uOttawa

Deliverable F: Business Constraints

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Introduction:

This deliverable will focus on determining business models for commercializing our team's product, creating a triple bottom line business model, describing core assumptions in developing the business model canvas, creating a sustainability report, including a table based on cost types, developing a 3-year income statement, using a NPV analysis, describing and justifying all assumptions, and exploring intellectual property balances and their importance. In this case, we are relating our project factors to business models and economics in order to better understand our work in a global context.

F.1 Business model and sustainability report:

Type of business model

1. **Identify and describe a type of business model that would be well suited to commercializing your team's product. Discuss the reasons for your choice.**

The "brick and mortar" business model is well suited to commercializing our product. The "brick and mortar" business model involves the operation of the business in a building or other structure, offline, mainly making money via face-to-face interactions and transfers. This business model is best suited to commercializing the team's product given that it allows customers to physically test, observe and investigate the walker before purchasing. The clientele would likely need the walker for medical related, age related, or other connected factors in which having the ability to test the walker before purchase is important. It is also significant that the team would be able to store/stock the product in a building.

Triple bottom line business model canvas

2. **Fill in a triple bottom line business model canvas by answering the how, what, who and how much of your chosen business model.**

<table>
<tr><th colspan="5">Table 1. Triple Bottom Line Business Model Canvas</th></tr>
<tr>
<td rowspan="2">Key Partners
Drive medical
Amazon</td>
<td>Key Activities
Advertisement</td>
<td rowspan="2">Value Proposition
Increase walker safety and accessibility to people with limb or joint disabilities, and/or elders</td>
<td>Customer Relationships
Trusting
Positive
Co-Creation</td>
<td rowspan="2">Customer Segments
People who struggle with limb or joint disabilities
People who want an alternative way to use their walkers</td>
</tr>
<tr>
<td>Key Resources
Walkers</td>
<td>Channels
Field Sales
Amazon Store</td>
</tr>
<tr>
<td colspan="3">Cost Structure
Marketing & Sales</td>
<td colspan="2">Revenue Streams
Product Sales
Warranty</td>
</tr>
<tr>
<td colspan="3">Social and Environmental Cost
Might be seen as useless
Creation of PVC pipes releases dangerous gasses</td>
<td colspan="2">Social and Environmental Benefit
Helps to reduce greenhouse gasses
Helps to reduce energy consumption
Recycled material
Helping People with mobility issues
Inclusivity</td>
</tr>
</table>

Core Assumptions

3. **Describe the core assumptions that you have made in developing your business model canvas and comment on its feasibility. Important: These core assumptions should be based on the business model you have chosen and not on your prototype (e.g. what type of clients do you assume your product will attract?).**

The core assumptions our team has made are outlined in the following table.

Table 2. Core Assumptions		
Assumption	**Description**	**Feasibility**
Value proposition	Our team has made the assumption that there is a need for single steering walkers and a target audience we are trying to reach	Our team has justified this based on the range of customers who need single-steering components to their walker.
Customer segments	The customer segments our team has identified are elderly individuals, individuals with medical related needs, disabled individuals, family/friends of individuals that require a more adaptable walker, etc.	Our team has made the assumption that having this target audience is enough to sustain the business because there is a large amount of these individuals.
Channels	The channels our team has identified to effectively reach the target audience is mainly by one-time/direct sales. We would also consider online platforms to reach our customers with advertisements through social media, advertisements, amazon stores, etc. As well as partnerships with Drive medical, amazon, etc.	Our team has assumed that these channels will effectively distribute information to our target audience as there are many different kinds of people who may be in need of our product, so incorporating online and in person channels will allow us to reach a wide range of customers.
Customer relationships	Our team has assumed that we have a strong positive/trusting relationship with our customers.	We take the time to speak with our customers in order to make sure they are receiving a product that is best suited for their needs. This will reassure the customer that it is their needs that are important to us.
Revenue streams	Our team has had to make the assumption that our revenue streams are sustainable.	We have identified a few streams for the revenue such as one-time sales and warranty costs. We have identified this through marketing and sales.
Funding	Our team has assumed that we would be provided with a sum of money to help our start up.	The $100 is our teams initial funding, and through partnerships we can have more.

