RpIND INC.

The Signs of Science to come….

----Business Plan for a Rapid Prototyping Service Bureau in India

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Executive summary :

Mission :

When the United States Department of Commerce says, India is currently one of the only three growth engines in the world, it is time to sit up and take notice.

RpIND Inc., will be a Rapid Prototyping Service Bureau in India, set up in Noida, the industrial belt around the capital city of Delhi. We will be the pioneer prototyping bureau in the booming manufacturing sector. Currently, the manufacturing sector in India is growing at around 12% and expected to hit 20% next year (see appendix). The current market size for prototypes is around 10,000 units, and not one soul is involved in the business!! The only people whom we could possibly call as competition are the CNC bureaus and RP service bureaus in the US. But, as you would see in the following pages, the die is loaded in our favor.

Keys to success:

- We have a clear plan of what we intend to achieve.
- Plan to use the Selective Laser Sintering technique (SLS), equipment from DTM Corp, Austin TX, the current market leaders in SLS machines.(see Appendix)
- We intend to supply prototypes at the shortest possible time (2-4 days) and at the cheapest rate ($700-800).
- The total investment we require would be **$400,000**, which we would be able to return in about 3 years time.
- The Profit at the end of 5 years would be **$7,25,000**.We expect to have a 20% growth in profits per annum and at the end of 10 years our expected profit is **$5Millions**.
- We have an excellent Management team comprising of Technocrats from Ivy League institutions and a Manager from a top biz school.
- Work with our Customers on a personal level, as opposed to the "What's your Customer number?" mentality of large firms.

Everybody knows who landed on the moon first, the fastest animal on earth , or the richest person, but how many of us know who stands 2nd in each of these??? That is the essence of being FIRST, and the blueprint of our success! We are going to be the FIRST to provide Rapid Prototyping solutions in India. We expect to be the Market leaders for a very long time to come.

Please read on and discover the opportunity waiting to be tapped…

Company Highlights:

The Company's address will be Block 4, Noida Industrial Park Phase II, Uttar Pradesh, India. This place is a major hub for automobile and ancillaries manufacture. It is one of the highly industrialized areas in India and also very close to the National Capital, where the Corporate offices of our prospective clients are situated. Not only automobiles, but other major players such as injection molders and toy makers are also concentrated here. Moreover, the Government also gives 2 year Tax Holidays for companies set up here before June 2002. We can also save money on transportation expenses, as the clients are all in close proximity. A study by the University of Delhi (completed in Dec 2000) says that Noida will remain India's largest Industrial Park for atleast another 15 years. A dedicated fax and phone line has been applied for. The domain name of "**www.rpind.com**" has already been reserved for setting up an interactive website which will also give instant quotes once the CAD file of the user has been uploaded.

We intend to rent a 300 sq. m facility, the rent being $10/sq.m. The main equipment, DTM's Vanguard SLS unit will cost around $400,000 (including initiation cost and cost of breakout unit). Inclusive of running costs, the total initial investment would be around $600,000. The State Bank of India has sanctioned a loan for Rupees 45 lakhs (That's around $100,000). We have raised another $100,000 from internal funds. So, we need $400,000 from you. This will cover all Capital investment and running costs for one full year.

Market Analysis:

Currently, the need for prototyping services is increasing greatly. As already said before, with the manufacturing sector experiencing high growth (See Appendix), the absence of RP Bureaus is actually hurting modernization and R&D. Big conglomerates can afford to buy their own machines. Mid-sized companies are getting their prototypes done in the US, albeit paying heavily (**TINA factor**). Small scale industries, which constitute about 70% of Indian Industry, is really feeling the pinch without RP services. The total market is expected to be around 10,000 pieces, which is a very conservative value taken for calculation purposes. In the years to come this is expected to rise quickly.

The clients we expect are a) Automobile accessories & ancillaries b)Toy Makers c) Injection Molders d)Consumer Electronics

Product and Competition:

We can make very good quality prototypes for the prospective clients given above. Our price per piece will be either $700 or $800. Moreover, we can deliver the prototypes within 2-4 days. This favors very favorably with our competitors pricing and delivery time as follows :

a) A1 CNC Services, Noida, India - $800/prototype, delivery in 8-10days. (Hollow prototypes not possible) , service very poor, most of the complex designs not possible.
b) A2 CNC Limited, Delhi, India - $750/Prototype, delivery in 8-10 days. Low reputation among clients, does not stick on to delivery dates.
c) Acme Prototyping Bureau, Portland, Oregon - $1500/prototype, delivery in 7-10 days – too expensive, and unavoidable shipping delays.

