

Define

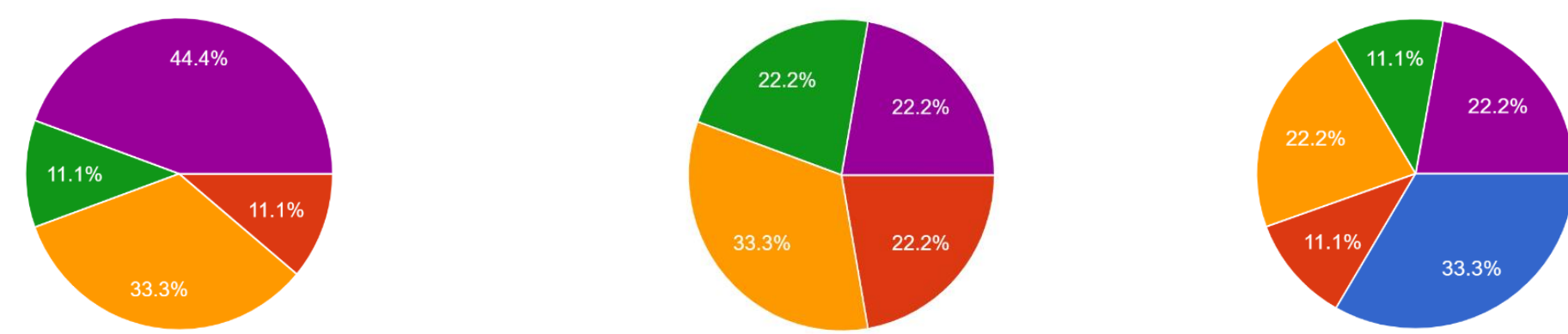
Problem Statement

Since 2022, there has been a reported need for a designated area for 3D printers in the PR4 & PR7 buildings of Collins Aerospace, which implies that the production cost of fixtures will be affected. The production of these, by an external supplier, results in a cost increase of 75%, which the company seeks to reduce by having its own laboratory of 3D printers.

Voice of the Customer

Internal Client: 3D Printer Users

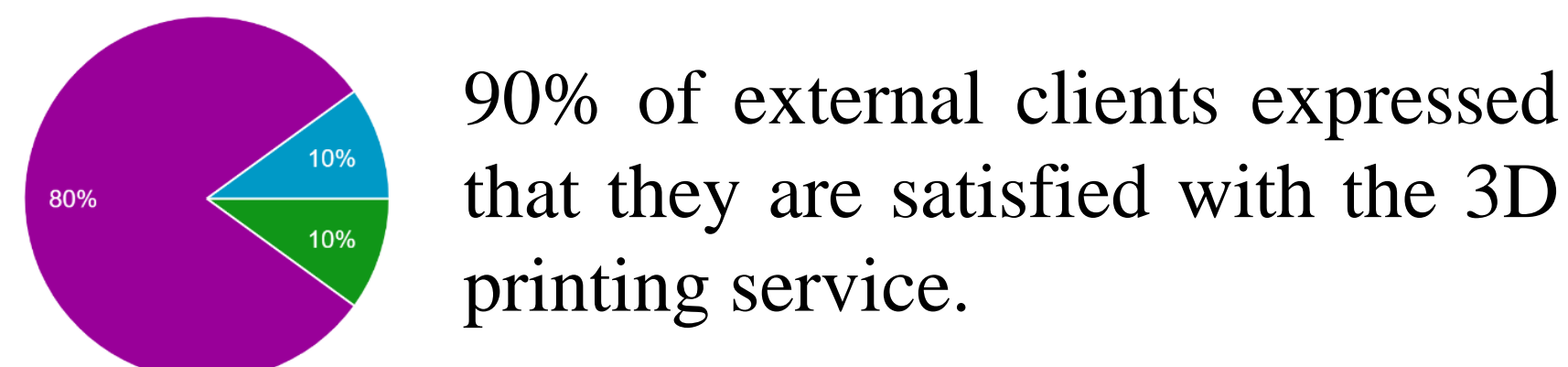
You were trained to utilize the 3D printing equipment. The materials you need are always available. The equipment receives preventive maintenance



