uOttawa

Project Deliverable G- Business Model and Economics Report

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1. Introduction

In this deliverable, the group outlined key factors to consider in the creation of a business designed to maximise profit if the group were to market and sell product themselves, and also created a business model and marketing scheme with which a specific audience could be targeted to sell the product to. The group settled on the B2C Manufacturing Model for a variety of reasons, and also decided to market the product to individuals specifically; local individuals as opposed to corporations.

2. Business Model

2.1 Business Model Type

There are numerous things to consider when deciding what type of business model would be well suited to commercializing a product. The first thing to consider is how the clothing rack will be distributed, what are the possible expenses, and how will it make a profit.

The clothing rack will be built with raw materials into a product. Once the product has been created, it will be sold directly to the consumers. There will be no third-party company to distribute or market the product for the team. More specifically, the chosen business model is a B2C Manufacturing Model.

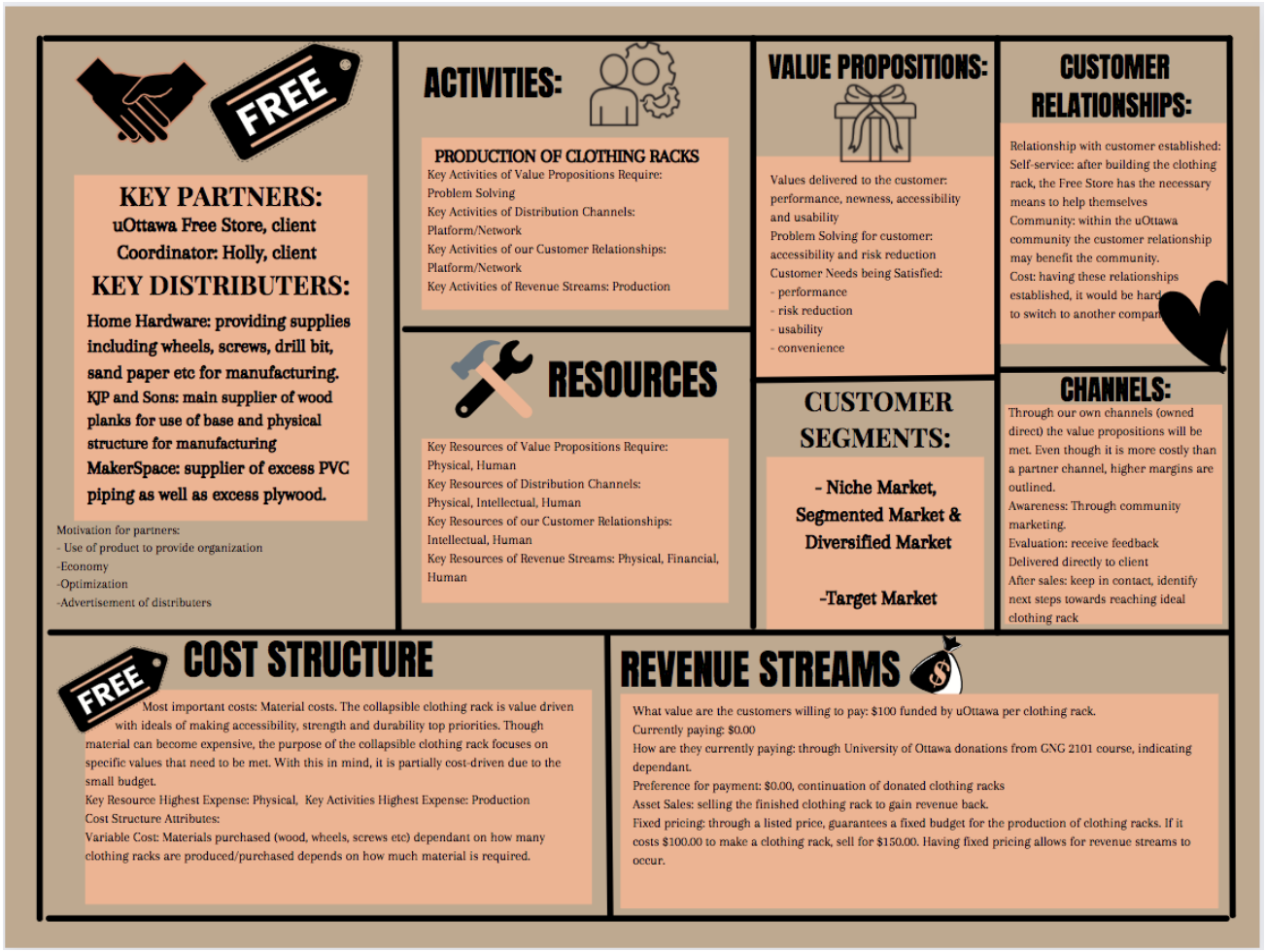
The clothing racks will be built in-house, shipped to a warehouse and from there can be distributed based on orders.

