[Microwave Transfer Project Deliverable G: Business Model and Economics Report]

Submitted by

[Lab A4 – Group 20]

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Introduction :

In this deliverable, we will outline a variety of business models which will help us prepare the marketing strategy plan of the product.For each Business Model , we will describe why we chose the model and why it is well suitable for our team's product.In addition , For the business model canvas , we will discuss the core assumptions that we have made to develop our model. Furthermore, we will discuss the economic model that will provide us with a hypothetical forecast of the project's income based on the Busines's model. This will include a 3 years income statement as well as cash flow diagrams. We will determine the break even point using NPV analysis. Diagrams and tables will be briefly described and analyzed. All core assumptions will be justified. Lastly, we will provide an updated outline of the project plan to align with the tasks.

Type of different business models :

Direct Sale Model :

This model includes companies that deal straight with the marketing plan directly to customers who are away from the specified related locations. This model involves one on one plan sales as well as internet selling. The advantage of this model is that it is effective for busy people. It enables customers to avoid physical stores locations along with a convenient buy process and reliability. However, the disadvantage is it can be overpriced if the customer databases are not properly managed.

Freemium model :

The Freemium model is usually used in the companies whose service is provided online. It is simply a model that offers customers basic services for free and more advanced services which they pay for. The advantage of using this model is that there's no upfront cost for the customer. However, this model is considered to be inefficient because the money produced does not maintain the production cost.

Subscription model :

The subscription business model is a model in which customers must pay a recurring fee to get access to a certain product or service. This is usually happening on an ongoing basis(monthly or yearly). The main advantage of the subscription model is guaranteed to receive a predictable and steady stream of income at a predefined date. The main disadvantage of the model is providing a repeated service that can be costly for some customers.

Chosen Business Models :

As mentioned above, the freemium model was chosen because it includes no upfront cost. In addition, this business model is used to direct lots of attention toward a diverse audience rather than a limited number of people. The subscription model was chosen because it is considered to have a steady plan and some customers prefer to have a regular plan where they have to pay to get the service to get the service on a monthly or a yearly basis.

Choosing a Business Model for our project :

A direct sale e-commerce business model is what has been deemed ideal for our idealized microwave transfer product. As we are selling a physical product and not a service, the options for selling our product are either through a brick and mortar store, or online. The geographical density of individuals and/or institutions that would be potential customers for an accessibility product is not extremely high, so having a physical store does not make sense. When looking at online options, the product could either be sold through a third party site or through our own private site. The latter is preferable as we seek to offer repair services and call centers. Having a single online location for all services and products offered by the company would be logistically simpler for both the business and the customers.

To gain brand recognition, targeted advertising on the internet would be a strong course of action. As the product is for accessibility and provides a social benefit, it would be important to emphasize this trait as much as possible. Offering cheap repair services and other forms of customer relations would help brand the company as an organization with the customer's interests at heart. This business model would also potentially allow the company to partner with charities and institutions that deal with people suffering from limited mobility.

Business Model Canvas

<table>
<tr>
<td rowspan="2">Key Partners

-material and electronic part manufacturers

-shipping companies and postal services

-charities and associations supporting people with limited mobility

-</td>
<td>Key Activities

-manufacturing and assembly of product

-product safety testing

-development of improved improved products based on client feedback and market research</td>
<td rowspan="2">Value Proposition

-provide a product offers wider accessibility to kitchen appliances and shelves

-products fulfill a role that is currently not addressed by any other product or company</td>
<td>Customer Relationships

-customers service call center that answers questions on product use and maintenance

-actively seek feedback from customers to improve or modify the product for their needs</td>
<td rowspan="2">Customer Segments

-customers looking for a method to automatically lift objects in an indoor environment

-homeowners with limited mobility

-public facilities that want to include more accessibility options (universities, recreation facilities, etc.)</td>
</tr>
<tr>
<td>Key Resources