4. **Provide a sustainability report that reflects on at least two of your product's major social, environmental, and economic impacts, both positive and negative. Perform a simple analysis of these impacts and use this analysis to help you fill in the triple bottom line of your business model canvas.**

As a team, we evaluated our product based on its positive and negative effects in social, economic, and environmental areas. More specifically, some of the negative ones such as the product's usefulness and how the creation of PVC pipes can contribute to the addition of dangerous gasses. On the positive side, it emphasizes the contribution to reducing greenhouse gas emissions, energy consumption, and the utilization of recycled materials. Furthermore, it acknowledges the product's positive social impact by assisting individuals with mobility issues.

We are giving highlights of potential problems connected to the perceived usefulness of the product and the environmental impact of PVC pipe production.

Social Impacts:

Positive Impact: Helping people with mobility issues. The one-handed walker steering attachment has a significant positive social impact by providing assistance to individuals with mobility issues. This product enhances their independence and allows them to navigate their surroundings more easily. By improving mobility, it helps to promote self-confidence, and overall well-being. The attachment's user-friendly design enables people with limited hand mobility to operate walkers efficiently, thereby reducing their reliance on external assistance.

Negative Impact: Perceived uselessness of the product. One potential negative social impact of the one-handed walker steering attachment is the perception that it might be seen as useless by some individuals. Due to limited awareness or understanding of the challenges faced by people with mobility issues, some people may dismiss the need for specialized attachments such as our product. With the help of awareness campaigns and educating people on the importance of such products and their role in supporting individuals with mobility limitations, we can change the potential negative perceptions of our product.

Environmental Impacts:

Positive Impact: Reducing greenhouse gas emissions and energy consumption. The one-handed walker steering attachment contributes positively to the environment by helping to reduce greenhouse gas emissions and energy consumption. By enabling

individuals with mobility issues to navigate their surroundings more efficiently, it reduces their reliance on motorized vehicles and other energy-intensive transportation methods. This reduction in travel-related energy consumption leads to decreased greenhouse gas emissions, contributing to mitigating climate change.

Negative Impact: Creation of PVC pipes releases dangerous gasses. One major environmental concern associated with the production of the one-handed walker steering attachment is the use of PVC (polyvinyl chloride) pipes. PVC production involves the emission of toxic gasses. They are harmful to human health and contribute to air pollution. It is important for manufacturers to address this negative impact by adopting more sustainable materials or exploring alternative production methods that minimize the release of dangerous gasses.

Economic Impacts:

Positive Impact: Utilization of recycled materials. The one-handed walker steering attachment's positive economic impact lies in the utilization of recycled materials. By incorporating recycled materials into the manufacturing process, the product helps to reduce the demand for raw resources. This contributes to resource conservation and minimizes the environmental impact associated with extracting and processing raw materials. Furthermore, utilizing recycled materials often presents cost-saving opportunities, making the product more economically viable.

To conclude, the one-handed walker steering attachment exhibits several positive and negative impacts across social, environmental, and economic dimensions. It helps people with mobility issues, contributes to reducing greenhouse gas emissions, and energy consumption through the use of recycled materials. While there are positive impacts, there are concerns related to the perception of its usefulness and the environmental impact of PVC pipe creation.

F.2 Economics report:

Costs associated with our business

1. **Include a list of variable/fixed, direct/indirect, and material/labour/overhead costs associated with your business, based on the manufacturing and sale of your product. Make sure that you distinguish between price and cost and realize that prototyping and higher-volume manufacturing costs will probably be different.**

Table 3. Basic Cost Type			
Category	Material	Labour	Overhead
Variable	PVC Pipes Hinge Adhesives Foam 3D Printed Parts (Clips and Adapters)	Constructors Factory Workers	Electricity for Factory Machine Rental HVAC for Factory
Fixed			Rent for Building
Direct	PVC Pipes Hinge Adhesives Foam 3D Printed Parts (Clips and Adapters)	Constructors Factory Workers	Electricity for Factory Machine Rental HVAC for Factory
Indirect			Rent for Building
Other cost type (special cost)			
Taxation Cost	Property Taxes Municipality Taxes		
Depreciation Cost	Depreciations of Machines		
Financial Cost	Loan Payment		

2. **Develop a 3-year income statement, which includes sales revenue and costs of units sold for each year, gross profit, operating expenses and operating income (no need to include interest and taxes).**
   assume selling for $150/unit, and selling 5 units yr 1, 8 in yr2, and 12 in yr 3