The B2C Manufacturing Business Model seems to be the best fit for the team because it allows for simplification and avoids having to work with another company to distribute. Since it is a new product, it is assumed that purchases may not be frequent for some time. For that reason, it will be manageable to build the clothing racks and distribute them. In the case that popularity increases, a revaluation on the chosen business model may need to be done.

2.2 Business Model Canvas

The Business Model Canvas created by the group can be seen in Figure 1.

Figure 1. Business Model Canvas



2.3 Core Assumptions

In the creation of the business model, several assumptions were:

A) The product will primarily be individuals and not large companies ordering many units at once. This assumption was made because the product is a fairly comprehensive system in its own right (i.e., it is not a piece or a part that could be incorporated as part of a larger system, and thus companies or individuals have less of a reason to buy it in bulk quantities (i.e., in dozens or 100s at a time)).

B) The popularity of the product (effectively translating to the number of individuals buying the product) is not so unmanageable that the group would need to subcontract to a separate organisation for labour. This assumption was made as a logical extension of the previous assumption (ie with no need to produce many units at a time, there is no need to subcontract to a separate organisation for labour)

C) Distribution will be done by the group itself. This assumption is related to assumption 1 and was made based on the fact that there will likely not be more than 1 unit sold to a customer at any one time

D) Given the fact that the product is fairly new, purchases may not be consistent. This assumption was made in the formulation of the business model such that the business model would focus more on marketing in order to bring in additional customers and thus revenue (whereas with a product that has an ever-present audience, there is less money that needs to be dedicated to marketing).

3. Economics Report

3.1 Different Types of Costs

It is important to distinguish the difference before price and cost before establishing different costs associated with the business. The cost is the amount of money required to create the product. The price is the amount of money that a customer is willing to pay for the product.

The goal is to sell the clothing rack for $250 a piece.

Table 1. Displays the different costs associated with the production of the clothing rack along with a description of the type of cost, and a justification.

Description	Types of Cost
Marketing	**Semi-variable, indirect cost** The marketing does not directly produce sales but can increase sales indirectly. The need for marketing can depend on the popularity of the product.
Production Materials	**Direct, semi-variable cost** The materials are going directly to the production, and if more clothing racks are produced, more materials will be required. If less clothing racks are produced, less materials will be required.
Electricity consumption	**Semi-variable, indirect cost** Electricity does not directly contribute to production but is needed to produce anything. The amount of energy used can vary based on hours working.
Rent	**Indirect, fixed cost** The rent does not directly produce the clothing racks but allows a space to do so. It is a fixed amount monthly and does not vary based on consumer consumption.
Boxes for shipping	**Indirect, semi variable cost** The boxes do not directly produce the clothing rack but allows a way to distribute them. The number of boxes needed will vary based on the popularity of the clothing rack.

Labourers	**Direct, semi-variable cost** The labourers directly produce the clothing racks. Based on how popular the clothing racks are, more labourers may be needed.

3.2 Income Statement

The income statement was created for a 3 year time period, as seen in Table 2, based on various assumptions explained in Section 3.4.

Table 2. Income Statement for a 3-year time period based on various assumptions.

