GNG 2101 – Intro. to Product Development and Management for Engineers

Deliverable G- Business Model and Economics Report

Team 11

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1.0 Business model

We plan to implement an empathetic design business model to commercialize our team's product. Our company is focused on delivering social value by providing disabled individuals with a low-cost solution to facilitate their daily activities. Our company aims to produce a minimum viable product, and then iterate and modify our product based on customer feedback. We chose this business model because physical constraints vary depending on the customer; their needs and functional requirements will vary. Thus, to ensure the best customer satisfaction, our team will empathize with our client before creating their product. This is to be fulfilled through client meetings and potentially a customizable online shower seat store.

2.0 Business Model Canvas

What:

We are social entrepreneurs, who are extremely customer oriented. Our goal is to facilitate the lives of disabled individuals through convenience and exceptional value for money. We value every customer, and this will be expressed by our lifetime warranty and utmost service. We cater our shower seats to meet the needs of every customer. Every shower seat is to be durable, portable, retractable and lightweight; so that customers can easily transport their product for travel abroad.

Who:

We are creating value for senior citizens and handicapped individuals who always wished to travel abroad, were always limited by physical constraints. Our products are also marketed towards health care workers, including nurses, PSWs and doctors. We hope to introduce our product to community centers, retirement homes and hospitals through private/government contracts.

Our customer relations are with retail stores and personal clients (customer relation?). We will deliver our products through our customizable website and online consultations. Our shower seat will also be sold to rehabilitation and medical clinics.

How:

We plan to execute our business plans by conducting safety testing, research & development, market research (alpha & beta testing, market simulations) and consistent team meetings. Our business will require 4 types of resources to function; they are the following:

1) Human capital resources (knowledgeable experts: engineers, project managers)
2) Funding (bank/private loans, venture capital)
3) Materials (ABS fittings and pipes, plastic, adhesives)
4) Equipment (3D printers, bandsaws, jigsaws, filers, measuring instruments)

Furthermore, our suppliers and partners will be essential to the success of our start-up. Our team will work with the hardware store for ABS pipes and fittings, private suppliers for HPDE material and direct manufacturers for equipment and machinery. We will also be working closely with marketing agencies and health specialists.

How much:

Our company's costs are divided into two sections, fixed and variable.

- Fixed costs: rent, utilities
- Variable: salaries, price of materials, delivery, packaging supplies, interest

Our economies of scale will be to buy seats and backrests directly from a manufacturer or wholesaler rather than private sellers. We can purchase contracts with manufacturers to create our plastic accessories, rather than using 3D printers. These suppliers will be cost-effective alternatives; however, they will only be useful once sales increase significantly. An online store may decrease labor costs, as purchases will be made electronically and automatically.

Our business plans to make money by implementing value-based pricing. Our product is different from our competitors; as it can be personalized for each customer. This means we are not required to compete so much on price and can instead sell our product based on customer-perceived value. We will deliver this value by:

- Providing great service to personal clients first and foremost, then large corporations
- Focusing on quality: product longevity, meeting performance and testing standards
- Marketing our products as high-tech and innovative
- Targeting the medical industry; clinics, hospitals, rehabilitation centers
- Certifying our product by medical professionals

We will produce both custom-made chairs for personal clients and readymade products for wholesalers and retailers. For wholesalers, our profit margins will be lower, as our products will be sold in larger volumes.

Feasibility:

Our team has developed several core assumptions based on our business model. They are the following:

1) The medical equipment industry is a large, competitive and well-funded market
2) Our product is a necessity and will be needed even during economic changes
3) Our empathetic business model is especially attractive for physically limited individuals. This includes elderly and disabled individuals.

Our business model is feasible since the required equipment, software and training are very accessible. The capital required to start up our business is attainable, and our business platform is simple. Using empathetic design, however, may be too time-consuming, especially once our business grows.

3.0 Economics Report

Table 3.1- Associated Costs

NAME	AMOUNT	CATEGORY	CLASSIFICATION
3D Printer	$500	Machinery	Direct Semi-Variable
3D Printer Filament	$583333.3	Material/ Components	Direct Variable
Bandsaw	$1089	Machinery	Direct Fixed
Jigsaw	$79	Machinery	Direct Fixed
Safety Glasses	$194.7	Equipment	Indirect Semi-Variable
Employee Training	$5500	Training	Direct Variable
Mill Machine	$2499	Machinery	Direct Fixed
Drill Bit	$539.64	Accessories	Direct Semi-Variable
End Mill	$546.72	Accessories	Direct Semi-Variable
Collet	$313.6	Accessories	Direct Semi-Variable
Jackob's Chuck	$144.52	Accessories	Direct Semi-Variable
High Density Polyethylene (HDPE)	$109620	Material	Direct Variable
Acrylonitrile Butadiene Styrene (ABS) Pipes	$112125	Material/ Components	Direct Fixed
Acrylonitrile Butadiene Styrene (ABS) Pipe Junctions	$210000	Material/ Components	Direct Fixed
Polymer Adhesive	$182000	Adhesive	Direct Semi-Variable
Blow Molding Machine	$4663.24	Machinery	Direct Fixed
Warehouse Rental	$25200	Rent	Indirect Fixed
Electricity	$1440	Electric	Indirect Variable
Employees Salary	$576000	Salary	Indirect Semi-Variable
Machinery Maintenance	$5000	Maintenance	Indirect Semi-Variable

The table above cites the costs associated with the manufacturing of an estimated amount of 50,000 shower chairs per year. An employee's salary was Estimated to be $20/hr., and the warehouse is set to operate 12 hours a day, 5 days a week.

