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**Project Name**: EZScoot

1. ***Problem statement and approach***

The purpose of the model was to study the economic feasibility of an innovative travel option called EZScoot. As mentioned in the project proposal, the fundamental premise of the EZScoot concept is - people needing to get around the city rent scooters at a low price for a short period of time. The initial users of the model would be the company founders to study the feasibility of the concept. After EZScoot commence its operations in one city, the model will be used to help raise venture capital to expand to more cities.

Assessing the demand is one of the critical factors of such a venture. In the real world, the demand, i.e, the volume and pattern of scooter rentals would be dependent on several factors such as demographics, traffic congestion, availability of convenient public transportation, parking etc.

The model did not focus on the methodology and factors used to make an accurate projection of scooter rental volume. Instead, this was one of the inputs expected by the model.

The model focuses on the various aspects of meeting this projected demand and measures their cost effectiveness, thus enabling an assessment of the viability of the venture. The factors being modeled include the initial amount of investment, periodic investments, operating costs, profit margins, cash flow, rental pricing required for the business to break even etc.

The model utilizes the measure of the effect of the customer satisfaction via “walk away” percentages and will guide the business financial requirements based on it. Every time a “walk away” event occurs (A “walk away” is when a customer wanting to hire a scooter leaves without one due to lack of availability) the customer satisfaction measure drops. The model focuses on the relationship between the customer satisfaction, volume of scooter rentals & operating costs. These have an effect on the profitability of the business and help answer the feasibility question.

**Design Approach**

The team decided to establish the ground rule from the onset of the project in order to insure a successful completion while taking into the consideration everyone’s busy life schedules of fulltime work, school and family. There was a consensus that for initial meeting we need to meet in person to get to know each other and establish the team dynamics. We quickly established the initial framework in terms of project deliverables and assigned tasks. During the project, some of the tasks were reassigned, changed or eliminated due to the changes in the model design. Most of the following meetings took place on the conference calls and email.

The team diligently worked to insure the model does not become a tool by creating introducing dynamic relationship where each quarter has an impact on the following one. We also run into an ongoing problem due to the lack of sufficient cash for the company operations. The problem was cleverly resolved by decided to sell the underutilized scooters to increase the cash flow and save on their maintenance and insurance expanse during the slow business periods.

A number of times we made a decision to meet in person mid week to tackle a problem that we could no effectively resolve remotely. For example, the initial assumption about the depreciation issue was that we will use the Convolve function. After the further review, we realized that based on the scooter pricing model that varied based on the number of scooters purchased and a financial decision to sell underutilized scooters. The method used to calculate the depreciation is described in more details in the “How the calculations work” section of the model documentation.

The checklist introduced in the early phase of the project was instrumental to keep us on track and, most of the time, to allow us to make changes to the model prior to heavily investing into an incorrect design.

The initial users of the model will be team EZScoot. Once the EZScoot has been tried and tested in at least one city, the model will be made available to venture capitalists for financing the rollout and expansion to other cities.

1. **Descriptions of scenarios**

We created two scenarios to reflect the financial outcome of the various business decisions the company management may decide to pursue. The scenarios differ by the level of the financial requirements and the quality of services offered by the EZScoot.

The salient features of the 2 scenarios are the initial investment amount, interest rates over the three years of the business operations, acceptable level of customer satisfaction, number of scooters to increase by if the demand is not being met at a kiosk, and the level of increase to be made to projected rentals if target customer satisfaction goal is exceeded. The user of this model can control the changes in investments, costs and projections by changing the aforementioned input parameters.

Varying the level of the initial investment between $10,000 and $100,000, we expected to learn about the venture capital requirements of the business. Based on this requirement, we would like to make a decision if EZScoot requires financing its growth mainly through cash flow or raising venture capital.

We would also like to learn the impact of the interest rates on our financial performance. We recognize that the interest rates vary with the economic fluctuation, typically rising during the economic downturn. By varying the cost of borrowing money, we may be able to estimate the impact of the economy on the success of EZScoot. The model also attempts to link the impact of the economic turns on the business performance.

