

Memo 6: Predictions

Predicted Speed:

Solar Panel Voltage: 12 v

Solar Panel Current: 49.4 amp

RPM: 240 RPM

$C = 2\pi(25\text{mm}) = 50\text{mm}\pi$

Gear Ratio: $50/10 = 5 = 5:1$

Linear Speed = $(240 \text{ RPM})(50\text{mm}\pi)(1\text{min}/60\text{sec})(1\text{ft}/304.8\text{mm}) = 2.06 \text{ ft./sec.}$

Cost Estimate

Item	Quantity	Cost item (\$)	Total Cost (\$)	Cost Left (\$)
Bread Board	1	2	2	78
Arduino UNO Board	1	20	20	58
Light Sensor	1	5	5	53
10500 RPM Motor	1	5.50	5.50	47.50
Rubberband	5	0.10	.50	47
Cardboard ft^2	5	0.10	.50	46.50
Brass rod 1/8"	1	2.50	2.50	44
Balsa Wood 1/4"	2	1.90	3.80	40.20
Pulley 50mm	4	0.50	1.00	39.20
50mm pulley ring	4	0.10	.20	39
150mm x 165mm solar panel	2	9.59	19.18	19.82

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10 tooth gear	1	0.30	0.30	19.53
50 tooth gear	1	0.70	0.70	18.83
Straw	4	0.10	0.10	18.73
Plywood 1/8"	3	0.70	1.20	17.53
Small Breadboard	1	1.00	1.00	16.53
Jiffy Clips 130mm	6	0.50	3.00	13.53
Wooden dowels	4	0.10	0.40	13.13
Rubber grommet 1/8"	8	0.10	0.80	12.33
Totals	55	50.79	67.68	12.33

Financial Analysis

Cost of taxi company: $67.68 * 100,000 = \$676,800$

Interest Rate: 6%

Lifespan: 20 years

OMR: \$200,000

Taxi Fare Cost: $14 / (20\text{ft}/2.06\text{ft per sec}) = 1.442$

<u>TYPE</u>	<u>VALUES</u>	<u>EQUATION</u>	<u>TOTAL</u>
<u>Recurring Loan Payment</u>	Initial Cost: 676,800 Interest: 6% per year Lifespan: 20 years= 240 months	$A = \frac{P(1+r)^n}{(1+r)^n - 1}$ $676800 \left(\frac{0.06(1+0.06)^{240}}{(1+0.06)^{240} - 1} \right)$	\$40,608.03
<u>Total Annual Cost</u>	Capital: $676800 \left(\frac{0.06(1+0.06)^{20}}{(1+0.06)^{20} - 1} \right) =$	<u>Capital + OMR</u> $200,000 + 59,006.50 =$	\$256,009.51

	59006.50 OMR: 200,000		
<u>Total Annual NET Benefit</u>	Taxi fare costs: \$ 1.442 Total Costs: 256009.51	Total profits-total costs (1.442*60*12 hours per day*5days*52 weeks*10cars) - 256009.51=	\$2,699,424
<u>Annual ROI</u>	Yearly profit: \$2,699,424 Present Cost: 676,800	Yearly profit/ present cost $\frac{2,699,424}{676,800} =$.399 or 39.9%
<u>Lifetime Cost</u>	Annual Loan payment: 40,608.03 Lifespan: 20years Initial cost: 676,800	(Annual loan payment* years)+ initial cost (40,608.03*20)+ 676,800=	\$812,160.60
<u>Lifetime NET Benefit</u>	Total annual NET benefit:\$ 2,699,424 Lifespan: 20 years	Total annual NET benefit * years \$2, 699, 424 × 20=	\$53,988,480
<u>Lifetime ROI</u>	Lifetime profit: \$53,988,480 Lifetime cost: \$812,160.60	Lifetime profit/ lifetime cost $\frac{53,988,480}{812,160.60} =$	66.475 or 6,647.5%

Analysis Summary

This venture is going to yield our company a profit and is worth continuing forward. Our return on Investment is very good because we are receiving a 39.9% back annually which is giving a good boost to what we need and is able to support us on future ventures. This venture has given benefits to transportation and the environment through giving access to people without a means of transportation and also through cutting down on emissions and pollution through

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ride sharing which reduces the amount of cars needed on the road. Overall this is an amazing venture and is well worth continuing.