The names of the companies have been changed to protect confidentiality. The opinions have been gathered from a market survey among potential clients. When we talked about our bureau to the clients, they were very enthusiastic about it, and looking forward to our entry.

The best part of our plan is that we have priced our product so low, that even in future if there are other prototyping bureaus, they will find it very hard to compete with us. At the most, they can sell at our rate, but then we would have the first to market advantage.

Sourcing:

We have entered into a long term agreement with DTM Corp, for the raw material needed. We have decided to use **Somos-201** for our prototypes. It has the following advantages.

- Rubber-like flexibility and functionality
- Durability and stability
- Fluid-tight, even under pressure
- High elongation
- Excellent abrasion resistance
- Array of color options

We are also planning a maintenance agreement with DTM-Corp for the Vanguard machine.

Marketing and Sales:

RpIND is launching a mini marketing blitz early next year. We have discussed with a small but reputable Advertising firm regarding the same. Full gloss Sales Literature is currently being printed. We are also raising awareness among the manufacturing community by visiting their offices, sending personalized letters etc. Being a pioneer in this field, the major newspapers of this region (Times of India, Indian Express, Business Line and Economic Times) have agreed to give some coverage to our launch and the local Cable Channel will also give us good exposure. The Manufacturing Society newsletter will carry an article of our entry in their next month's issue.

Strategy and Implementation:

I) Utility analysis:

We conducted a Scientific market survey (a technique developed by the Massachusetts Institute of Technology, Cambridge) and ascertained what value our customers have placed on the current market players, and what value we could expect to get if we enter the market. A copy of the questionnaire will be provided on request.

For any prototype, two attributes are considered most important. **A) Price of the product B)Number of days required for delivery**. The summary of the utility can be given as follows:

	Single Attribute (Price)	Single Attribute (Days)	Multi Attribute
RpIND	0.88	0.98	0.96
CNC Services	0.88	~0.4	<0.8
US prototypes	0.1	~0.4	<0.5

As you can clearly see in the table above, the utility of our product/service is much higher than our competitors! This means that our product has a distinct advantage in the market compared to our rivals.

II) Growth rates:

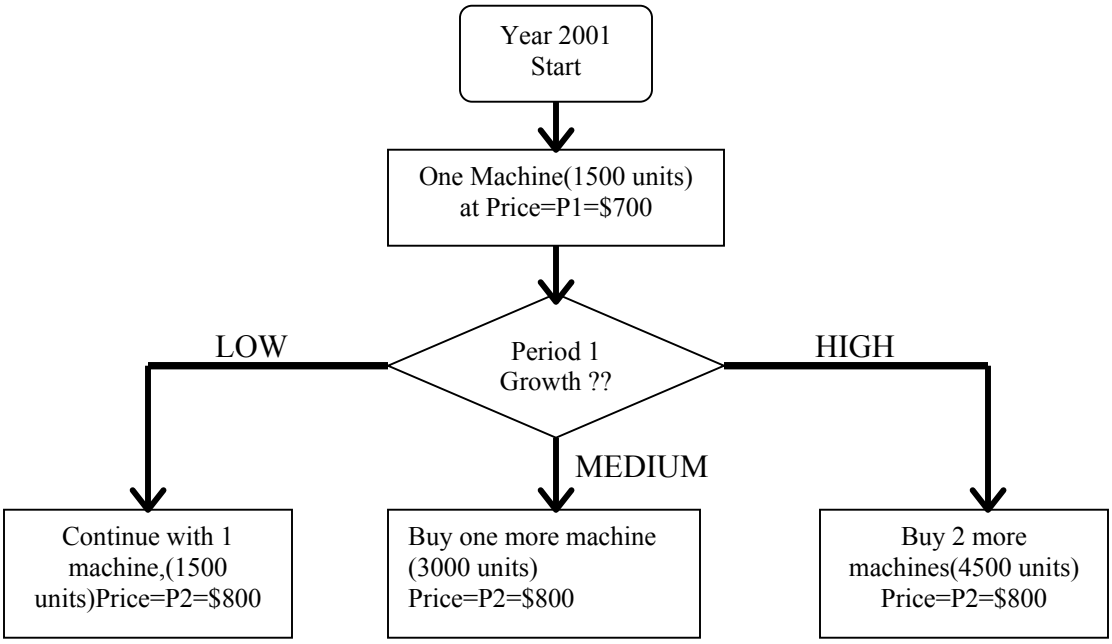
Taking very conservative values, we have estimated our growth rates for various demand scenarios as:

	Low Demand	**Medium Demand**	**High Demand**
2001	10%	10%	10%
2005	10%	20%	30%
2010	7%	8%	10%

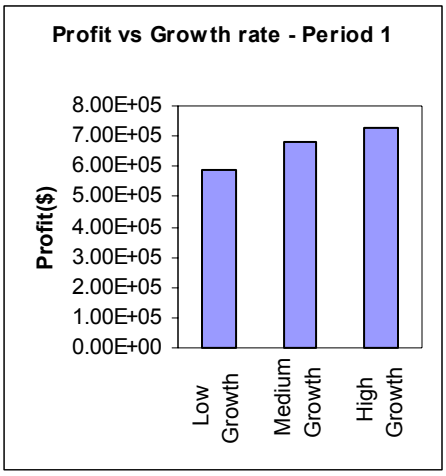
If we have a high demand scenario as we predict, our market share at the end of 10 years would be around 68%.

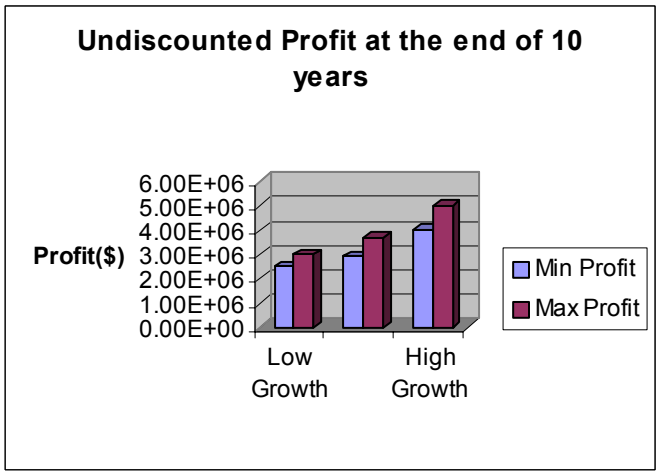
III) Strategy:

Using Dynamic Strategic Planning, we have decided to adopt a plan as given in the flow chart below:



So, we start with one machine making 1500 units/annum, and a total investment of $600,000. After 5 years we evaluate the situation once again, and take appropriate action as described above. This is the strategy the software suggested, and we plan to follow the same as it gives very reasonable and expected values. As seen below, for the 1st period, we make a profit of **$7,25,000** and at the end of **10years**, our expected profit is around **$5 Millions**.





IV) Sensitivity Analysis:

Now that we have designed the plan of action, it has to be verified for robustness. This can be done using sensitivity analysis. We perform 3 kinds of sensitivity analyses as explained below.

A) **Price and Probability of High Demand** : Please see graph in appendix. This shows us how low the probability of high demand can go for us to set the price at $700. i.e. if the probability of high demand

goes less than 45% then we price our prototype at $800. But since we have assumed the probability of high demand to be 50%, we price our product at $700. But, both these values compare very well with the rates of our competitors. And our assumption of 50% probability for high demand is also very reasonable.

B) **Market Share Sensitivity :** Please see graph in appendix. From this plot we can gather two important pieces of information. The first is that during the first period, with a 15% market share, it does not really matter if the demand is high, low or medium. i.e. the profit is insensitive to the demand till a market share of about 15%. Secondly, we see that if our market share were to exceed 15% in the first period, there is a dip in the profits. This is because, at 15% of the market share, we would have reached the maximum capacity of production and a 2nd machine is needed to cater to that demand. So, the software suggests that we go to medium scale. But, we prefer not accepting the extra orders rather than buying a new machine, because we do not want a dip in the profits and nor do we know the situation in the 2nd period. So, because of the uncertainty and decrease in profits, we continue with one machine.

C) **Discount Rate sensitivity**: Please see graph in the appendix. The discount rate for our business is taken to be 30%, which was determined by an independent consultant. This is a rather high value, but since it is taken to be a high-risk business, we have calculated with this value. With a 30% discount rate, we start with one machine. But, as we decrease the discount rate, the EV of the company keeps increasing. Moreover, at 17% discount rate, our strategy changes to a medium scale one. In other words, if the discount rate is taken to be <=17%, we start RpIND with two machines instead of one.

Management : The management team consists of the following people:

Avinash Kashyap – CEO, SM, Singapore-MIT Alliance, Class of 2001
Somanathan Vaidya – CFO, MBA, London School of Economics – Class of '96
Arun S- CTO, SM, Singapore-MIT Alliance, Class of 2001
Steby Rodriguez, Vikas Jindal and Agam – Engineers, SM, Singapore-MIT Alliance, Class of 2001

The resumes of the management team will be provided on request.