One of our hypotheses is that the rate of the customer satisfaction has a significant impact on how the innovative travel option of electrical scooters will be accepted by the company future patrons. Our model simplifies the measure of the customer satisfaction by directly linking it to the scooter percent utilization. One of the scenarios has a stronger requirement for customer satisfaction which is reflected in the higher requirement for scooter’s Percent Utilization compared to the other scenario. The assumption is that if the utilization rate is 100%, then all customers are completely satisfied with our level of service; if the utilization rate is 80%, then 20% of the customers are not happy with our service. The model will test a wide range of the utilization spectrum.

In addition, this model allows the management to control the changes in investments, costs and projections by changing Scooter Increment and Rental Increase input parameters defined earlier in this document. The initial assumption is that by aggressively going after a higher level of scooter percent utilization, we will be able to faster penetrate the market and therefore insure a rapid company growth. The model is basing it percent utilization prediction for the next quarter on the current quarter performance and assumption that additional scooters are readily available for an immediate delivery at a moment notice. The model will also help us determine the level of increment in the number of scooter required per increase.

1. **Conclusions of the study**

**Initial Investment**

The first scenario is built based on a better funded business model. Initial investment of $100,000 in the first scenario helps to insure the availability of capital when the company needs to make additional investments into scooters, kiosks and personal. The initial investment of $10,000 available in the second scenario forces company to limit its ability to effectively manage customer satisfaction and sets it at an unsustainably low level. Inability to finance purchase of additional scooters to satisfy customer demand prevents EZScoot from collecting the entire potentially available revenue stream. In addition, it requires EZScoot to borrow large amount of money from the bank and, therefore, spend a significant portion of the total revenue on interest financing. The constant need to borrow money from the bank may hinder management will to spend money and keeps the company financial performance below expectations.

The first scenario has a feasible and sustainable break-even point in the first quarter of the second year of the business operations. The second scenario shows a faint promise of improved business performance during the third quarter of the first year of operations. However, during the second and the third years of operations, the financial deficit is increasing and the company finds itself deeper in debt.

The evaluation of the required level of capital in the initial stages of the company existence showed that we have to finance growth mainly though raising venture capital as it will allow a faster market penetration and rapid company growth.

The low level of capital available initially and the corresponding drop in the customer satisfaction may negatively affect projected rental volumes. At the same time, it may require additional investments (or a restructuring of existing investments) to boost availability. The negative publicity due to a drop in customer satisfaction may lead to additional operating costs such as advertising, promotions etc. Similarly, a rise in customer satisfaction will have different effects on volume projections and operating costs.

**Interest Rate**

Over the course of the three years of the business operations that this model encapsulates, the average interest rate in the first scenario is 5.78% compare to the 4.83% in the Second one. Even though the average interest rate is lower in the Second scenario, it does not have a significant impact on the long term financial performance of the business largely due to a high level of borrowing. As discussed above, without the initial venture capital infusion into the company’s coffers, the management has to make a decision to aggressive borrow money from the back, and therefore, further increase the cost of borrowing. Increase debt load is difficult to manage and there is also no guarantee that bank will continue to indefinitely finance company operations. Although this model does not restrain the level of borrowing, the company founders should seriously consider its impact.

In addition to the aforementioned concerns regarding the high level of borrowing, the interest rates fluctuation provides an indication of the impact of the economy on our business model. This is due to the bank interest rates being, in general, lower in the good economic climate. Based on the aforementioned assumptions that economy and interest rates coincide, we can conclude that the interest rate does not have a significant impact on our company financials, also indicating that economic fluctuation may not be a significant factor on the company performance.

**Customer Satisfaction (Acceptable CSAT)**

EZScoot senior management team is fiduciary responsible to insure a long-term survival of the company and a reasonable return on investment for the shareholders. Therefore, the management decision on the best methodology to utilize company’s limited resources has to reflect the overall financial burden. In the Second scenario, due to the lower initial investment and a high cost of borrowing, the acceptable level of customer satisfaction has to be lowered to insure company stays afloat without accumulating a high debt load. The targeted customer satisfaction is 95% and 20% in the first and second scenarios respectively.

