Deliverable G - Other Considerations

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Introduction

In this deliverable, we will produce an economics report and an intellectual property report for our product. This will be done assuming that we have taken our product to market and no longer have the facilities of the University of Ottawa available for our use. We also will be updating our project plan on Wrike and will be continuing to progress on our prototype.

G.1 Economics Report

G.1.1 List of Costs

Name	**Type**			**Cost**	**Assumptions**
Equipment	Fixed	Indirect	Material	$7000 upfront	Assuming we need a mill, bandsaw, and small shop equipment (ie. hand drill)
Office Space	Fixed	Indirect	Overhead	$5000 per month	Assuming only 5 of us working there
Materials	Variable	Direct	Material	$400 per unit	Assuming costs are slightly lower for parts when buying bulk
Utilities	Variable	Indirect	Overhead	$2000 per month	Assuming roughly $2 per square foot (1000 square ft workspace)
Payroll	Fixed	Indirect	Labor	$300000 per year	Assuming $60000 per person
Shipping/ Delivery	Fixed	Direct	Material	$40000 upfront	Assuming we buy our own delivery truck and ship within local regions
Insurance	Fixed	Indirect	Overhead	$1000 per month	Assuming an average level of small business insurance.

Figure 1: List of Costs

G.1.2 3-Year Income Statement

The income statement was developed under the assumption that we sell units at $1000 a piece, among the assumptions made in the list of costs.

3 Year Income Statement (2023-2025)			
Revenue	**2023**	**2024**	**2025**
Sales Revenue	$250,000	$400,000	$500,000
Net Revenue	$250,000.00	$400,000.00	$500,000.00
Expenses			
Equipment	$7,000.00	$0.00	$0.00
Office Space	$60,000.00	$60,000.00	$60,000.00
Materials	$100,000.00	$100,000.00	$100,000.00
Utilities	$24,000.00	$24,000.00	$24,000.00
Payroll	$300,000.00	$300,000.00	$300,000.00
Shipping/Delivery	$40,000.00	$0.00	$0.00
Insurance	$12,000.00	$12,000.00	$12,000.00
Net Expenses	$543,000.00	$496,000.00	$496,000.00
Net Revenue	**-$293,000.00**	**-$96,000.00**	**$4,000.00**

Figure 2: 3-Year Income Statement

G.1.3 NPV Analysis

This NPV analysis was made under the assumption that sales will increase by $100000 per year and uses the current bank rate in Canada of 4.47%. It is shown that the break-even point of our company will occur in the fourth year of operation when the NPV will be $40 310.60.

Revenue	Expenses	Income	Year	Discount Rate	NPV
$ 250,000.00	$ 543,000.00	-293,000.00	1	4.47%	-$327,463.29
$ 400,000.00	$ 496,000.00	-96,000.00	2	4.47%	-$134,960.57
$ 500,000.00	$ 496,000.00	4,000.00	3	4.47%	-$43,491.79
$ 600,000.00	$ 496,000.00	104,000.00	4	4.47%	$40,310.60
$ 700,000.00	$ 496,000.00	204,000.00	5	4.47%	$116,935.19
$ 800,000.00	$ 496,000.00	304,000.00	6	4.47%	$186,842.81
$ 900,000.00	$ 496,000.00	404,000.00	7	4.47%	$250,467.96

Figure 3: NPV Analysis

G.1.4 Assumptions Description and Justification

When developing our economics report, we made several critical assumptions based on preliminary market research to find estimations for demand, market share, and unit pricing. These assumptions form the foundation of our financial projections and contribute to the overall viability of our business model.

#	Assumption and Description	Justification
1	Demand in the Target Market	We assumed a demand for our product in the target market based on comparing it with similar products. Our assumption is based on the specific need within the market for a wheelchair rowing exercise device. This assumption aligns with a growing awareness of the importance of accessible fitness equipment and inclusive health solutions.
2	Expected Market Ownership Share Percentage	To estimate our expected market share, we considered factors such as the uniqueness and effectiveness of our product, competition, and potential issues. Our assumption of capturing a reasonable market share is grounded in the belief that our product would be one of few in the market which was specifically developed for rowing device purposes.
2	Unit Price Based on a Sound Pricing Strategy	The unit price of $1000 was determined through a pricing strategy that considered production costs, competitor pricing, perceived product value, and willingness to pay within the target market. We want our product to be priced competitively while allowing for enough revenue to cover costs and produce a reasonable profit margin.
4	Sales Growth Rate	We assumed a $100,000 increase in sales per year for our NPV analysis. This growth rate was determined by considering market expansion, increased brand recognition, and the potential for product enhancements over time. The assumption aligns with our goal of scaling our product to capture additional market share % as the business grows.
5	Bank Interest Rate	For our NPV analysis, we used the current bank rate in Canada of 4.47%. This assumption is based on current economic conditions and is a reasonable estimate for the cost of capital. It provides a standard benchmark against which we can evaluate the present value of future cash flows.