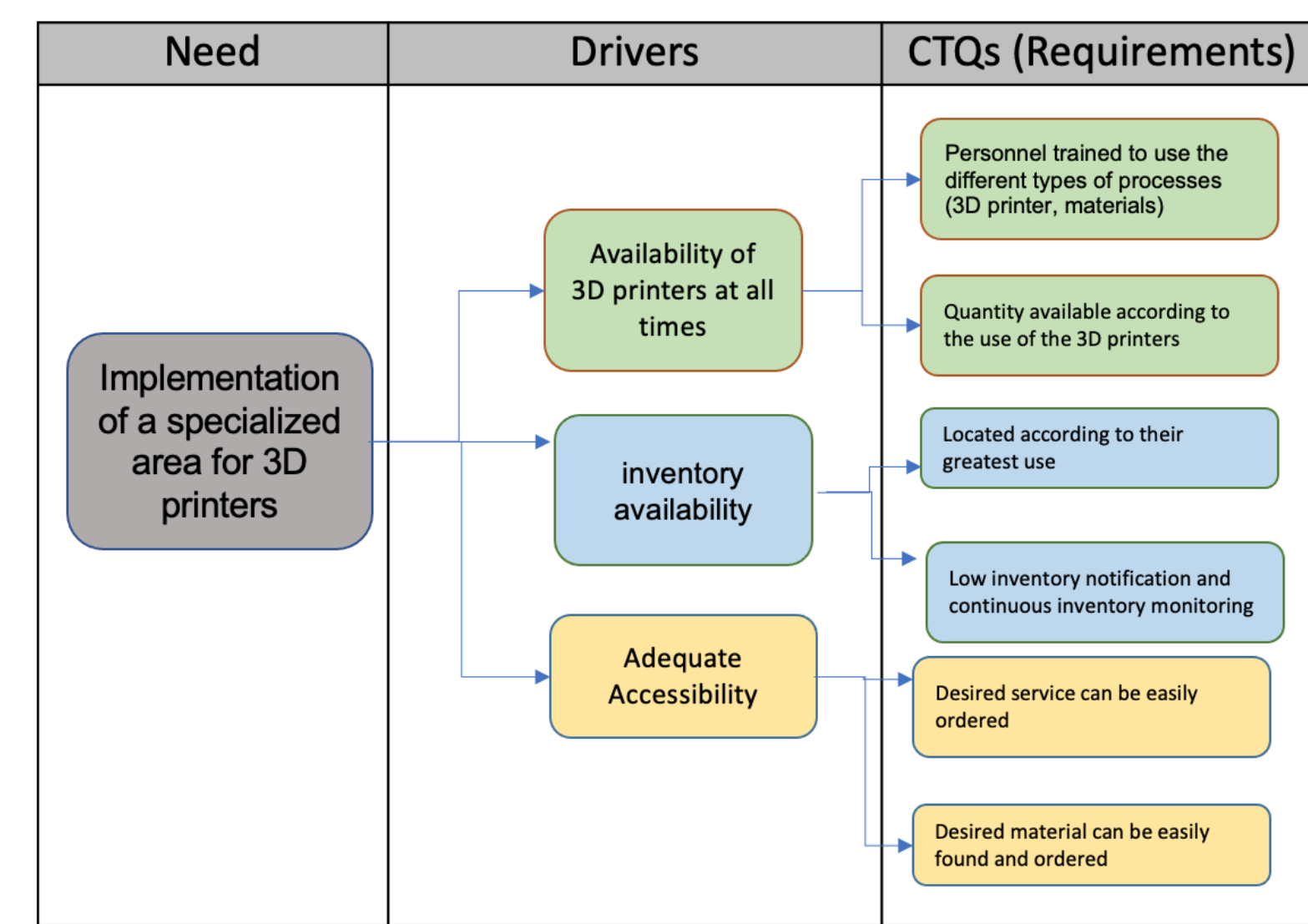
44.4% of internal customers expressed they have not been trained to use 3D printers. Also, 44.4% expressed that the materials are not always available and 22.2% expressed that the equipment does not receive preventive maintenance.

External Client: Departments that obtain 3D printing services

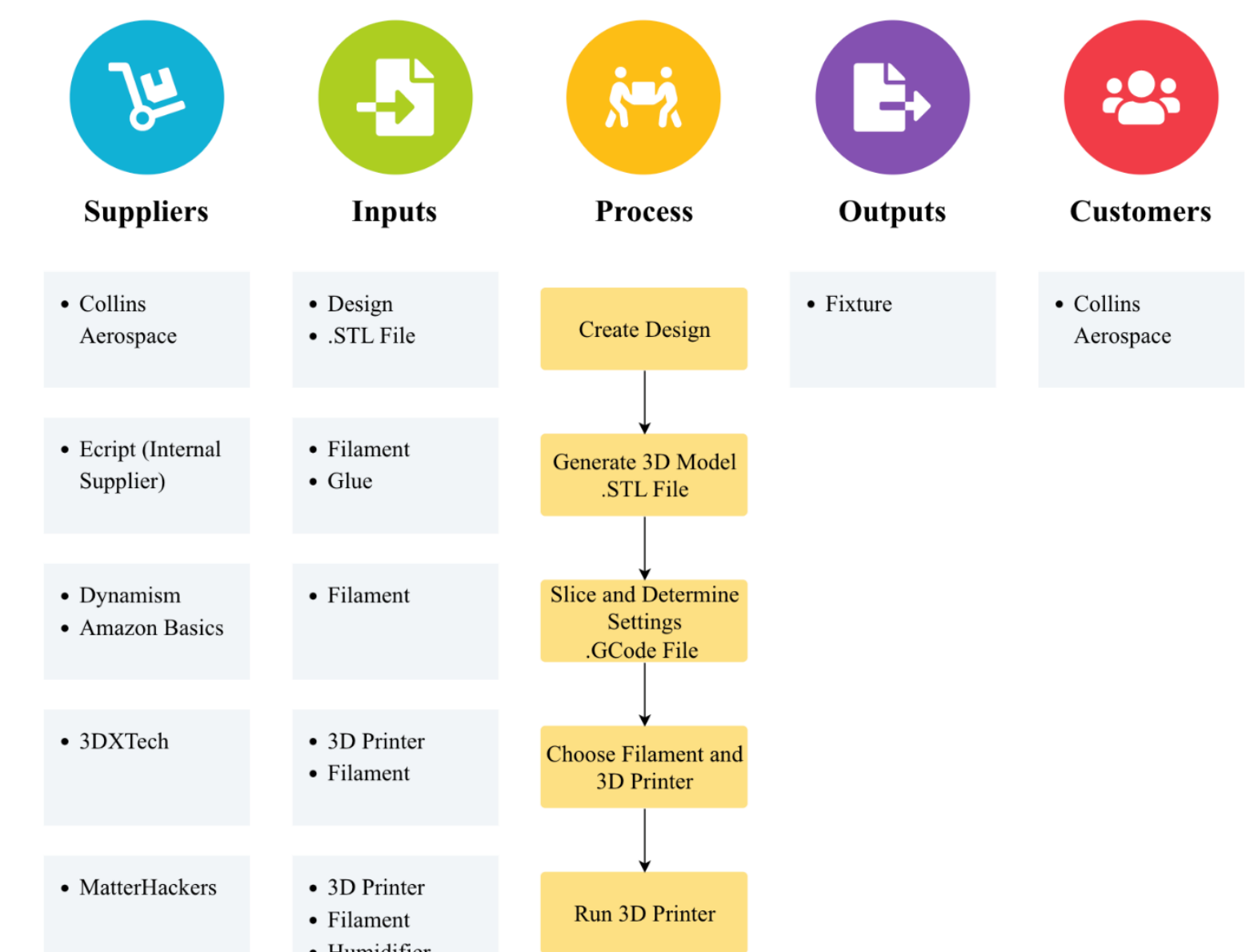
You are satisfied with the 3D printing services.



