Capital Project Appraisal Presentation

Financial Management and Planning

Additive Manufacturing Project Appraisal Study

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Additive manufacturing of non-critical parts

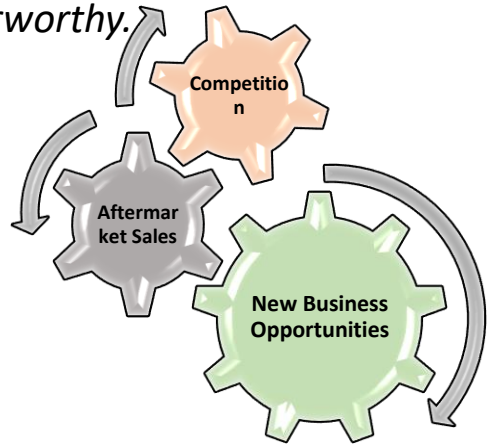
BACKGROUND

The opportunity to improve customer satisfaction and boost business profits are always top priorities for all companies. In this instance, Aftermarket Business Unit is considered for improvement because of its direct customer interactions, handling in-service issues and sales of spares. Currently, the spares are manufactured using conventional method of Vacuum forming. Because of the low volumes and the cost of setting up the tools becomes very high. Hence, the company has invested in Additive Manufacturing to increase profitability and reduce lead time. The ability to manufacture complex shapes is the biggest advantage of additive manufacturing. Our Team have laid out a systematic plan to set-up the additive manufacturing, which includes machines, process qualification, testing, certification and requirements for regulatory approvals. The parts selected for Additive Manufacturing are currently highly priced due to their usage on business class suite on aircraft.

Additive manufacturing relies on 4x controlling elements in process: 3M+P – Material, Machine, Machine-Manufacturing Location, Parameters (e.g. machine nozzle, speed, temperature, drying of pellets, etc.)

SCOPE : Aftermarket Business Improvement with Additive Manufacturing Implementation

- *Quick turnover to the customer to reduce AOG due to damaged seats and improve the business relationship, whilst winning the future projects. Additionally, parts shall comply to all regulatory requirements to ensure the parts are safe and airworthy.*
- *To assess business opportunity and credibility of "Additive Manufacturing" of non-critical parts;*
- *Improve the aftermarket growth and lead by example in the aviation business;*
- *Risks to loose the Spares After Market Business to competitors;*
- *To assess the credit-worthiness of the project;*
- *To assess probable cost and returns or benefits from the project and perhaps the profitability of the project;*
- *To assess the capital requirements (fixed or working capital);*
- *The current setup is based at a Vendor location where the Machine, process, material are all qualified.*



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Timeline for implementation

2 months for implementation of this Additive Manufacturing process.

For calculation purposes, we are considering cumulative costs of all the parts (Bumper, Trim and Monitor Face) for one year that are to be manufactured with Additive Manufacturing process.