-manufacturing/assembly facilities

-human resources for product development and general operation

-parts and materials for building the product

-company website to sell the product through</td>
<td>Channels

-potential customers are attracted through online advertising and referrals from organizations supporting people with limited mobility

-product is sold through an online store and distributed through the mail to customers</td>
</tr>
<tr>
<td colspan="3">Cost Structure

-website hosting and maintenance costs

-salaries, rentals of manufacturing and office facilities and utility costs

-raw parts and materials for constructing product

-shipping fees

-research and development costs

-advertisement and sales</td>
<td colspan="2">Revenue

-primary source of revenue is through product sales through the online store

-additional revenue can be obtained from a subscription service that offers warranties, product repairs and replacement of parts</td>
</tr>
<tr>
<td colspan="3">Social and Environmental Costs

-the shipping product distribution method creates a large carbon footprint</td>
<td colspan="2">Social and Environmental Benefit

-solves a problem faced by people with limited mobility that is not accounted for by current market options

-the product repair services provide an alternative to sending an entire product to the landfill is one component breaks</td>
</tr>
</table>

Core Assumptions:

The first product of the business will be an improved prototype of what we designed in the project. Because a product designed only for microwave transfer is incredibly niche, a commercial product would need to offer more functions in order to attract more customers. Therefore, the product assumed for this business model is an object lifting/transfer device that can be used in multiple household applications like lifting objects up to and down from shelves. The product would also include features that our group dropped due to time constraints such as adjustable motion ranges and safety features.

Another key assumption is that there would be a market for our product if it were to be turned into a business. The theme for all groups in this semester's project is accessibility, something that large product companies often do not account for due to it not being seen as profitable. Since the market pull for a product such as ours is uncertain, this business model is assuming that preliminary market research has been done to confirm that there is sufficient demand for our product. It is also being assumed that our product will have 75%+ of the market share for devices that make lifting small household objects more accessible. The high market share prediction is due to an inability to find similar products in the benchmarking phase of the project.

As any new business is unlikely to turn a profit early on due to being unknown and not having existing customers, having cash or investors to start the business is essential. It is being assumed that the business would have the financial resources necessary to not break even for 1 to 2 years.

Being able to establish partnerships with shipping companies, material suppliers are factors necessary to increase the audience we can sell our product to, reduce the price of the product and gain brand recognition. Being unable to make these connections before launching a business would be a huge risk that could easily result in failure. As such, it should be assumed that some, if not all, the desired partnerships have been established before formally launching the company.

Economic Report:

Before we reach the income statement, we first need to list all the parts and components that are needed to build our product:

Lead Screw Motor #1	$40
Lead Screw Motor #2	$30
Servo Motor	$16 - $35
C-Channel Aluminium	$5
Fasteners	$27
Wheels	$8
Wood	-
PLA Filament	$30
3D Printer	$1000
Telescopic Guide	$10
Contour	$9
Rack and Gear	$10
Rollers	$15
Electronics	$42.7

The following is a list of the variable, fixed, direct, and indirect costs:

Costs	**Type**
Motors	Fixed-Direct Cost
Electricity	Variable-Direct Cost
Production Materials	Variable-Direct Cost
Website Hosting	Fixed-Direct Cost
Electronics	Fixed-Direct Cost
Advertising	Fixed-Direct Cost

Since our business is an e-commerce business, online advertisement is a crucial part of our business model. Looking at the age range for our product, people with disabilities or weaknesses who can't manually place objects in and out of the microwave are our target audience. Using this information, we can aim our advertisement on two platforms: Facebook,

and Linkedin. The average cost of ads is between $400 - $1500 for each of Facebook and Linkedin [webfx]. Considering that this is a brand new business, we will opt for the lower end of the spectrum and go with a total of $400 spent a month for advertising. Since our profit isn't enough to go higher than $400, we will stick to the $400 price for the duration of 3 years and only advertise for 6 months of a year. We can increase this amount yearly if we consider the growth of the business, but at the current moment, we will only stick to the $400 mark.