Table 4. 3 Year Income Statement			
Particulars	Year 1	Year 2	Year 3
INCOME			
Revenue from Sales	750	350	1500
Revenue from Past Yr inventory		750	300
OPERATING INCOME	750	1100	1800
EXPENDITURE			
Cost of material/unit	120 (10x)	120 (5x)	120(10x)
Labor/Salary	20	20	20
Marketing	30	30	30
Depreciation	10	10	10
Total cost of material (all units/yr)	1200	600	1200
OPERATION EXPENSES	1260	630	1230
Gross Profit for the Yr	-450	470	570

Break-even point

3. **Using a NPV analysis, determine the break-even point (i.e. number of units that must be sold for your business to become profitable). Note: It is highly unlikely that your operating income will be positive in the first year because of fixed costs. Therefore, you must use a NPV analysis to compare costs and profits over multiple years based on present value. Draw two cash flow diagrams of the expenses and incomes for the next three years.**

Calculate the NPV value of each expense/income and determine the differences and then the break-even point.

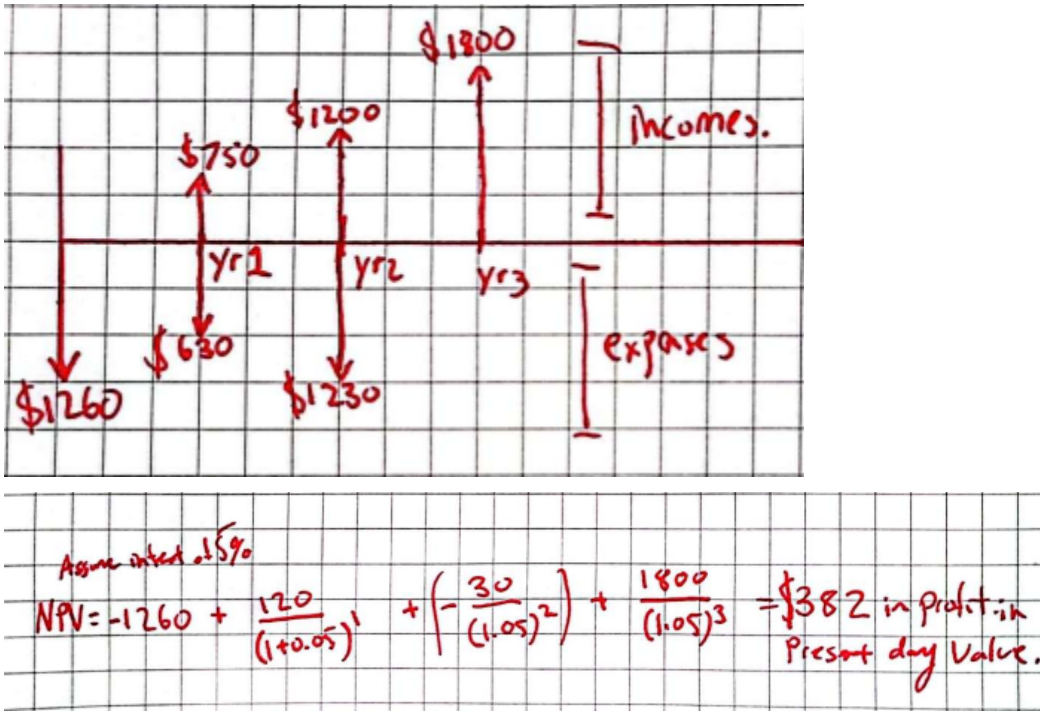

Figure A. From the cash flow diagram, the break even point will happen during year 2

Assumptions in developing economics report

4. **Describe and justify all assumptions that you have made in developing your economics report. The assumptions must be factual based on a preliminary market research that you conduct in order to determine the amount of demand in your target market, the expected % of the market that you would own, and the unit price of your product based on a sound pricing strategy.**

The economic report was made with the assumption that we mitigate the maintenance costs by not having a base of operations, and by manufacturing in batches. Because of this, understanding the demand of the product is vital in estimating how many units should be manufactured in each batch. Since our product is extremely niche, there are few products like it on the market. The only indicator of the demand for our product is from a youtube demonstration for a similar product by: TADACT (Customised One-handed Walker tutorial - YouTube), where the demand for the product can be seen in the comment section. From this market research, we decided that 10 units would be a good starting point for our team. After year one, only 5 units were sold,

leaving 5 left in inventory. Due to the poor performance of the first year and how many units are left in stock, the assumption for the following year is to cut back on manufacturing; only making 5 new units in the start of the second year, and using up the inventory. Year 2 saw 8 units sold, which indicated growing interest in our product, and so in the beginning of the third year, 10 units were manufactured.