Collapsible Clothing Rack		
Income Statement		
March 20th, 2025		
Gross Profit		
Sales (revenue)*	$4,500.00	
Cost of Goods Sold**	$1,705.50	
Gross Profit		$2,794.50
Operating Expenses		
Marketing expenses***	$360.00	
Boxes for shipping****	$505.44	
Labour expenses*****	$1530.00	
Total operating expenses		$2395.44
Operating Income		
Operating Income		$399.06

*sales (revenue) = (units sold)(price per unit) = (18 units)($250 /unit) = $4500

**cost of goods sold = (units sold)(cost per unit) = (18 units)($94.75/unit) = $1705.5

***marketing expense = (cost per month)(time period) = ($10/month)(12 month/year)(3 years) = $360

***boxes for shipping = (units sold)(box price per unit) = ($28.08/unit)(18 units) = $505.44

****labour expenses = (cost per year)(time period) = ($510/year)(3 years) = $1530.00

3.3 Break-even Point

In order to determine whether the business will become profitable, and how long it would take, an NPV analysis was used to determine the break-even point.

The equation for the NPV was as follows:

$$NPV = \frac{R_t}{(1+i)^t}$$

Where R_t is the cash flow, is the interest rate, and t is the period of time. Therefore:

$$NPV = \frac{R_t}{(1+0)^t}$$

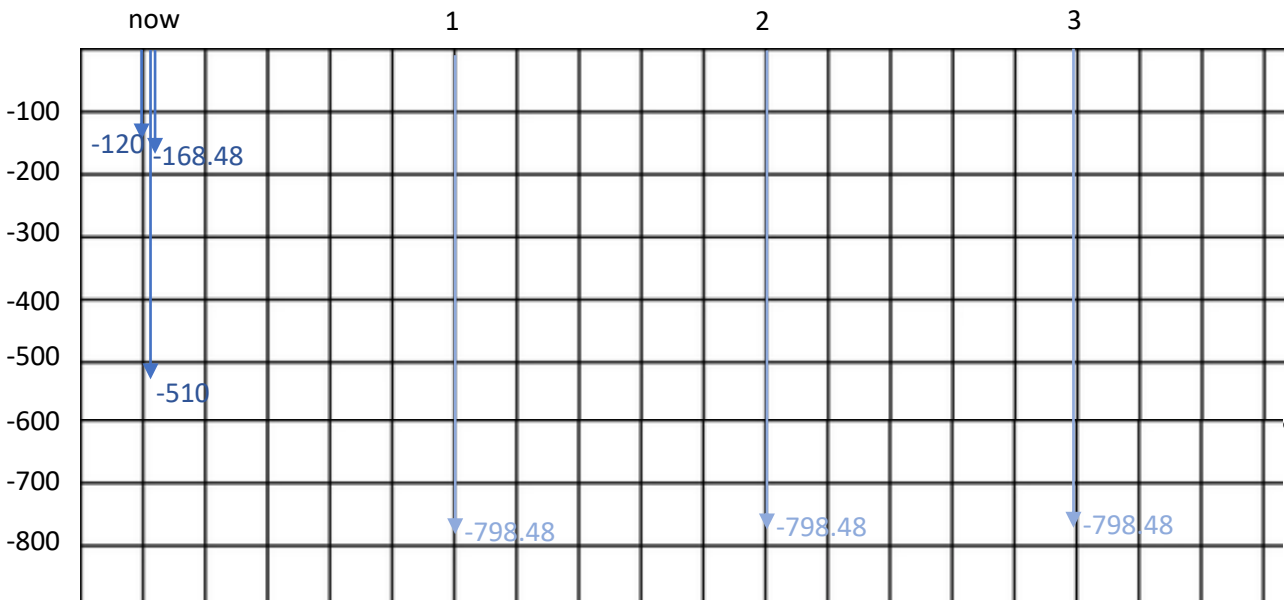
$$NPV = R_t$$

Hence, the NPV analysis was used on both the expenses and the income.

3.3.1 NPV of Expenses

The expenses were calculated first and a cashflow diagram was used to illustrate the analysis, as seen in Figure 2.

Figure 2. Cash flow diagram of expenses.



The values seen in Figure 2 were used from individual NPV analysis of the expenses for a one year period of time. While the calculations included positive numbers, since expenses are calculated, the numbers were expressed as negatived in the diagram.