Finances in a Nutshell : The money we need to start the business and keep it running is summarized in this table:

Period 1 : 2001-2005	One Machine (1500 units)	$600,000
Period 2 :2006-2010	Continue with one machine	No additional investment
	Buy one machine (3000 units)	$400,000
	Buy two machines(4500 units)	$800,000

The Total Profit we expect to make in 5 years time will be **= $7,25,000** and in 10 years we can get a profit of **$5 Million,** which is a very decent return.

In the worst case scenario, with just a 4% market share and very slow growth of 5%, the maximum we would lose will be $93,400. But then, we really don't expect this to happen!!

Exit Strategy : We know your money is important and you would like to make quick profits as much as us. After 5 years we have many options:

- Merger with a big Engineering firm, which can have RpIND as one of its divisions.
- Franchisee option, by selling rights to other players.
- Opening more branches, say one in Gurgeaon another important Industrial center) and another one down South in Chennai (formerly Madras), known as the Detroit of India, with many Automobile manufacturers.
- If the company is really successful, we could go for an IPO.

We hope you are interested in this business proposal. We are committed and willing to work hard to achieve our goals and we will not leave any stone unturned.

Hope to hear from you soon.

Appendix I:

The Vanguard SLS Machine from DTM Corp:

What is Selective Laser Sintering?

Selective laser sintering (SLS) is a thermal process that uses a laser to sinter (fuse) layers of powdered thermoplastic materials together to form solid three-dimensional objects. The SLS technology is known for its ability to processa variety of prototyping materials including thermoplastics, investment castingwax, and metals.

Selective Laser Sintering starts with a thin, evenly distributed layer of powder. A roller spreads the powder over the surface of a build cylinder. The piston in the cylinder moves down one object layer thickness to accommodate the new layer of powder. The powder delivery system is similar in function to the build cylinder. Here, a piston moves upward incrementally to supply a measured quantity of powder for each layer. A laser beam is then traced over the surface of this tightly compacted powder to selectively melt and bond it to form a layer of the object. The fabrication chamber is maintained at a temperature just below the melting point of the powder so that heat from the laser need only elevate the Temperature slightly to cause sintering. This greatly speeds up the process. The process is repeated until the entire object is fabricated. At the end of the build process, the entire cake of powder, sintered and unsintered, is allowed to cool down and lifted out of the machine. Then the loose powder is shaken off (it can be used again) and the sintered object is freed. Models can be sanded down and painted if required, to give a smooth finish. No supports are required with this method since overhangs and undercuts are supported by the solid powder bed. SLS offers the key advantage of making functional parts in essentially final materials. However, the system is mechanically more complex than stereolithography and most other technologies. A variety of thermoplastic materials such as nylon, glass filled nylon, and polystyrene are available. Surface finishes and accuracy are not quite as good as with stereolithography, but material properties can be quite close to those of the intrinsic materials. The method has also been extended to provide direct fabrication of metal and ceramic objects and tools.