CTQ Analysis



SIPOC

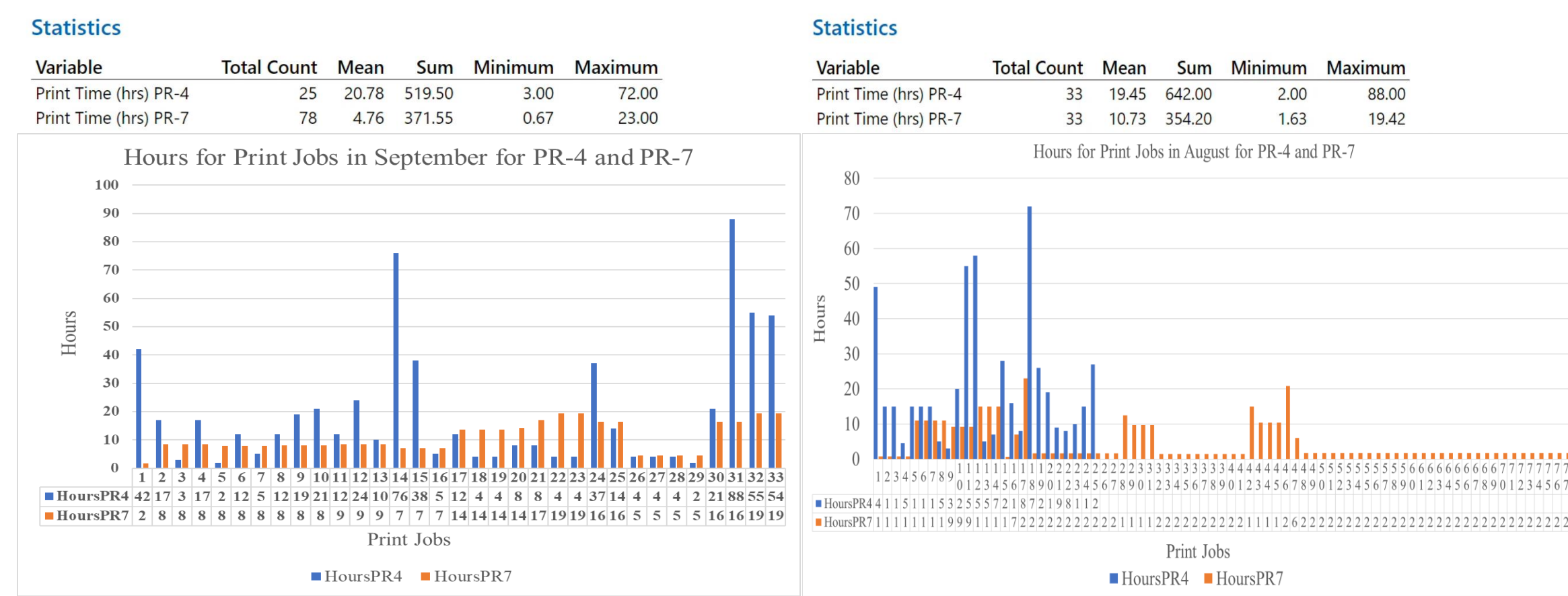


Measure

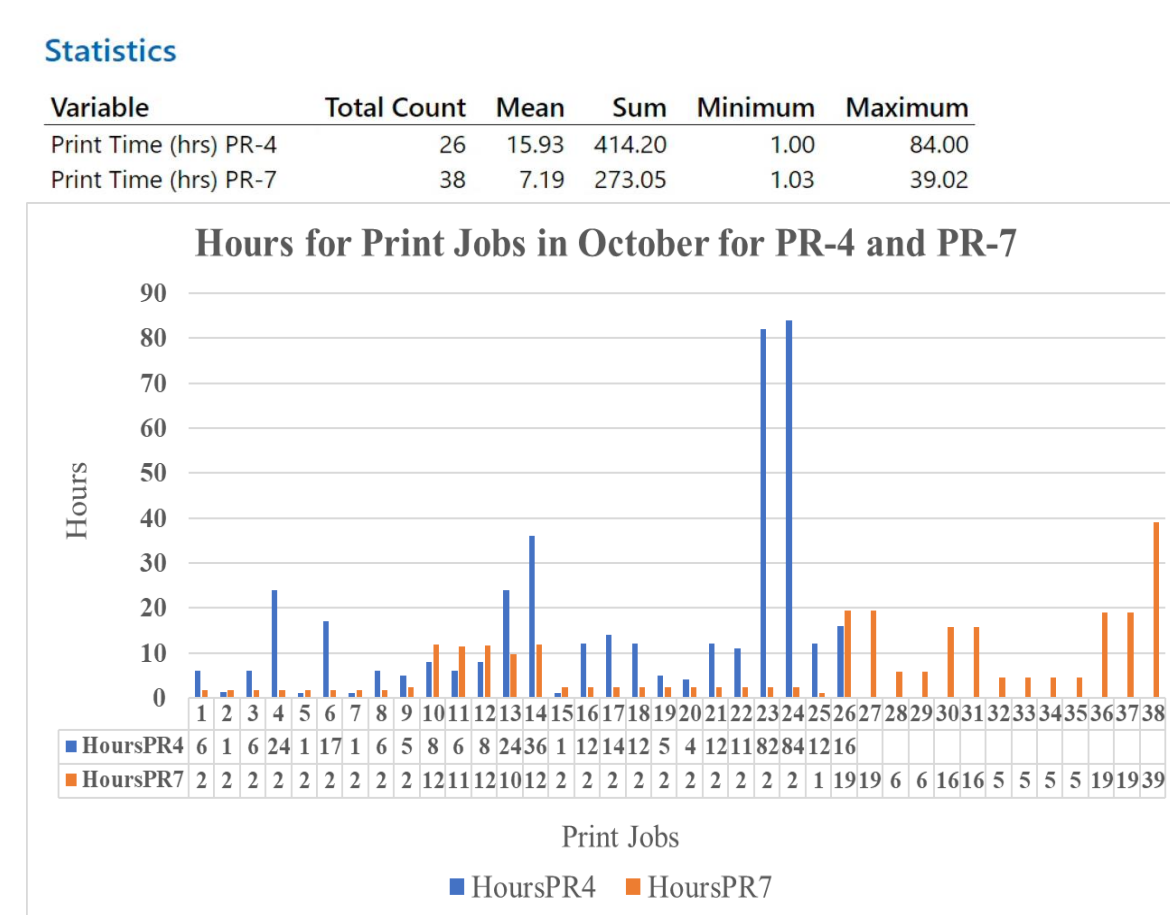
Descriptive Statistics

Historical Data

Descriptive Statistics: August Print Time (hrs) at PR-4 and PR-7 Descriptive Statistics: September Print Time (hrs) at PR-4 and PR-7

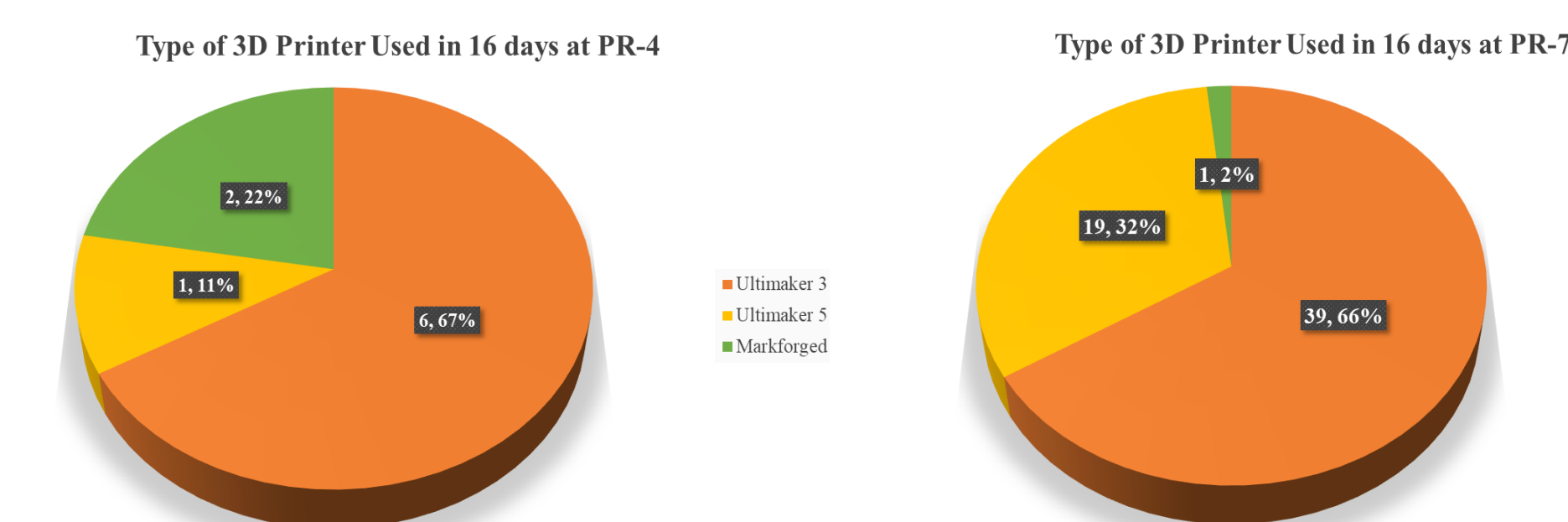


Descriptive Statistics: October Print Time (hrs) at PR-4 and PR-7



The PR-7 building presented greater utilization of 3D printers from August 2023 to October 2023. The total utilization from both buildings in August was 22.45%, September 25.04%, and October 17.12%. The total savings from August to October were \$154,470.