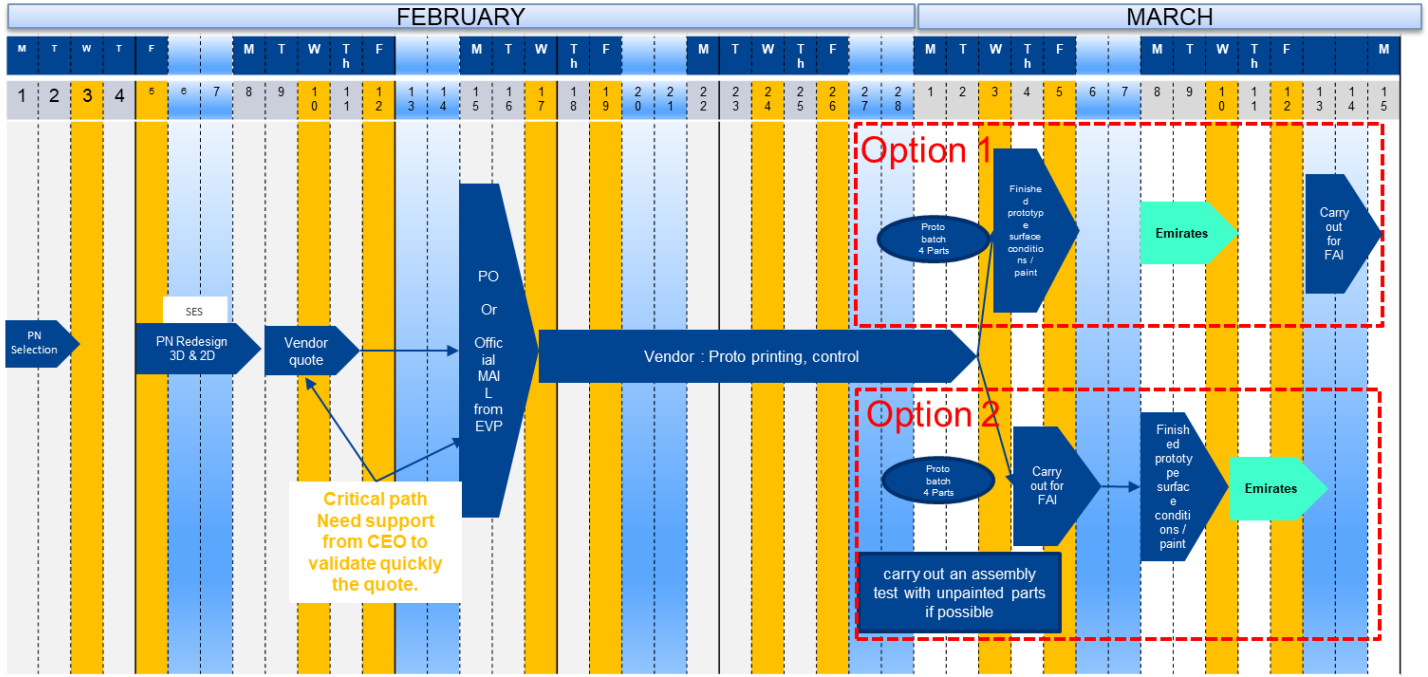
Delivery of the 1st article after industrialization: Reduction of Lead Time from 45 to 8 days. Second Article onwards will be easy as there is no more qualification tests and certification involved.

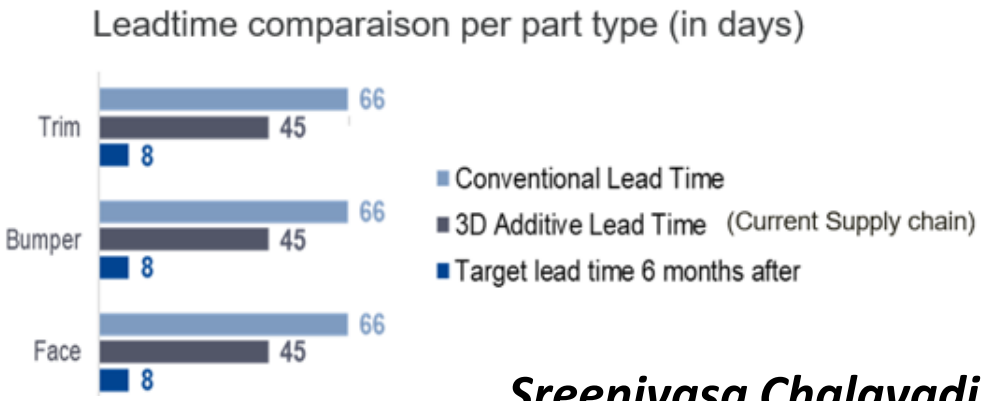
Conventional Vacuum Formed parts Lead Time = production time only.

Standard :

3D for the 1st article in Additive Manufacturing with the control phases: 45 days: 20 days of production + 15 days of finishing + 10 days of FAI.