$NPV_{\text{marketing expense}}$ = (cost per month)(time period)

= ($10/month)(12 month/year)

= $120/year

NPV_{labour} = (cost per year)(time period)

= ($510/year)(1 year/year)

= $510/year

$NPV_{\text{boxes for shipping}}$ = (units sold per year)(box price per unit)

= ($28.08/unit)(6 units/year)

= $168.48/year

Next, the NPV was totalled for a easier to understand cash flow diagram.

$NPV_{\text{total}} = NPV_{\text{marketing expense}} + NPV_{\text{labour}} + NPV_{\text{boxes for shipping}}$

NPV_{total} = ($120/year) + ($510/year) + ($168.48/year)

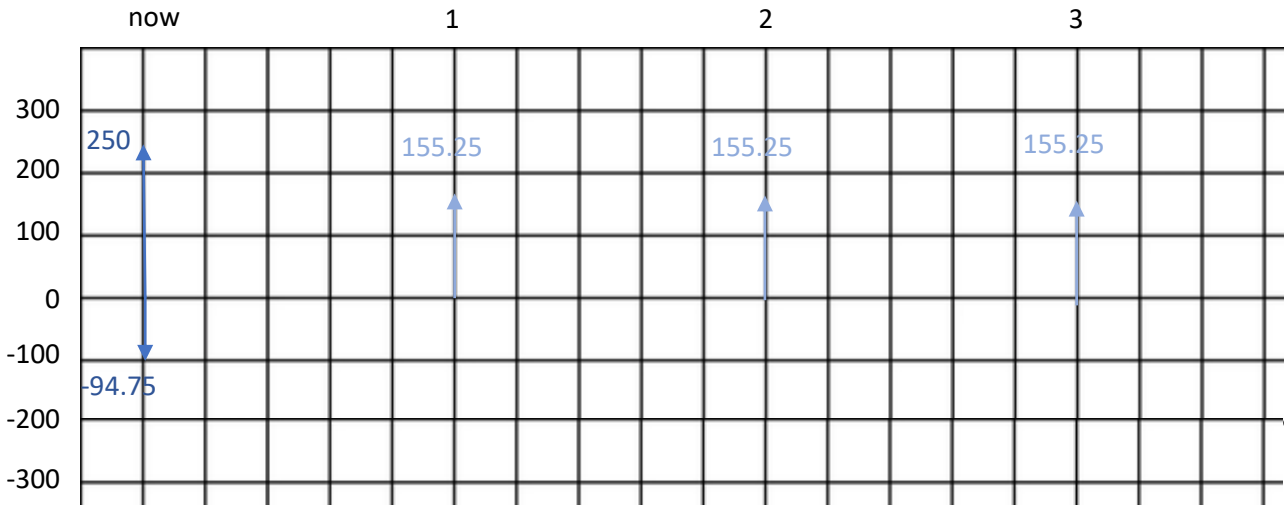
= $798.48/year

Since no interest rate existed, the expenses stayed constant over all periods of time.

3.3.2 NPV of Income

The income was calculated per unit and a cash flow diagram was created as seen in Figure 3.

Figure 3. Cash flow diagram of income per unit.



The values seen in Figure 3 were used form individual NPV analysis.

$NPV_{sales\ revenue}$ = (units sold)(price per unit)

= (1 unit/unit)($250/unit)

= $250/unit

$NPV_{cost\ of\ goods\ sold}$ = -(units sold)(cost per unit)

= -(1 unit/unit)($94.75/unit)

= -94.75/unit

Next the NPV was totalled for the gross profit per unit.

$NPV_{income} = NPV_{sales\ revenue} + NPV_{cost\ of\ goods\ sold}$

= ($250/unit) + (-94.75/unit)

= $155.25/unit

Since no interest rate existed, the income stayed constant over all periods of time.

3.3.3 Difference in NPV of income and expenses

The difference between the NPV values was calculated as follows:

$\Delta NPV = NPV_{income} - NPV_{expenses}$

= ($155.25) – ($798.48)

= -$643.23

The difference in NPV values was -$643.23

3.3.4 Calculating the Break Even Point

The break-even point was calculated as follows:

Break Even Point = $NPV_{expenses}$ / NPV_{income}

= ($798.48/year)/($155.25/unit)

= 5.14 units/year

= 6 units/year

Therefore, 6 units would need to be sold to break even with the expenses of a single year.