Figure 4: Table of Assumptions and their Justification

G.2 Intellectual Property Report

G.2.1 Related Intellectual Property

A patent filed in 2003 by Canatescu et al showed a mechanism to secure a wheelchair to an exercise machine. Their product has many different subsystems to secure the wheelchair and its user to the machine. Like our design, they use telescoping tubes to adjust the stoppers for different sizes of wheelchairs. They have individual stoppers for each caster wheel in which the wheel rolls into the stopper and a pin stops them from rolling out. The stoppers can be moved forward or backward with telescoping tubes for adjustability. The design also includes pins to extend the width between wheel stoppers to accommodate wider wheelchairs.

Because this design is patented, we would not be able to use the same subsystems in our product. Our design's wheel stopper is a single wide horizontal bar that can be moved forwards and backward, with a set width. This differs enough from the patent's design and so does not infringe on the inventor's IP.

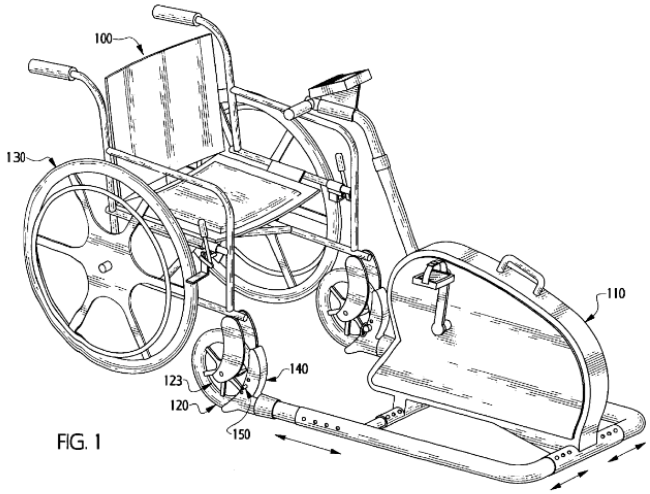

Figure 5: Canatescu's patented design with the adjustable wheel stoppers' adjustability represented with arrows. [1]

Another patent filed in 1990 by George A. Johns shows another way to secure a wheelchair during exercise. In his design, Johns used adjustable straps to secure the user and the wheelchair at the same time to the exercising machine. Two straps with hooks attach under tension to the rear wheels of the wheelchair, preventing it from moving. Straps also go around the legs and torso of the user, preventing them from sliding or falling off.

[1] https://www.freepatentsonline.com/6648358.html

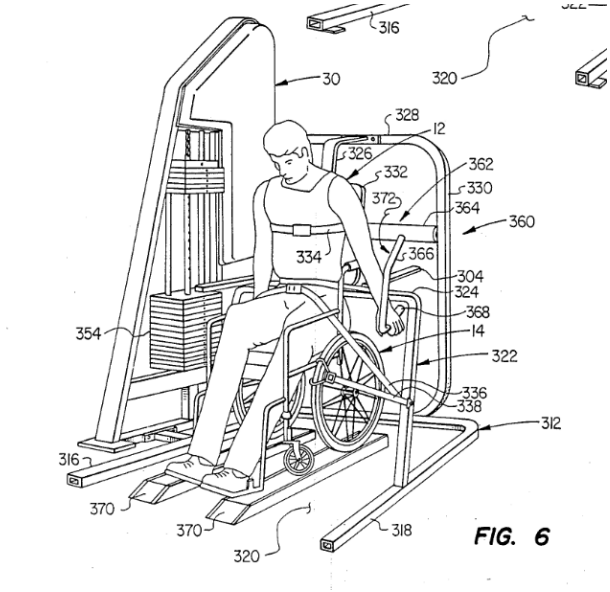

Figure 6: George A. Johns' patented design with the straps visible[2]

Legally, our product would not be able to incorporate this kind of security subsystem if we wanted to because it is patented. Luckily, our design does not include straps to secure the user to the wheelchair, rather relying on the straps built into the wheelchair and the knee stopper to prevent the user from pulling themselves off of the chair.

Conclusion

In this deliverable, we assumed the role of a small company that manufactures our product. We accounted for all the costs and made a 3-year plan based on our costs and revenue. We've also calculated our theoretical break-even point. We also found similar patented designs and explained what details from them we could not legally reproduce or copy. Moving forward, our team will finish our third and final prototype, and get ready for Design Day on November 30th.

Wrike
https://www.wrike.com/frontend/ganttchart/index.html?snapshotId=ueofyLmTG1SbO8dqd5BOFYfAVDwanxmn%7CIE2DSNZVHA2DELSTGIYA

[2] https://www.freepatentsonline.com/4911435.html

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