Target: After 6 months of manufacturing: produce the part in 8 days.





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Cost of the project :

Investment in the project, includes Machine cost, initial machine qualification, initial process qualification, Design work, Manufacturing cost, FAI, program costs, testing and finally certification of the parts manufactured. The values shown below for Trim, Bumper and Face includes costs also includes non-recurring costs and indirect costs.

Investment *(Machine Cost + Trim + Bumper + Face)* = ***258,100 €*** (160,000 € + 16,000 € + 32,600 € + 49,500 €)

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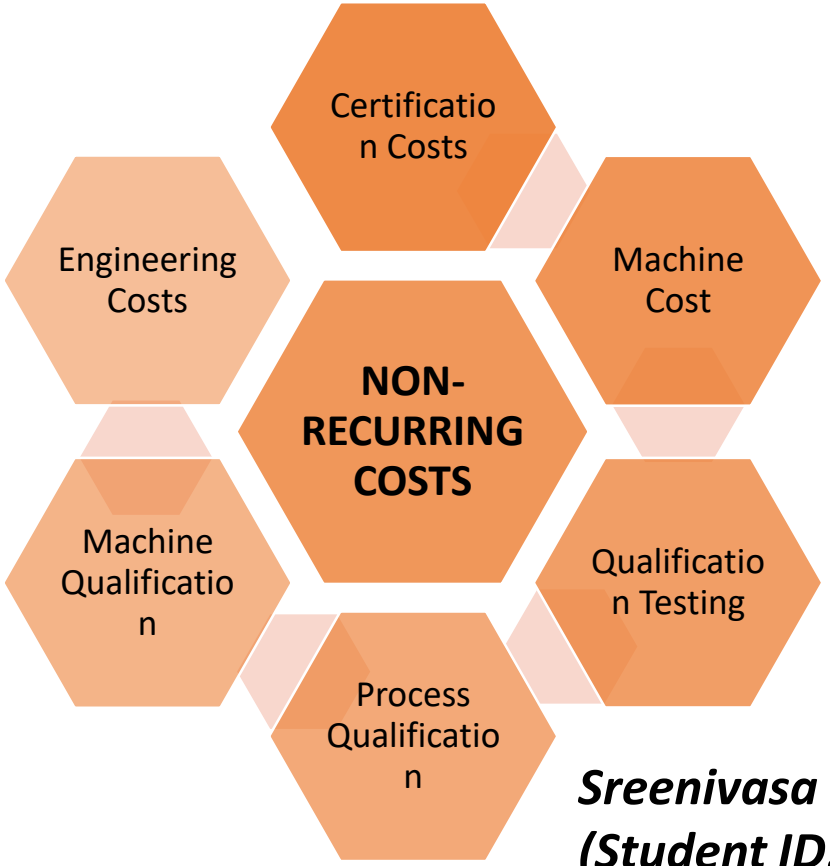

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Life span of the project

Following are some of the considerations for the life span of the project

- Life of the Seats or Suites installed on the aircraft. Typically, 10 years where technology is supporting only one project. In case of multiple projects and parts manufactured, this will vary accordingly.

- Until a new technology emerges to dominate Additive Manufacturing technology.

- Life of the Stratasys Fortus 900MC Machine 7 Years as per Manufacturer's specification Product Life Cycle Classification | Stratasys™ Support Center.

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Potential Issues due to implementation

Resource Management

- Automation leading to extensive training of the current work force.
- Skilled resource availability for the new technology, hence increasing the labour costs.

Disruptions

- The whole supply chain is disrupted due to the new technology. New suppliers need to be qualified with reference to the raw material canisters, additional necessary tooling.
- Transition from one manufacturing to the other is very minimal, as the Additive manufacturing site is based at Vendor site.

