Wio Link For SVH

GNG 2101 - Deliverable H.1

Submitted by Team E24

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Introduction

The objective of this report is to convey the economic future of the Wio Link based device and our company as well update the interested parties on our plans for task completion. The report will consist of a cost breakdown based on the projected manufacturing and sales of the UI, a three-year income statement of our company, and an NPV analysis which will indicate a realistic breakeven point for the company; the relevant assumptions made in each section will be indicated at the end of that respective section. Finally, there will be a Gantt Chart which will outline the current plan for task completion including group members responsible and task descriptions.

Economics: Costs & Income Statement

Costs

As mentioned in deliverable F the main costs associated with this product are marketing and sales, product development, and administrative costs. These costs will vary drastically between prototyping and high-volume manufacturing so we will split the cost analysis into pre-sale (prototype development costs), and post-sale operation (costs to run company while selling the product).

Table 1: Pre-Sale Operation

Cost	Cost Type	Description	Quantity /	Price Per Unit	Total
			Units		Amount
Prototype	Fixed, Direct	Wio Link, Wires,	1	\$31.08	\$31.08
Physical		Button,			
Components		Protoboard,			
		Grove, Light			
		Sensor			
Prototype Tools	Fixed, Direct	Scissors,	1	\$26.08	\$26.08
		Soldering Iron,			
		Flux			

Table 2: Post-Sale Operation

Parent Cost	Cost	Cost Type	Description	Quantity / Units	Price Per Unit	Total amoun t
Product	Physical	Fixed, Direct	Wio Link,	5000	\$8.35	\$41
Development	Component		Wires, Button,			750
	S		Protoboard,			
			Grove, Light			
			Sensor, Flux			
	Tools	Fixed, Direct	Scissors,	4	\$26.08	104.32
			Soldering Iron			
Marketing &	Marketing	Fixed, Indirect	HIMSS Booth,	10ft ²	\$44/ft ²	\$2 240
Sales			web	+	+	
			advertisement	12 months	\$150/	
			s		month	
Administrativ	Website	Fixed, Indirect	Cost for	12 months	\$18/mont	\$216
e Costs	Server Costs		website		h	
			upkeep			
	Employee	Fixed/Variable	Employees	4	\$18/hour	\$142
	Рау	, direct	who	employees		272
			manufacture	, 247 days		
			the product	a year, 8		
			and coordinate	hours a		
			with	day		
			customers			
	Overhead	Fixed, indirect	Electricity,			\$20
			insurance			000

Table 3: Income Statement

Year 1	
Sales	\$200 000.00
Cost of Goods Sold	\$41 750.00
Gross Profit on Sales	\$158 250.00
Operating Expenses:	
Marketing Expenses	\$2 240.00
Tools	\$104.32
Salaries	\$142 272.00
Overhead	\$20 000.00
Website Server	\$216.00
Total Operating Expenses	\$164 832.32
Operating Income	-\$6 582.32
Net Income (year 1)	-\$6 582.32
Year 2	
Sales	\$262 500.00
Cost of Goods Sold	\$62 625.00
Gross Profit on Sales	\$199 875.00
Operating Expenses:	
Marketing Expenses	\$5 240.00
Salaries	\$177 840.00
Tools	\$26.08
Overhead	\$20 000.00
Website Server	\$216.00
Total Operating Expenses	\$203 322.08
Operating Income	-\$3 447.08
Net Income (year 2)	-\$3 447.08

Year 3	
Sales	\$437 500.00
Cost of Goods Sold	\$104 375.00
Gross Profit on Sales	\$333 125.00
Operating Expenses:	
Marketing Expenses	\$7 240.00
Salaries	\$284 544.00
Tools	\$52.16
Overhead	\$20 000.00
Website Server	\$216.00
Total Operating Expenses	\$312 052.16
Operating Income	\$21 072.84
Net Income (year 3)	\$21 072.84
3-year totals	
Operating Expenses	\$680 206.56
Operating Income	\$11 043.45
Gross profit	\$11 043.45

Figure 1

Assumptions

Costs

Price per unit in bulk was assumed to be ~25% that of its regular build price based off the rate Arduino Uno's are sold in bulk vs individual

This rate is reasonable given that most bulk retailers selling microcontrollers sell them at 25% the regular market price given our research.

Each employee has one set of tools

Being a small start up it is all hands-on deck, and each employee would need to be able to manufacture the product.

The company sells 5000 units in its first year at \$40 a unit.

This is assuming we secure deals with 100 facilities and provide 50 units per facility. Given that at the locations we will be catering to there are many patients in need of such a device plus more for training and future patients.

Average web marketing on a small-medium scale goes for a rate of \$150 / month

This is based off quotes from

Website costs are \$18 a month

Based on squarespace.com

4 employees required

Being a small, not diverse company, we only have a need for manufacturers and sales reps. It's then most efficient to have each employee work multiple positions. Also, given the scale of the company at this point there isn't a need for more employees

Income Statement

Each new employee requires a set of tools for manufacturing

Within the first few years of operations, the employees will all need to be able to work manufacturing positions.