F.3 Intellectual property report:

Intellectual properties related to product/business

1. **Explore intellectual property databases (i.e. patents, industrial designs, integrated circuit topographies, trademarks, copyrights, creative commons, or open source software) to identify at least two intellectual properties related to your product or business:**
    - http://cipo.gc.ca
    - http://www.freepatentsonline.com/
    - http://patft.uspto.gov/
    - https://patents.google.com/ or other

One intellectual property found in the patent database is the rollator walker. The rollator is a medical grade walker similar to the nitro walker. It includes a seat, breaks, wheels, a basket in the front, and more. This relates to our product given that it is a very similar if not precise prototype of the walker we are working with. Similarly, the collapsible walker offers the same design in which the walker has a seat, breaks, wheels, etc but also involves a folding mechanism in which the walker is able to be folded, allowing it to be picked up more easily.

In both cases, the nitro walker falls under these patents as a medical walker that is able to fold and help with mobility. These patents are therefore significant to our design in the sense that the group cannot modify the walker to have the following significant functions due to the patents.

It is also significant to note that there is a trademark on the name “Fast & Furious” in which the team has based our design group’s name on. It is important to identify the inspiration for the name.

Finally, in terms of specific parts of our design, taking the adjustable bar for example, other types of adjustable bar are significant to note. In one case, the “adjustable bar screen” involves an adjustable bar similar to our own that uses holes and screws to adjust.

Link to patent for rollator:

https://www.ic.gc.ca/opic-cipo/cpd/eng/patent/2890870/summary.html?query=walker&type=basic_search

Link to patent for collapsible walker:
https://www.ic.gc.ca/opic-cipo/cpd/eng/patent/2265191/summary.html?query=walker+steering&type=basic_search

Link to trademark for name:
https://www.ic.gc.ca/app/opic-cipo/cpyrghts/srch.do?lang=eng&page=1&searchCriteriaBean.textField1=fast+and+furious&searchCriteriaBean.column1=TITLE&submitButton=Search&searchCriteriaBean.andOr1=and&searchCriteriaBean.textField2=&searchCriteriaBean.column2=TITLE&searchCriteriaBean.andOr2=and&searchCriteriaBean.textField3=&searchCriteriaBean.column3=TITLE&searchCriteriaBean.type=&searchCriteriaBean.dateStart=&searchCriteriaBean.dateEnd=&searchCriteriaBean.sortSpec=&searchCriteriaBean.maxDocCount=200&searchCriteriaBean.docsPerPage=10

Link for adjustable bar:
https://www.ic.gc.ca/opic-cipo/cpd/eng/patent/2130625/summary.html?query=adjustable+bar&type=basic_search

Importance of intellectual properties

2. **Explain the importance of these intellectual properties and the legal constraints they place on developing your product or business.**

These intellectual properties are significant to identify in order to ensure that the team is not undergoing intellectual theft. It is important to ensure that the team is not creating something that someone else has created and calling it our own. Moreover, in the case of product design, there may come a time where the team would need a license to use their patented process or technology.

Conclusion

In conclusion, we have chosen the “brick and mortar” business model in the goal of commercializing our one-handed walker steering attachment. This business model not only gives us the capability to store or keep the product in a dedicated building but also provides customers with the opportunity of making in-person interactions before making a purchase. The customer can determine whether the product is right for them by trying it out, making observations, and giving it an overall thorough examination. Additionally, the 3-year income statement as well as the cash flow diagram in our economics report determines that the break-even point is reached in the second year.

Finally, when exploring intellectual property databases, we have identified the rollator walker and the collapsible walker as two intellectual properties that relate to our product. Our report explored the issues regarding how to measure feasibility among the core assumptions. Our team examined the issues related to the alternative material choices, and sustainable production practices in order to enhance the overall sustainability of the product.

Updated Wrike Link
(https://www.wrike.com/workspace.htm?acc=4975842#folder/1117638707/list?filters=status%3Dactive&showDescendants=0&sortOrder=10&spaceId=-1&viewId=-1)