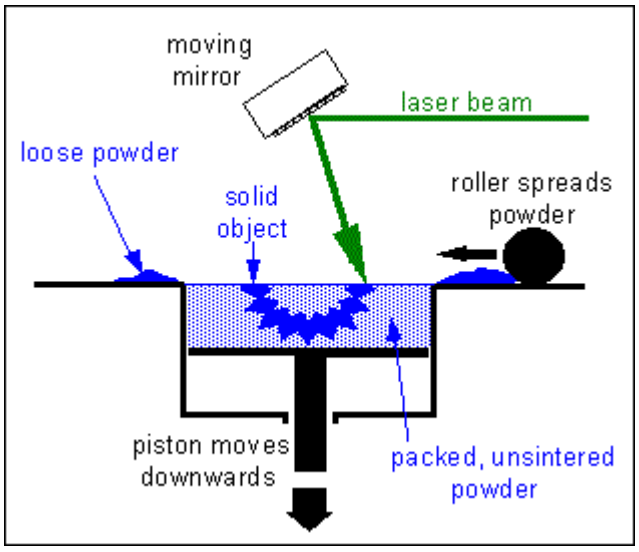
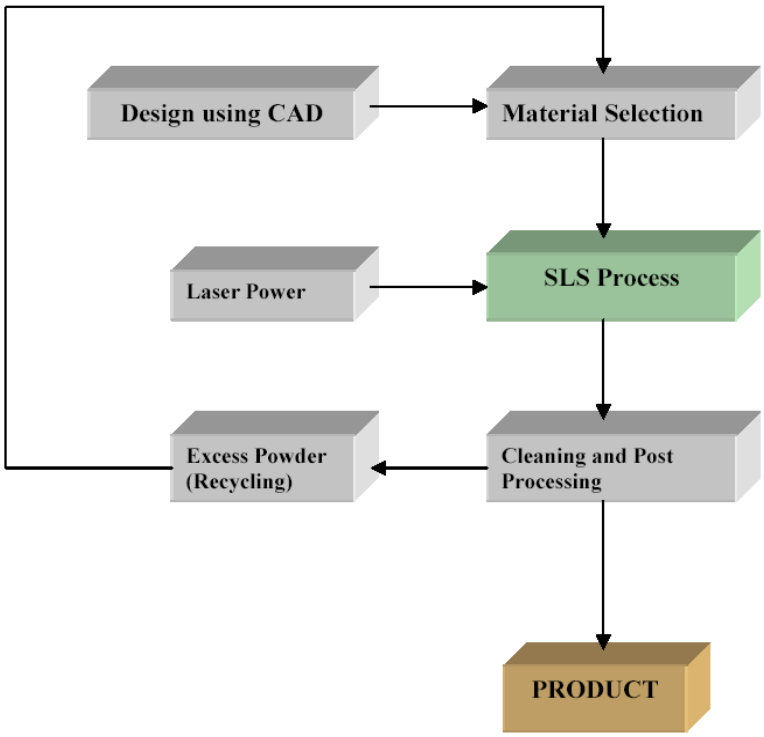
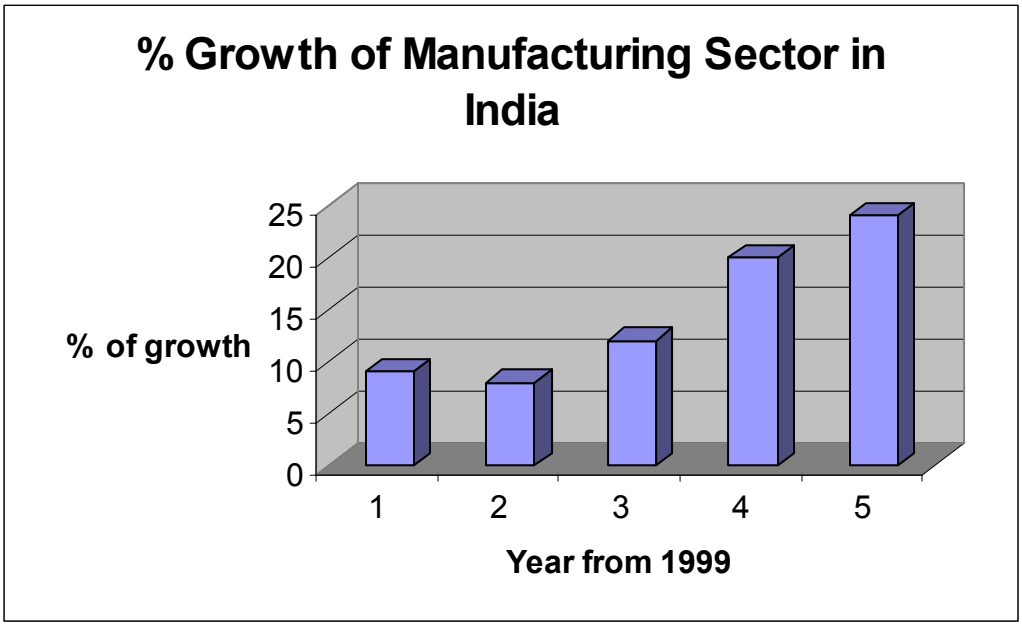


Fig : SLS Process

Steps involved in Prototyping :



Appendix II :



