts and graphs during the build.

*Share your model with others*. One thing that PharMed did not do was share the model that we built with other folks. We really wish that we would have done that form the standpoint of collaboration and idea generation. Because our team is in “the world” and not in the actual classroom each week, we really missed out on the opportunity to collaborate with other classmates about potential ideas for our model. Somehow, showing the model to a spouse who isn’t familiar with excel just isn’t a good substitute. A possible solution to this would be sharing your model with colleagues at work but, if you are like PharMed, you may want to actually launch the idea.

*Don’t get overwhelmed*. We found this to be a key point of the project. When Rick Brenner made assignment in class, we really felt overwhelmed by everything that was included in doing this project. The requirements can be really intimidating but if you work off of the schedule and budget that you set and really stick to it, things flow smoothly. In our case, we had some hiccups which caused us to deviate from our schedule and added some unnecessary stress.

**Appendix 1- Market development methodology**

In our Problem statement and approach section of this document, we outlined a methodology for defining the market for pharmaceutical market research reports. We have placed that in tabular form in this appendix to create a greater degree of transparency.

Step1

|  |
| --- |
| Global market size by therapy area |
| X % of Global pharmaceutical market size by therapy area spent on R&D |
| = Global Market RD Budget |

Step 2

|  |
| --- |
| Global Market RD Budget |
| X % percent of RD budget spent on external reports |
| = RD External Report Market |

Step 3

|  |
| --- |
| RD External Report Budget |
| X % of PharMed market penetration |
| = Sales |