Next, for hosting our website and keeping it online, we can use WHC (Web Hosting Canada). Since this website is used for business purposes, we can choose the 'Pro' package option which costs $13 per month before sale [whc.ca]. The package includes a domain name, SSL certificate, and unlimited space and traffic. Once the business grows, we can upgrade to the 'Enterprise' package option which includes a dedicated IP address.

The 3D printer price was decided following our group member's personal experience in purchasing them. A professional 3D printer with auto-calibration costs around $1,000. Only one 3D printer will be used for now since the number of employees is limited to just 4. This means that even if we increase the volume of manufacturing, it wouldn't matter since only 4 people can do the rest of the work.

Finally, for electricity consumption, I used the power consumption, energy price, and usage time to find the price of electricity. A normal 3D printer uses around 50W per hour, while a more professional 3D printer uses around 70W per hour [m3Dzone]. The electricity prices in Ottawa are 13 cents/kWh [Hydroottawa]. For now, we estimate that we'll need the 3D printer to run for 8 hours a day. Using the power consumption, energy price, and usage time, we find that the electricity bill is only $27 per month.

After working on the project for a few months, our group decided that a realistic number of units produced per year with the number of people we have is 4 per month. This makes the number of units produced in 3 years, a total of 144 units. To make a profit but keep the price low, we decided to set the price for the microwave transfer device to $355. Therefore, selling a quantity of 144 after 3 years with a price of $355 and a cost of production around $250, the income statement is the following:

Sales:	$51,120
Cost of Goods Sold:	$36,000

Gross Profit on Sales:	$15,120
Operating Expenses:	
3D Printer	$1,000
Electricity	$1,000
Hosting	$500
Advertising	$7,200
Total Operating Expenses	$9,700

Operating Income	$5,42

3-year income statement:

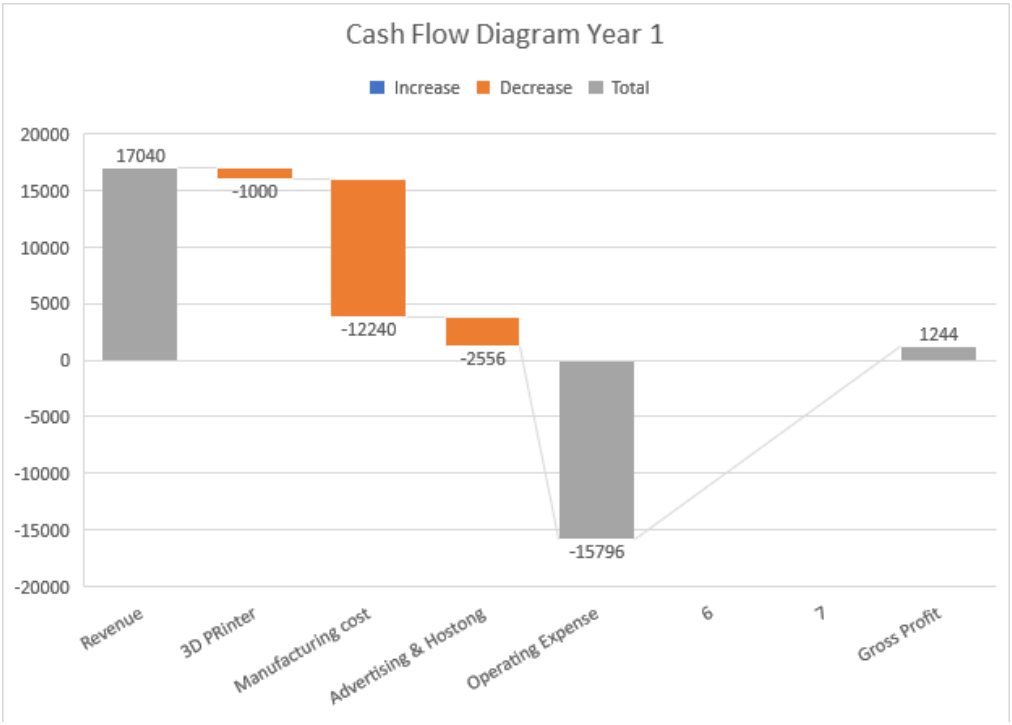
	Year 1	**Year 2**	**Year 3**
Sales	17040$	17040$	17040$
Cost of goods	12240$	12240$	12240$
Hosting	156$	156$$	156$
Advertising	2400$	2700$	3000$
3D Printer	1000$	-	-
Total Operating Expenses	15796$	15096$	15396$
Profit	1244$	1940$	1644$