Source : Business Week

Utility analysis:

i) Single Attribute Utility

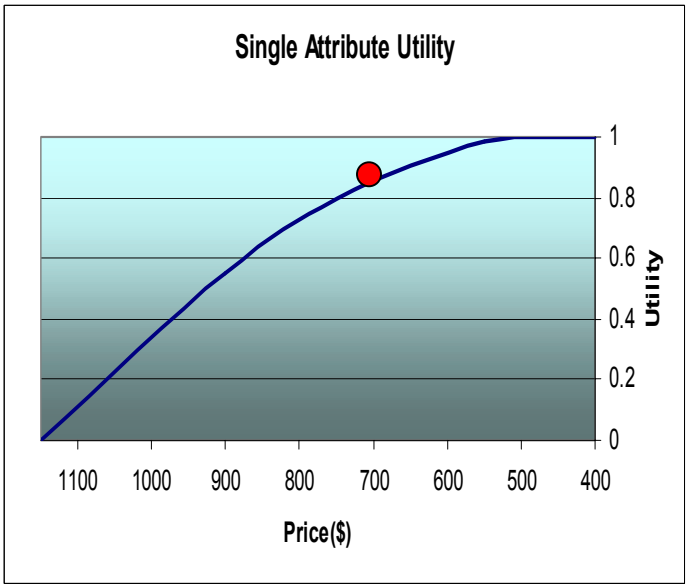


Fig : Single Attribute Utility for Price

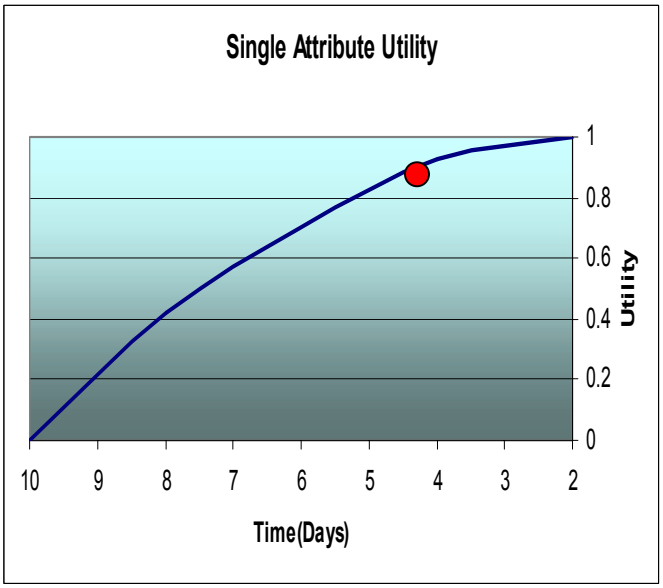
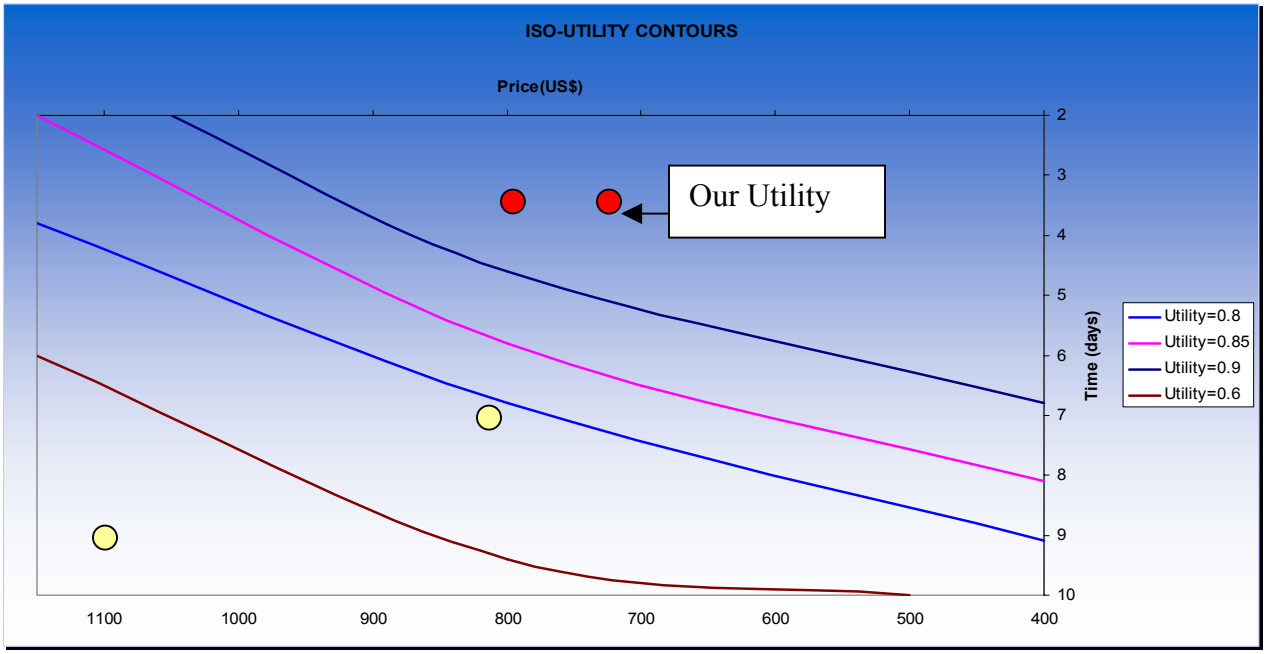
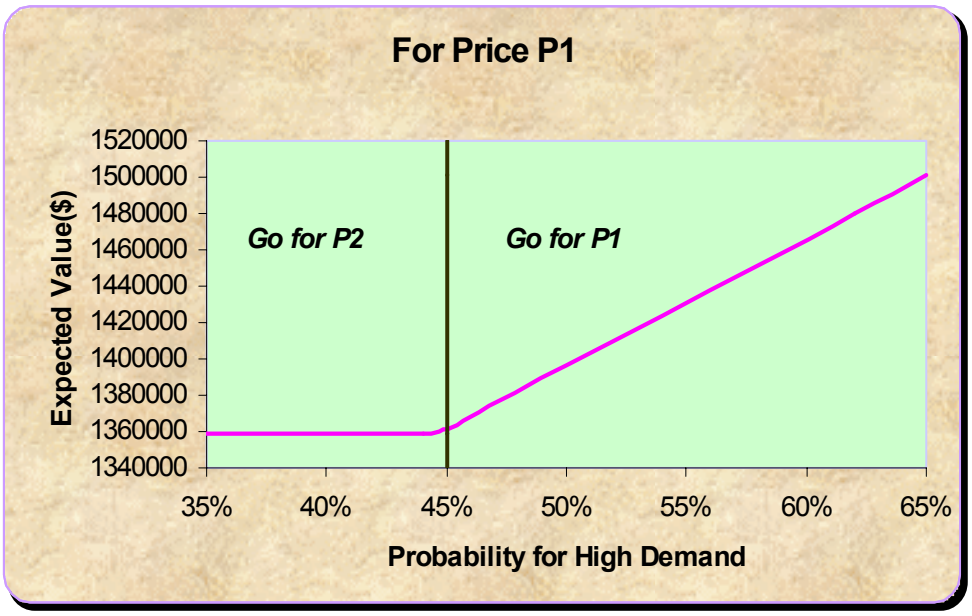