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Model of the Project

Additive Manufacturing						
		No. of Years (t)				
	Investment	1	2	3	4	5
Present Value (PV)	(258,100)	138,140	138,140	138,140	138,140	138,140
Payback	1.9	Break even point is at 1year 10 months (1.9 years)				
Discount Rate (WACC)	10.00%					
		From Present Value Table				
Future Value((PV t/1+10%)^t)	(258,100)	125,581.82	114,165.29	103,786.63	94,351.48	85,774.07
Net Present Value (NPV)	265,559					
Internal Rate of Return (IRR)	45.24%					

Profitability Index (PI)	2.03
Benefit Cost Ratio (BCR)	1.03

Conventional Vacuum Forming						
		No. of Years (t)				
	Investment	1	2	3	4	5
Present Value (PV)	(203,750)	61,736	61,736	61,736	61,736	61,736
Payback	3.3	Break even point is at 3year 3 months (3.3 years)				
Discount Rate (WACC)	10.00%					
		From Present Value Table				
Future Value((PV t/1+10%)^t)	(203,750)	56,123.64	51,021.49	46,383.17	42,166.52	38,333.20
Net Present Value (NPV)	30,278					
Internal Rate of Return (IRR)	15.66%					

Profitability Index (PI)	1.15
Benefit Cost Ratio (BCR)	0.15

*All values provided are in Euros(**€**).*
The above values are calculated for both New Technology, Additive Manufacturing, proposed and Conventional Vacuum Forming to understand the Profitability Index (PI), Net Present Value (NPV) and Internal Rate of Return (IRR).

*By comparing these two, the new technology "**Additive Manufacturing**" dominates the existing conventional method of manufacturing. Additive Manufacturing has a PI, NPI and IRR higher than the conventional method as established in the Project Appraisal model above. The IRR shows the expected annual rate of growth ~45% of the investment in case of Additive Manufacturing.*

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Rational of your Business

The new manufacturing proposal "Additive Manufacturing" is the most sought over conventional Vacuum forming process in the aftermarket business. Therefore following points analysed from the project appraisal, provides a rational for the board of directors to consider "Additive Manufacturing" as the aftermarket business opportunity.

- *Payback is in 1 year 10 months time, which is less than 2 years. Hence a great investment to invest as the return on investment is quite rapid.*

- *The Internal Rate of Return (IRR) of 45% for Additive Manufacturing is greater than 20%.. The potential money threatening risk in the future of the investment is quite low.* This implies that Additive Manufacturing method in aftermarket business will yield higher chances of growth than conventional manufacturing method. Hence making it the most desirable project to pursue.

- *Positive NPV of 265,559* **€** *at WACC of 10%, has* high returns compared to the conventional method of manufacturing for Aftermarket business. With NPV>0, the future project cost will be less than the expected Cash flows indicating a positive investment outlook.

- *Profitability index is also greater than 2, which means the present profit value is more than 200%.*

- BCR is greater than 1. This indicates that the discounted benefits exceed the present value of the costs and investments. Therefore, the project is expected to generate greater profit on investment.

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Funding

Our company has the leading position in implementing Additive Manufacturing.

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Conclusions and Recommendations

Conclusion *:*

Considering the cost benefits established in this presentation on previous slides, it is a strong indication that the implementation of Additive Manufacturing is a perfect investment in Aftermarket business.

Although, the parts manufactured by Additive Manufacturing are highly priced, the process itself brings down the lead time of spares drastically from 60 days to 8 days. The Airlines would appreciate that their aircrafts will not be on ground for long for replacing the damaged parts. The more the aircraft is on the ground, the more the airlines will incur the loss. The Airlines need not wait on ground for long to get the seat repaired as they did before.

Therefore, this is a great win-win situation to both our company and to our Airline customers.

Recommendation:

Since our company is a manufacturer of the First class and Business class suites, the cost of the parts are generally high with low volumes. The Payback, Net Present Value, Profitability index and Internal Rate of return etc strongly indicate to implement Additive Manufacturing. Therefore, we recommend to implement Additive Manufacturing.

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