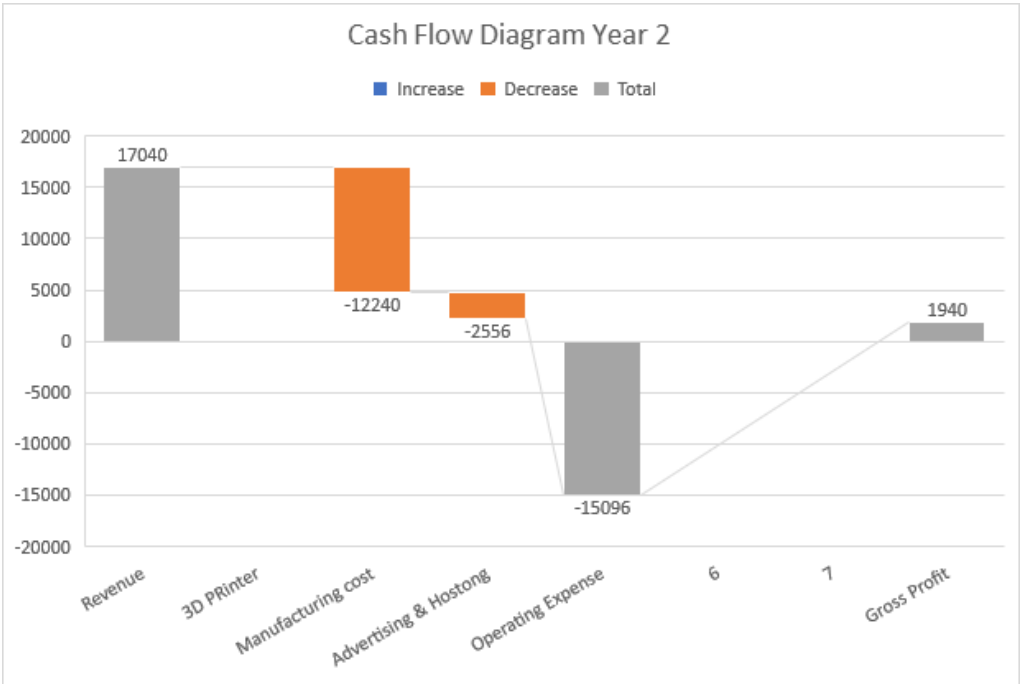
Month	1	2	3	4	5	6
Sales	1420$	1420$	1420$	1420$	1420$	1420$
Cost of goods	1020$	1020$	1020$	1020$	1020$	1020$
Hosting	13	13	13	13	13	13
Advertising	400$	400$	400$	400$	400$	400$
3D Printer	1000$	-	-	-	-	-
Total Operating Expenses	-2433$	-1433$	-1433$	-1433$	-1433$	-1433$
Operating income	-1013$	-13$	-13$	-13$	-13$	-13$
Revenue	-1013	-1026	-1039	-1052	-1065	-1078

First 6 months with advertising

Month	7	8	9	10	11	12
Sales	1420$	1420$	1420$	1420$	1420$	1420$
Cost of goods	1020$	1020$	1020$	1020$	1020$	1020$
Hosting	13$	13$	13$	13$	13$	13$
Advertising	-	-	-	-	-	-
3D Printer	-	-	-	-	-	-
Total Operating Expenses	1013$	1013$	1013$	1013$	1013$	1013$
Operating income	+387$	+387$	+387$	+387$	+387$	+387$
Revenue	-691$	-304$	83$	470$	857$	1244$