Graphs



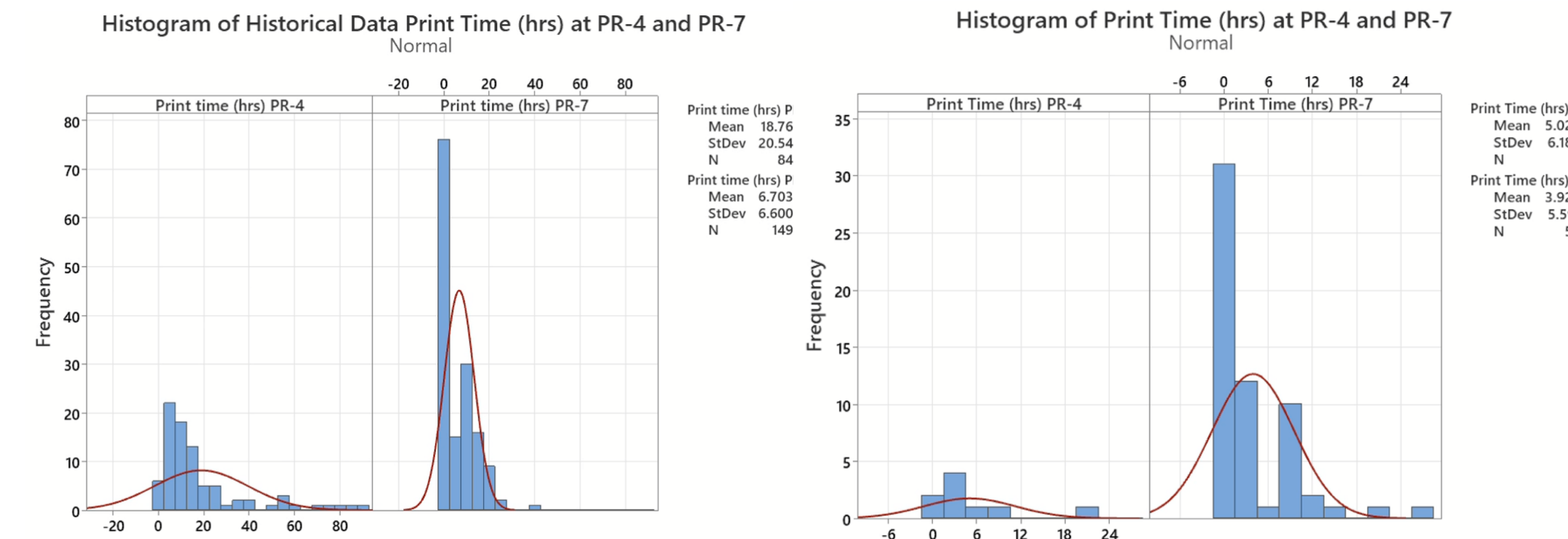
During 16 days of collecting data, the 3D printer models used were identified. In PR-4 67% of the print jobs were done using the Ultimaker 3, 22% with the Markforged, and 11% with the Ultimaker 5. In PR-7 66% were done with Ultimaker 3, 32% with Ultimaker 5, and 2% with the Creality. Overall, the Ultimaker 3 was the printer model most used.

Printers Specifications

Printer Number	Printer Model	Building	Size (inches)	Time used	Material used
1	Creality CR-30:	PR-4	26" x 21.5" x 16"	No data.	No data.
2	Creality CR-10 Max:	PR-4	22" x 35.5" x 38"	No data.	No data.
3	Zortrax M200:	PR-4	18" x 13.5" x 20" x 27"	Broken.	No data.
4	Markforged X7:	PR-4	22.25" x 17.75" x 35.65"	2,059h 35min.	Prints Completed: 305
5	Creatbot F430:	PR-4	24.75" x 19.10" x 27"	960h 27min.	No data.
6	Ultimaker 3 Extended:	PR-4	13.25" x 15.25" x 19.25"	29d 12h.	1901.40m
7	Ultimaker 2 Extended:	PR-4	13.5" x 16.55" x 28.65"	19,166h.	1,135m.
8	Ultimaker S5:	PR-4	19.25" x 16.25" x 46.5"	CORE 1: 33d 9h. CORE 2: 1d 10h.	CORE 1: 765.99m. CORE 2: 119.28m.
9	Creality CR-10 Max:	PR-7	22" x 35.5" x 38"	Broken.	No data.
10	Creality CR-10 Max:	PR-7	22" x 35.5" x 38"	No data.	No data.
11	Ultimaker 5:	PR-7	19.25" x 16.25" x 46.5"	CORE 1: 25d 16h CORE 2: 6h 38m	CORE 1: 528.56m CORE 2: 0.45m
12	Ultimaker 3 Extended:	PR-7	13.5" x 16.55" x 28.65"	No data.	No data.
13	Ultimaker S3:	PR-7	19.3" x 15.5" x 25.1"	CORE 1: 76d 21h CORE 2: 3d 10h	CORE 1: 1,237.34m CORE 2: 41.92m