Marketing expenses increase each year to get the word out

As each year passes and the company becomes more financially viable, we will have more money to continue the company's growth.

Each year 2 employees are hired

1 employee can produce 1250 units per year in the first year (another assumption), and so as more units increase more employees must be hired.

The units sold increase from 5000 to 7500 to 12 500

As the marketing grows and the brand name grows, more units should be sold as a reflection of the companies continued growth.

There is no tax / interest on loans

Stated in deliverable description

Analysis: NPV and Break-Even Analysis

Table 4: NPV

Year	0	1	2	3
Units Sold		5000	7500	12500
Price Per Unit		\$40	\$35	\$35
Cost Per Unit		\$8.35	\$8.35	\$8.35
Cashflow	-\$57.16	-\$6 582.32	-3 447.08	\$21 072.84
Discount Rate	6%	6%	6%	6%
PV	-\$57.16	-\$6 209.74	-\$3 067.89	17 693.16
NPV	-\$57.16	-\$6 266.90	-\$9 284.79	\$8 408.37

Break-Even Analysis

- → Break even point exists at 12 500 < Units Sold < 25 000 in year 3
- -\$9 284.69 + (\$35 per unit)*(X units) = 0 (break even point)
- X = \$9 284.69 units / \$35 per unit

X = 265.277 Units

→ The total number of units sold to reach a break-even point would be 12 766, with 266 sold in year 3.

Assumptions

The discount rate is applied yearly

This is often how these rates are applied, and help simplify the calculations in NPV and Break-Even without effecting the accuracy of those results too much

The break even point occurs in year 3

The net present value is positive in year three, implying the Break-Even point was reached

The cashflow in year 0 is only associated with the prototyping costs

Given that we've developed a prototype, and to begin selling the product on mass all we would need are fixed costs payable over the first year. This would mean the only initial investment required is what was put into the prototype.

The cost per unit remains constant

The cost is based on the proportion of cost for bulk Arduinos to individual Arduinos, with the estimation purposefully rounded up to \sim 25% price for unit in bulk of individual prices.

The discount rate is 6%

This is based on values taken from the lecture and other online resources. It appears to be the norm for discount rates.

The units sold are 5000, 7500, 12 500

This increase in units sold is proportional to an increased investment in marketing and a more recognizable brand name leading to increased sales.

Project Plan Update

23	V	PD H Video script	1day	09/29/2020	09/30/2020	22	Gavin
24		PD I Pitch Creation and question list	10days	11/15/2020	11/18/2020	28	Clément
25	≝∢⊒≙	PD H Video Creation	4days	11/11/2020	11/14/2020	23	Gavin
26		PD I Demonstration video	10days	11/15/2020	11/18/2020	28	David
27		PD I Procure Visual aids	0day	11/18/2020	11/18/2020	26	David
28	<	PD H Video Edit	2days	11/14/2020	11/15/2020	25	Gavin
29	1	PD J - User manual - Main Body	14.5days	11/20/2020	11/25/2020		David
30	1	PD J - User manual - Conclusions & Bibliography	7.13days?	11/25/2020	11/27/2020	29	David,Jack
31	1	PD J - User manual - Intro, Abstract, Contents/Figures, Makerepo	7.25days?	11/27/2020	11/29/2020	30	Jack
32		PD J - Submission	1day?	11/29/2020	11/30/2020	31	Jack
33	1	PD K - Presentation - Summary	6.88days?	12/01/2020	12/03/2020	31	Gavin
34		PD K - Presentation - Concepts	3.25days?	12/03/2020	12/04/2020	33	David
35	1	PD K - Presentation - Decisions	1day?	12/07/2020	12/07/2020	34	Phil
36		PD K - Presentation - Trials & Tribulations	2days?	12/07/2020	12/08/2020	35	Kaleigh
37	1	PD K - Practice	1day?	12/09/2020	12/09/2020	36	Team
38	1	PD L - Intellectual Property - intellectual property databases	1day?	11/27/2020	11/27/2020	27	Phil
39	1	PD L - Intellectual Property - Report	4.88days?	11/30/2020	12/04/2020	38	Phil

Figure 2



Figure 3

Conclusion

This report has included list of pre and post manufacturing costs, a three-year income statement detailing relevant monetary gains and losses, an NPV analysis which clearly shows at which point a break even on sales would be reached, and the assumptions made in those analysis. The updated plan for task completion was also shown at the end of the document which outlines upcoming tasks and group members responsible. The costs and income statement showed in depth the kind of expenses and gains our company could expect to encounter. There would be net losses over the first 2 years as we cannot move a large enough amount of inventory in that time to break even. Employee pay is consistently the highest expense, which is reasonable and unavoidable. An asset to our company is the inexpensive manufacturing costs of the product, as even with a considerable mark up the price is extremely competitive which should help to move the predicted number of units. The NPV analysis allowed for the changing value of money over time to be considered and give a realistic number of units sold to break even. If the product becomes as popular as predicted there are great implications for the future of opensource software and microcontrollers. A successful business venture like this has the potential to incite a group of competitors to work on products like ours and in turn pass on innovation to the customer.