3.4 Assumptions

The income statement was created for a 3-year time period. The cost of goods sold was taken used from the bill of materials in Deliverable D, which was $94.75 per unit. As discussed in 3.1, if the product where to be sold for revenue, rather than created for the uOttawa free store at no cost, the goal would be to sell each clothing rack for $250 per unit. The price per unit was determined when compared to products currently on the market, such as the Oceanstar Garment Rack with Adjustable Shelves and Hooks (link) which sells for $357 per unit; the Whitmor Commercial Grade Garment Z-Rack (link) which sells for $159.99; the 30.3'' Rolling Clothes Rack (link) which sells for $116.99; and the Industrial Clothes Rack (link) which sells for $238.55. All aforementioned benchmarked products where commercially available collapsible clothing racks that appeared to be lighter than the collapsible clothing rack developed for this project, though, on the other hand, they didn't appear to be as sturdy nor as versatile in function; hence, the price per unit was determined by comparing the prices and determining a reasonable price for the product in comparison.

The production of the first prototype took about one semester (4 months), including the time it took to design the prototypes and test them; therefore, assuming the product is only built by group members of group 2.1 who continue to be enrolled full time throughout the year in school, it was determined that one rack could be build in half the time when the designing process it excluded. As a result, if one rack is built every 2 months, 6 racks are built every year and 18 racks over the three 3-year time period. Seeing as many small stores and companies exist in the Ottawa region where the rack would be build, it was assumed that the demand would be large enough for all built units to be sold within the period of time.

As the product would be built at one of the group members homes or at using the uOttawa facilities, such as the Makerspace, electricity costs and rent costs wouldn't be applicable for the building of the product. Assuming two members of the group of 5 work on the product 2 hours every other week on Sunday, at a minimum wage of $15.00 per hours (link), while also taking off 4 months for the summer semester where students go home, the cost of labour per year would be $510. The marketing of the product was decided to be focused on Facebook, where each click on the advertisement would cost $0.97 (link); a total of $10 would be allocated to marketing per month.

The price for the boxes used for shipping was decided on based on the size of the prototype. Since the clothing rack can be collapsed, it was noted that the boxes needed to, at a minimum, hold a frame of length 55”, a base of width 30”, and the collapsed height of 20”. Since no box could be found online, it was instead decided to join two boxes of 36”x36”x36” dimensions to reach the desired length, and the gaps would be filled with scrap paper to cushion the product. The price per box was 14.04 (link), which would be doubled per product sold.

After researching other clothing racks currently on the market, it was determined that this company would own a very small percentage of the market due to the vast amount of clothing racks available. This company also would only own a small percentage of the market due to the small start up, only producing 18 clothing racks over a three-year period which would mean that there wouldn’t be a high availability for customers to purchase the product. After the three years, the goal is to hire more workers to be able to produce more clothing racks to be able to expand the company and obtain a greater percentage of the market.

4. Conclusion

For this deliverable, the purpose was to create a business model and economics report for the collapsible clothing rack. The business model that best supports the creation and distribution of this collapsible clothing rack is the business-to-consumer manufacturing business model because there will not be many sales right away due to the company being new, allows for easy simplifications, and avoids using outside companies to sell the product. Formulating the business model involved many assumptions to be made, such as the racks being for smaller businesses, the demand won’t be too high, group members will oversee distribution, and the small number of products being built may cause purchases to be inconsistent. To create the economics report, the different costs for building/selling the clothing racks were split up into direct, in-direct, fixed, semi-variable, and variable costs. Once completed, an income statement was built which revealed that the operating income would be $399.06. The breakeven point for the expenses in one year was calculated to be 6 units using an NPV analysis. Similar to the creation of the business model, many assumptions needed to be made to create the economics report, including the selling price for one unit being $250 through research of similar products. It was also assumed that over a three-year period, 18 units could be built by evaluating the time it took to create the first unit this semester. Working forward on this project, the team members are going to be producing their final product in the Maker Space on campus in preparation for the upcoming Design Day.