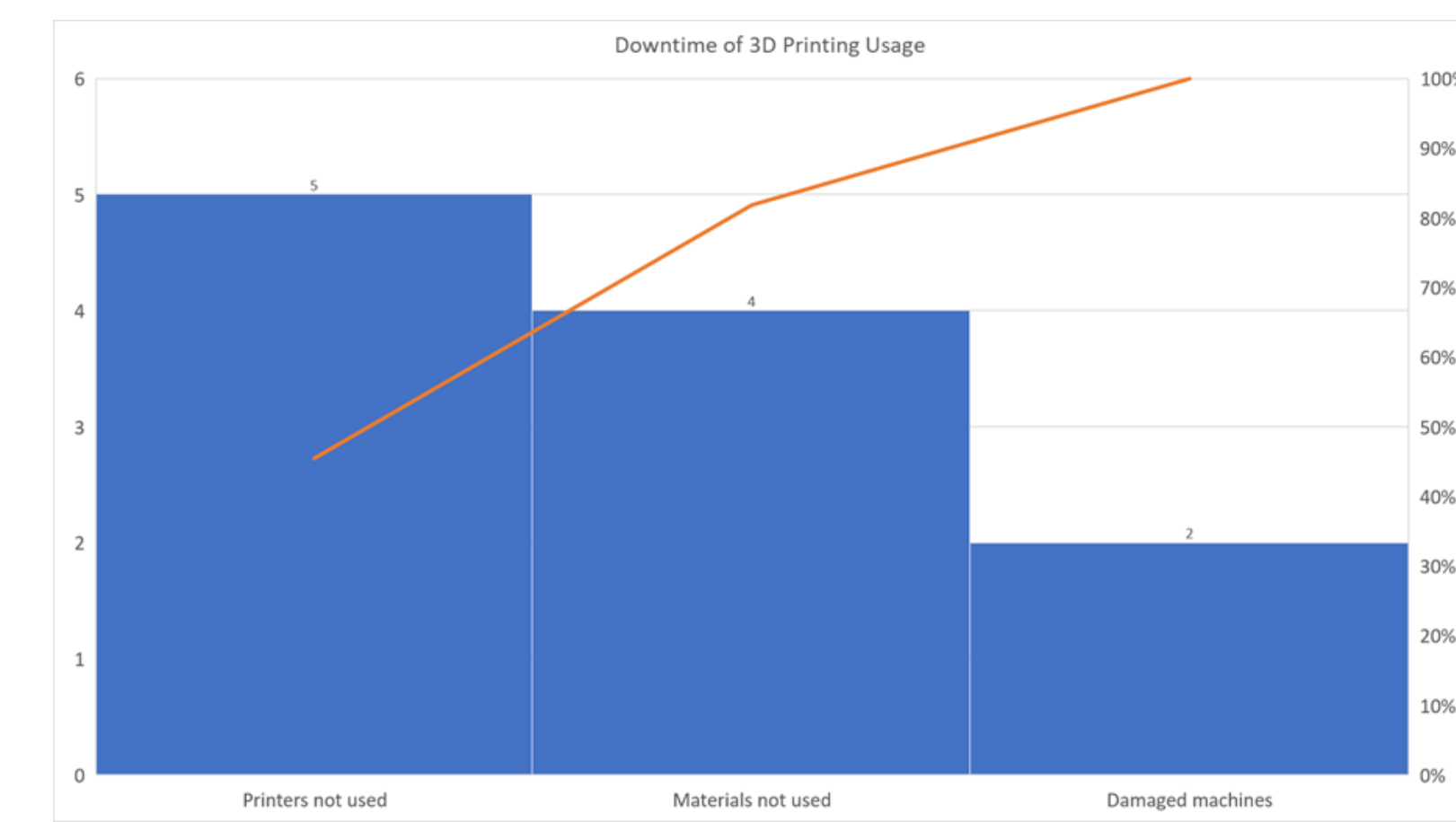
Analyze

Histogram



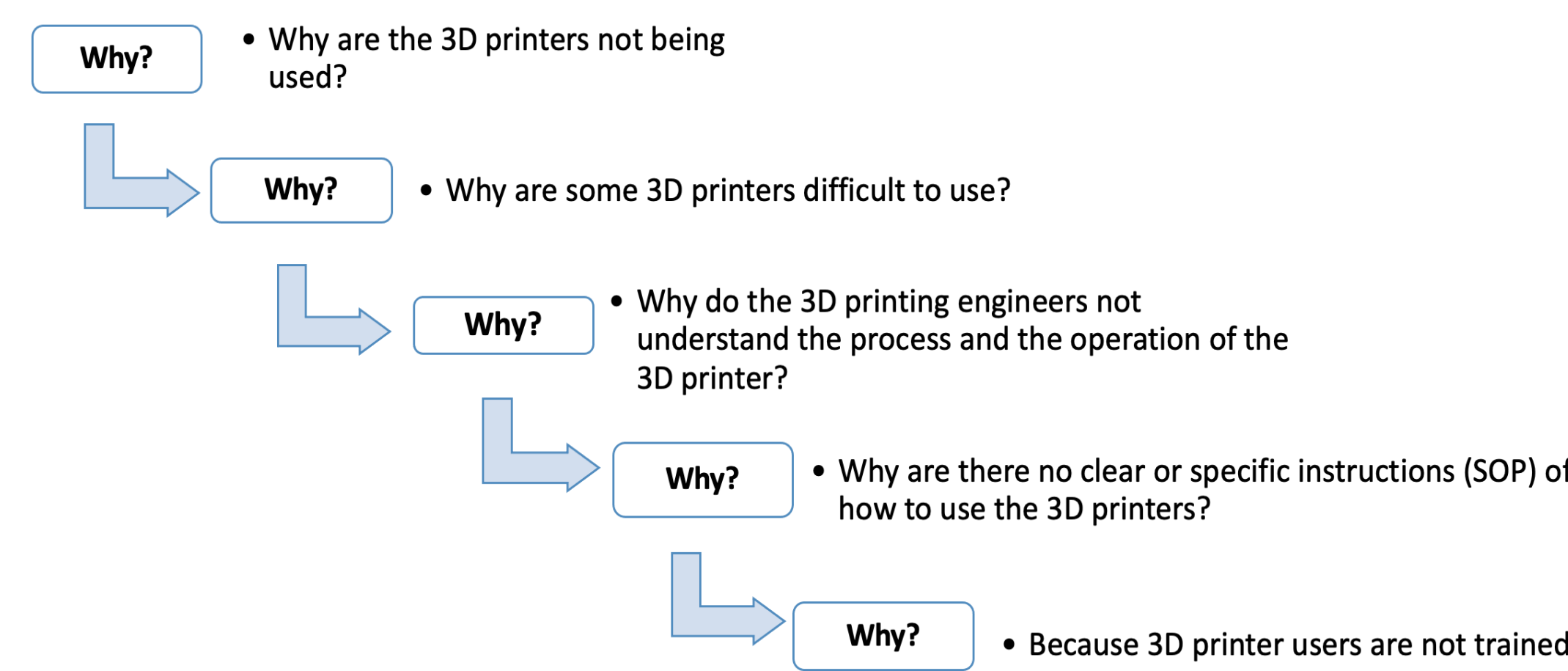
In the historical data, there was a higher variation in the fixture printing time at PR-4 and more atypical values than at PR-7. Looking at the frequencies it was noted that PR-7 produces more quantities of the same fixture than PR-4.