The model predictably demonstrates a lower level of expenditure with target customer satisfaction set at 20% compared to that set at 95%. To achieve a higher CSAT target, the business has to invest heavily to minimize the number of dissatisfied customers. Since, this is dependent on the number of walk-aways, investments have to be made to ensure that enough scooters are available at every kiosk, erring on the side of having excess scooters than fewer. This increases the amount of capital investment in the business, requiring a larger initial investment, larger loans or both. If larger loans are taken, the interest expense increases. Also, each scooter poses a certain amount of cost to the business – having more scooters will increase this cost.

Having a high amount of availability, however, will maximize the number of rentals, leading to larger amount of revenue. This larger amount of revenue will gradually counteract the costs and net positive equity will build over time.

The model can be used to show that there are three ranges of investments and management of customer satisfaction.

Having a low amount of investment will restrict the revenue and will put the business into a negative spiral. Thought the lower amount of investment will reduce the variable costs (i.e., associated with the number of assets) it has little or no affect on the fixed costs.

Having a moderate or just right amount of investment will nicely balance out the increase in expenses with increase in revenues and put the business on a good positive growth pattern.

Having it higher than this amount will increases the expenses without increases in the revenues and start tending the business towards the negative.

In the second scenario, What is not visible without the model is the impact on the overall financial performance of the EZScoot. The Second scenario simply cannot afford a higher level of customer satisfaction, for example, 95% rate used in the first scenario would double to debt load of the Second model over the three years of operations. The low level of capital available for business growth, and therefore, the lower utilization rate, hinders our ability to collect all available potential revenue streams, in addition to potentially introducing a long-term negative public reaction due to unpredictability in scooter availability for rent. Limited finances and negative public perception, as our model indicates, results in the demise of the EZScoot operations in the early stages.

**Rental Increase**

By changing the “RentalsIncrease” and “RentalDecrease” parameters we can control the volume projections for the next quarter. Increases are made to projected rentals if target customer satisfaction goal is exceeded. The opposite applies during period of time the customer satisfaction is on a decrease.

The first model requires company to make bolder moves to insure customers do not have to wait for scooters and do not walk away without renting one as reflected in a higher Rental Increase percentage then the Second scenario. The rates are 20% and 5% respectively.

These parameters introduce added risk to the business model. The over forecast of future rentals requires company to make unnecessary additional investment in scooters; an under forecasting, denies company of a vital sources of revenue and creates an additional level of customer dissatisfaction, which in turn, requires supplementary advertizing spending. The larger Rental Increase in the first scenario compared to the Second scenario, even though risky, creates a tremendous return on investment.

**Scooter Increment**

By changing the “ScooterIncrement” and “ScooterDecrement” parameters we can control the number of scooters bought, sold and maintained in the next quarter. Increases are made to the projected scooter increment if the demand is not being met at a kiosk. The opposite applies during period of times when the scooter demand is decreasing. Similarly to the Rental Increase increments, the Scooter Increment caries an inherent risk to overspend the limited available capital by purchasing too many scooters or not having enough and lose the potential revenue stream. The Second scenario minimizes the risk by keeping the increment level at 1 scooter, whereas, the first scenario accepts a higher level of risk by setting the increment level at 7 scooters and in the long term, maximizes the profit and overall business sustainability.

**Conclusion**

Our financial model is based on a number of simplified estimates and assumptions. Based on the results of the model, the management will need to plan on initial investment to make the financials work.

The model indicates that a larger upfront investment can insure the stability and a solid financial performance of the EZScoot. It will also reduce advertizing expenses in the long run due the higher level of customer satisfaction and therefore, a positive word of mouth based advertizing reducing the requirement for an expensive marketing campaign. The lower interest rates in the Second scenario could not help the business model to overcome a significantly higher debt load then the one presented in the First scenario. The lower level of the customer satisfaction introduces additional challenges in the Second scenario and is further impacted by the low level of scooter increment and rental increase ratios. Furthermore, First scenario partially owes its success to the tenfold level of initial financing over the Second model and as a result ability to hold itself to a higher requirement for customer satisfaction, i.e. percent utilization. Higher level of finding allows the management of in the First scenario to insure customers do not have to wait for scooters and do not walk away without renting one insuring collection of all available revenue. The initial capital investment also reflects in a higher Rental Increase percentage the company can afford in the First scenario in comparison to the Second scenario.