Machine Components such as drill bits and endmills are estimated to wear out due to usage once every month.

In order to reach the quota, 10 employees are needed per day; 5 for morning and 5 for evening shifts, each of them will require a $550 one-time course that will include mill training, as well as workshop safety and basic training.

Each 3D Printer Filament will produce the clamps necessary for 3 chairs, 12 clamps total before needing to be refilled and/or replaced.

Each 10 oz. Polymer Adhesive can be used for a total of 2 chairs before needing to be refilled and/or replaced.

Machine Harnesses such as collets and chucks are expected to wear out due to usage once every 3 months.

4 pounds of High-Density Polyethylene are required for the manufacturing of a single shower chair. Finally, the cost of manufacturing a single shower chair after 1 year is $12.2749, with operating expenses of $24.1408544 per unit sold; therefore, the price per unit sold was decided to be $50.

4.0 Income Statement

- *Sales (Revenue) = 150000 units x $50 = $7500000*
- *Cost of Sold goods = 150000 units x $12.2749 = $1841235*
- *Gross Profit = $7500000 - $1841235 = $5658765*
- *Operating Expenses = 150000 units x $24.1408544 = $3621128.16*
- *Operating Income = $5658765 - $3621128.16 = $2037636.84*

Since we neglected interest expenses and taxes, the net income is equal to the operating income.

INCOME STATEMENT

FOR YEAR ENDED DECEMBER 31, 20225

NET SALES	**$7,500,000**
COST OF SALES	**$1,841,235**
GROSS PROFIT	**$5,658,765**
SELLING AND OPERATING EXPENSES	**$3,621,128.16**
OPERATING INCOME	**$2,037,636.84**
NET INCOME	**$2,037,636.84**

5.0 Break-Even Point

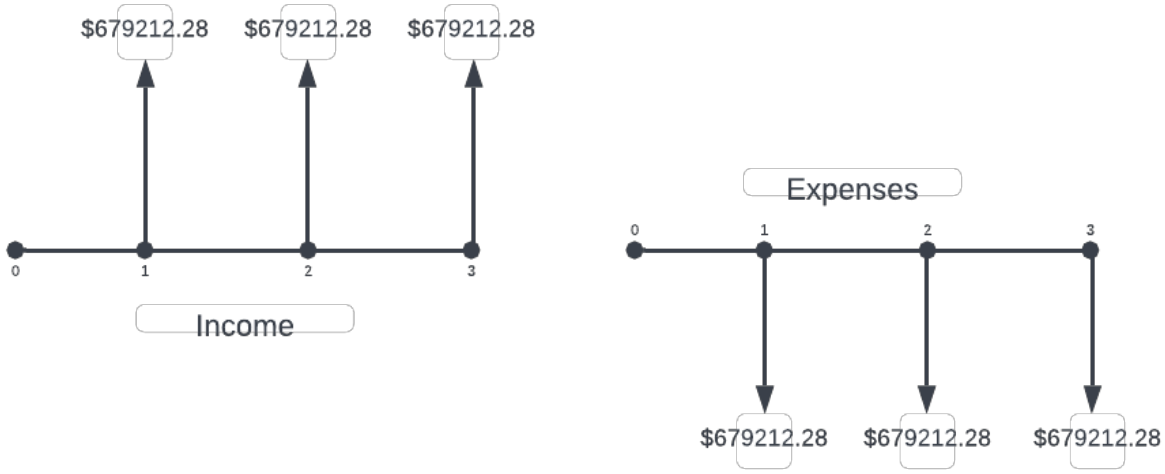
(units) = Fixed Costs ÷ (Sales price per unit – Variable costs per unit)

Fixed costs per unit: sum of all fixed costs ($356115.24)

Sales price/unit: $50

Variable cost per unit: $12.2749

Units to break even: 9441



6.0 Assumptions/Justifications

The key assumptions that have been made throughout the development of our economics report, were based some market research collected from Statistics Canada and Secondary data sources. Our team assumed that approximately 25% of the Canadian population is our target segment. When searching through Statistics Canada (2017), we determined that 6.5 million people have disabilities; this however does include mental disabilities. In addition, we found that there are 7,329,910 Canadians aged 65 years or older (2022), which comprises approximately 19% of the Canadian population. Our unit price cost was determined based on our leading competitors' prices, which range from $50-$100. These companies include Orthos XXI, Compass Health, Sunrise Medical and many more. Although our initial plan is to implement value-based pricing strategies, we understand the importance of competition-based pricing and look to gain market share and brand awareness through low-prices.

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