Pareto Chart



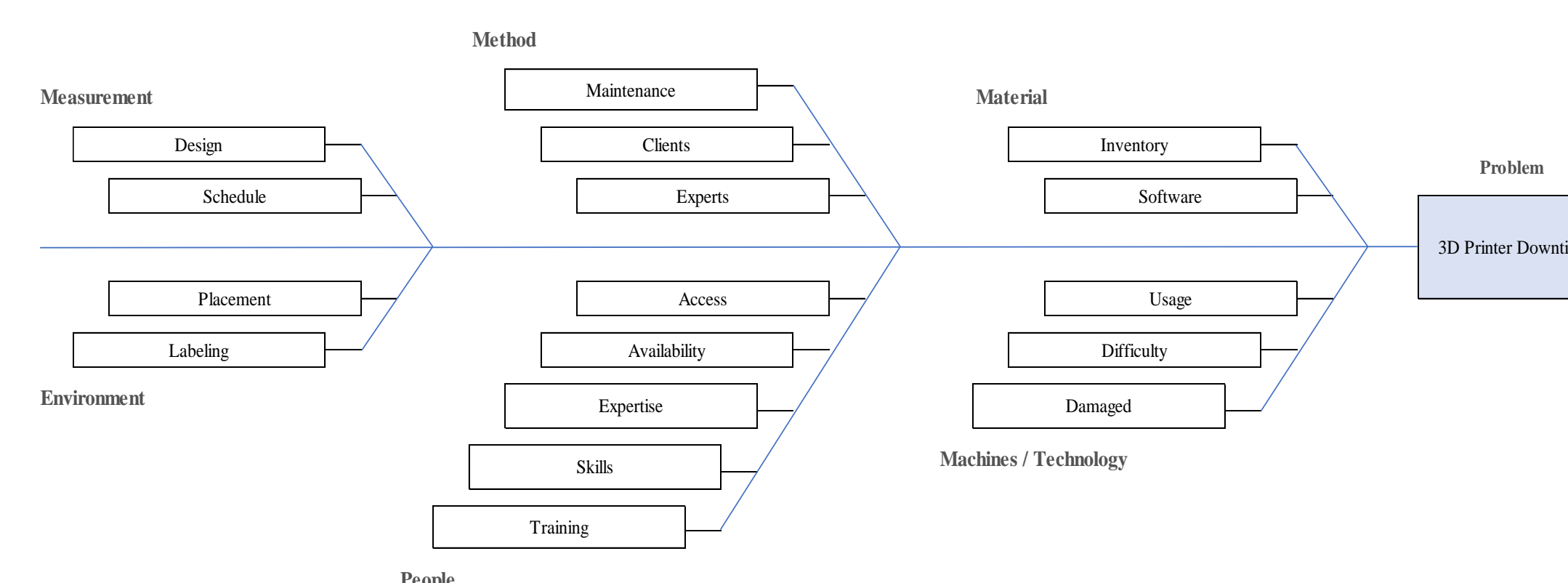
More than 80% of the downtime of 3D printer usage is that printers that work are not being used.

5 Why's



The reason why printers are not being used is that users are not trained to use 3D printers.

Cause and Effect Diagram



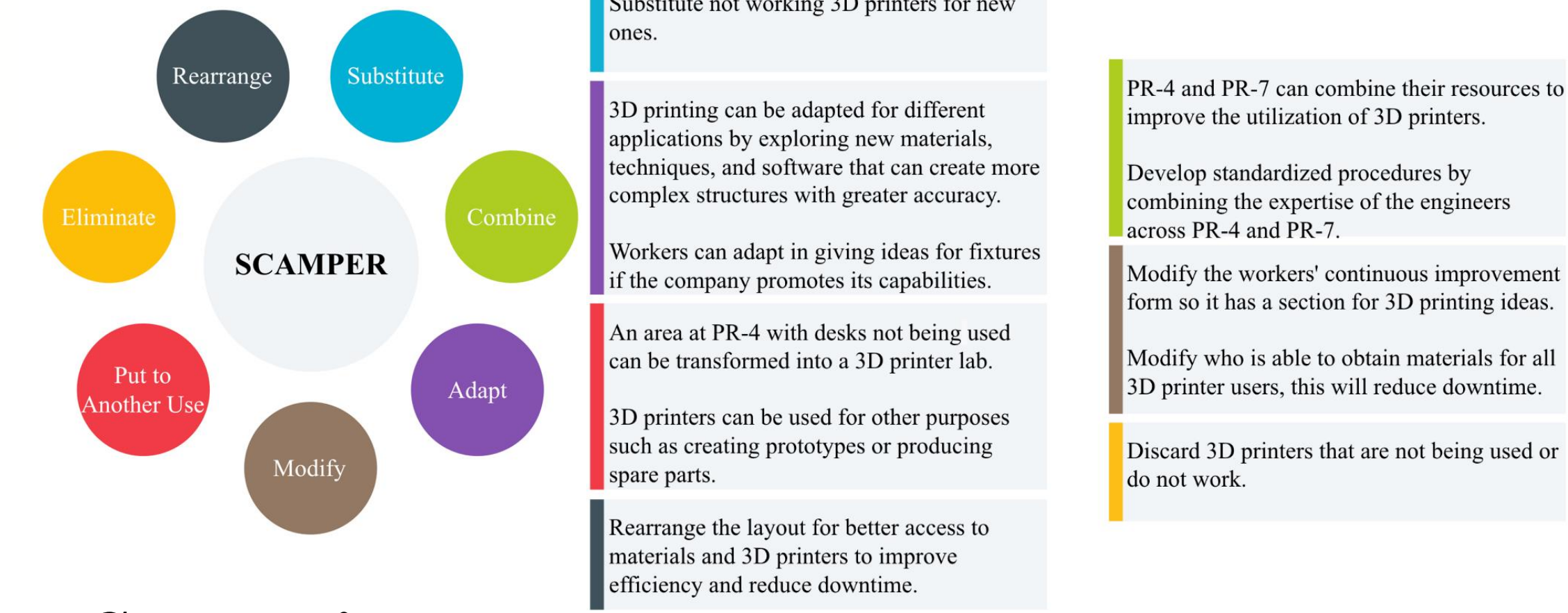
The problem statement indicates that 45.45% of 3D printers are not being used. This percentage represents 80% of the downtime.