1. **Budget and schedule performance**

The team initial estimate was not as accurate as we had hoped. It was partly due to underestimation of the effort to build some of the functionalities and partially due to a decision to change a number of salient inputs to insure the model is effective and answers the questions it is build to solve.

The continuous reevaluation of the model made it stronger and helped the project team to better understand the problem we were working to resolve.

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| **Activity** | **Due Date (Budgeted)** | **Due Date (Actual)** | **Time required ( in Hours) (Budgeted)** | **Time required ( in Hours) (Actual)** |
| Planning | 10/23/2008 | 10/23/2008 | 2 | 6 |
| Requirements analysis | 11/02/2008 | 12/02/2008 | 4 | 6 |
| Modeling | 12/18/2008 | 01/08/2008 | 20 | 38 |
| Execution, Testing & Quality Assurance | 01/08/2009 | 01/08/2009 | 4 | 20 |
| Documentation | 01/11/2009 | 01/13/2009 | 10 | 18 |
| **Total** |  |  | **40** | **88** |

1. **Lessons learned**

**Choice of Problem**

The problem we have chosen to model proved to be a successful concept. It had a large variety of possible inputs and even more potential outputs. From the early stage of the project the team realized that we must control to scope of the model to insure a successful completion. We focused our initial discussion on the desired model outputs in order to design the relevant inputs. From the commencement of the project discussion, the team knew that EZScoot concept will allow us to practice all of the tools covered in the class. With a focus on tool’s usage instead of project definition, we had a successful concept to model.

**Design and Organization**

The project topic selection was done well. However, during the numerous team discussions, even throughout the last few weeks of the design stage, we were realizing that we forgot to take into the consideration some of the key variables and parameters, and as a result may not be able to use a more complex functionality introduced in class such as Convolve. For example, during the planning phase, the team thought that we will be able to use Convolve function to calculate the scooter’s depreciation rate. During the last weeks of the modeling period, we realized that due to the structure of the model that includes variable cost of the scooter based on the number purchased and the assumption that the unused scooters will be sold during the business slowdown prior to the end of the useful life, we cannot use this functionality. If we were to start the model building now, we would select different assumptions regarding some of the inputs to insure complex functions and techniques are utilized within the model.

Furthermore, a few functionalities were eliminated from the project to accommodate assumptions made by other team members. If we were to work on this project again a more effective process control would reduce the time spend on designing unnecessary model capabilities.

**Budget and Schedule Performance**

Every team member has full time demanding job in addition to enrollment into the multiple classes. The heavy school load in conjunction with this challenging project created some delays. The team was able to handle it well thanks to a good communication mechanism established early in the project during the planning phase such as creating a Google group to keep connected and have an integrated information location and regularly scheduled conference calls to discuss the progress and ask questions. It would be beneficial for the team to review in a greater details the future subjects to be covered in class to enable the team to use more advanced Excel capabilities such as Macros.

Creation of the Check list was tremendously beneficial to keep the project on track and catch a few requirements that “got away” during the model creation. The requirements to have 10 or fewer worksheets within the Excel file and the need for the project name to appear in cell A1 of every Excel worksheet may not have been implemented without a comprehensive checklist. A checklist created during the planning period and its continuous review would prevent time spend on worksheet consolidation. An exchange of the project with another team may have helped to catch additional missed opportunities to meet the project requirements.

In addition to the specific lessons learned mentioned above, there were many other, though more general but nonetheless important. Our model is very complex. In the real work environment one can never predict all possible variations and changes within and outside of the organization. The team spent a lot of time discussing an arrangement to insure the significant variables are covered and other variable will not have a detrimental impact on the model’s results. A simpler model may have provided the management team with a similar conclusion.

Furthermore, this modeling project took more time then anticipated. This may have been attributed to the novelty of the team members working with each other and the time needed to learn each other styles. The positive aspect of the team discussions was the fact that the meeting notes were complied and email to all member of the team after the meeting was over to insure that everyone of the team can understand his responsibility and understand how all parts of the model interconnect.