Fig : Single Attribute utility for Number of days for delivery.

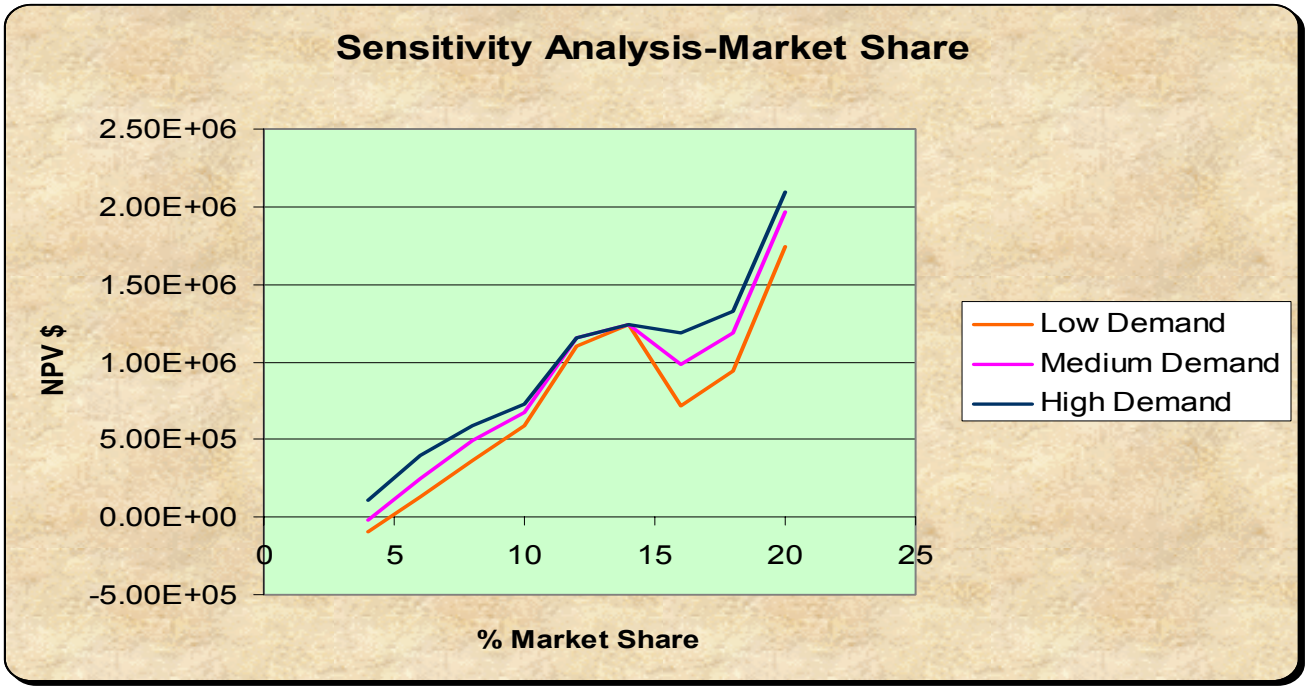
ii) Multi-Attribute Utility:



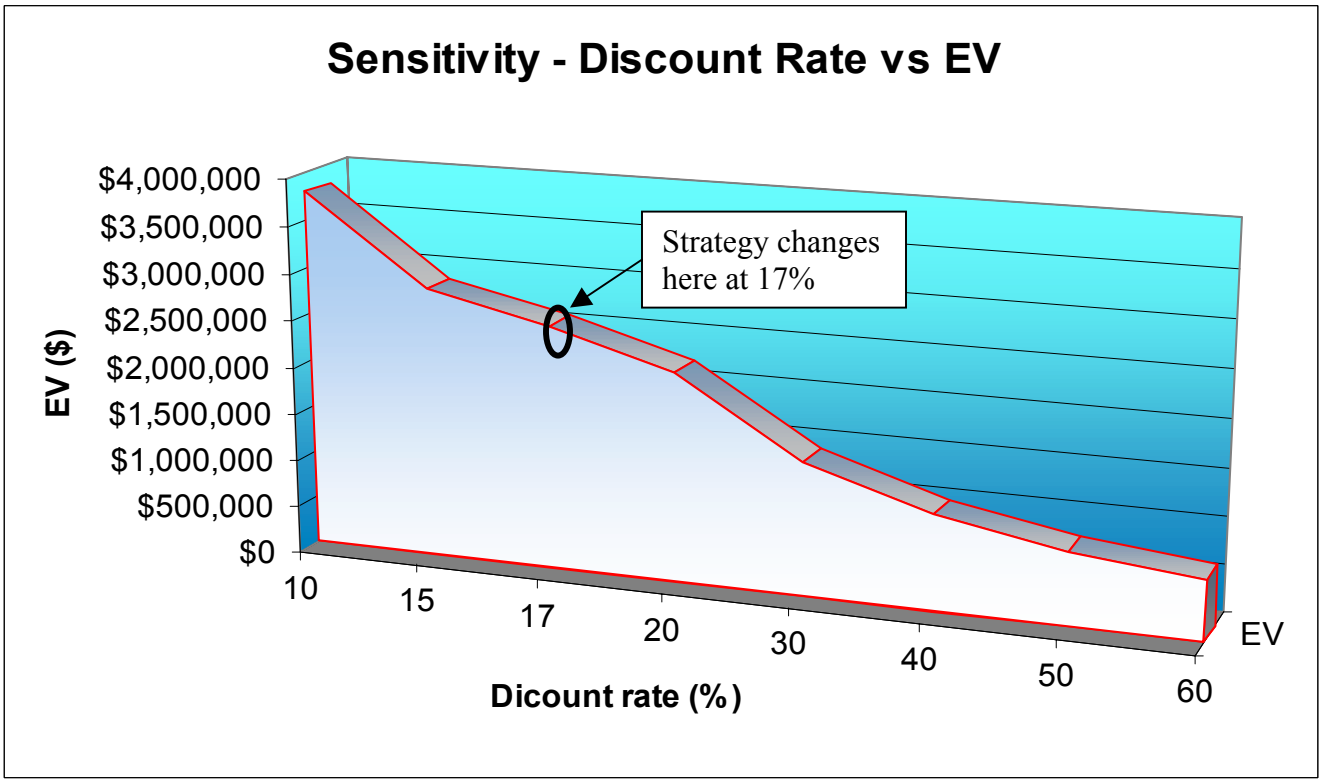
Sensitivity Analysis (I) Price Sensitivity:



Sensitivity(II) : Market Share :



Sensitivity (III) : Discount Rate :



Prototypes we expect to make :

Thank you and for more information, please contact us at avinash@mit.edu !