Improve

UN Sustainable Development Goals

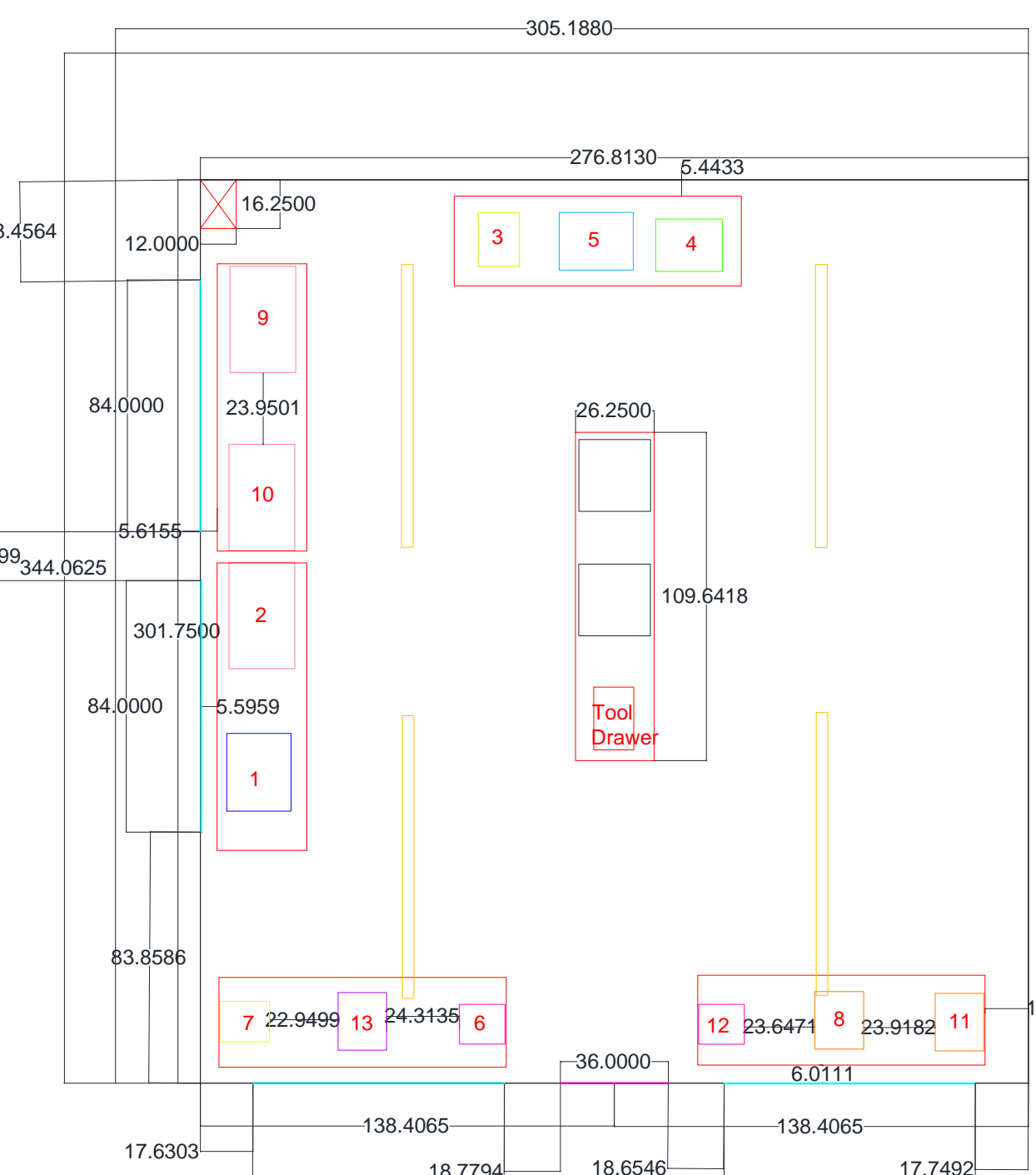


SCAMPER



Suggestions

Suggestion 1: Create a 3D Printer Laboratory



Suggestion 2: Improve the Continuous Improvement Platform

Prototype Design Suggestion Form

EMPLOYEE INFORMATION

Name: _____
Employee ID: _____
Reports to: _____
Department: _____
Date: _____
Job Title: _____

SUGGESTION - SCHEME GUIDELINES/NOTES

Enter any guidelines or notes that you wish to communicate, here.

Example: Current situation. Describe in detail the present practice, condition, or method. Include the attached documentation of the problem (if possible).

SUGGESTION

Describe your suggestion here.

Example: Describe your proposed improvement. Include how it improve your job or job of others, add value to customers and what specifically is your concern that is being addressed (lost time, wasted use of material, return of goods, inefficiency, etc.) Attach benefits and resources needed.

Suggestion 3: Provide Training for 3D Printer Users



The estimated cost of setting up the 3D printer lab and providing training is \$91,143.34. By using the lab and increasing its utilization to 30%, the company can save \$860,557.10 per year. The ROI for implementing the suggestions is 844% and its Payback Period is less than 2 months.

Control