6 months without advertising


Cash Flow Diagram Year 1
Increase
Decrease
Total
20000
15000
10000
5000
0
-5000
-10000
-15000
-20000
17040
-1000
-12240
-2556
-15796
1244
Revenue
3D PRinter
Manufacturing cost
Advertising & Hostong
Operating Expense
6
7
Gross Profit


Cash Flow Diagram Year 2
Increase
Decrease
Total
20000
15000
10000
5000
0
-5000
-10000
-15000
-20000
17040
-12240
-2556
-15096
1940
Revenue
3D PRinter
Manufacturing cost
Advertising & Hostong
Operating Expense
6
7
Gross Profit

Net present value can now be calculated to be:

$$NPV = \sum_{t=0}^{T} \frac{C_t}{(1+r)^t}$$

Where:

- **C** = Cash Flow at time t
- **r** = discount rate expressed as a decimal
- **t** = time period

Year	NPV
1	-813.24$
2	944$
3	2364.55

With an initial investment of 2000$ and a discount rate of 5% we will break even by second year.

Conclusion :

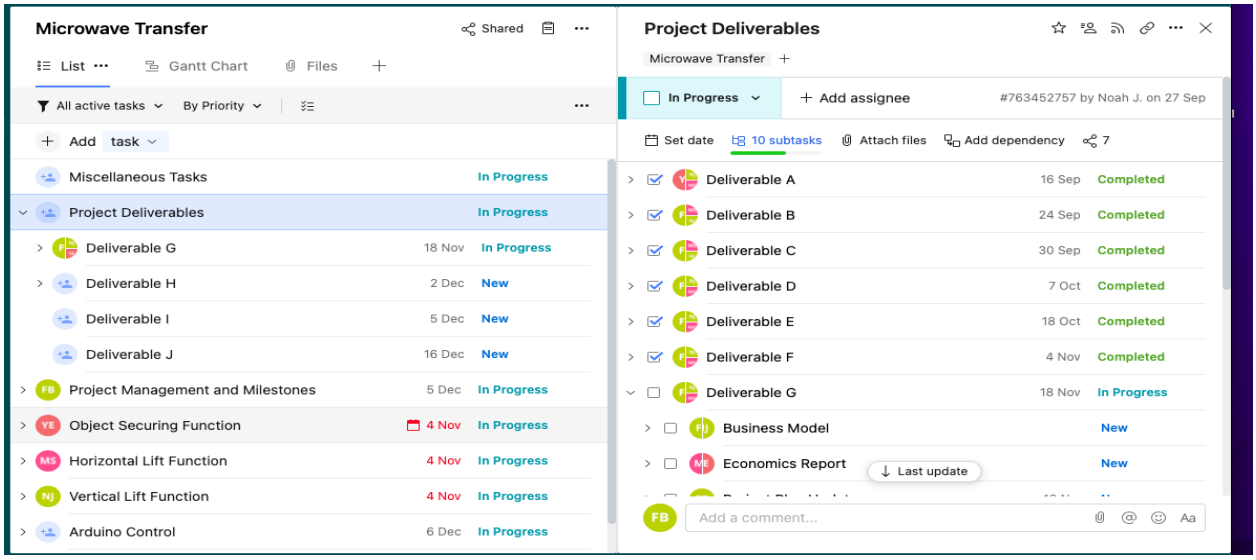
In summary, we have identified and described different types of Business models. Overall of the Business models, we chose to go with the direct sale model as it is the most suitable model for our product in terms of feasibility and sustainability.We have explained the core assumptions with details. As well we have created a model business model canvas where we have categorized specific aspects of the business model. In addition , we have developed a list of variables of the business model in corporate of the manufacturing of our product then we have developed a 3 years income statement. In addition, using NPV analysis , we determine the break even point. Lastly , we have developed an outline of the project plan.

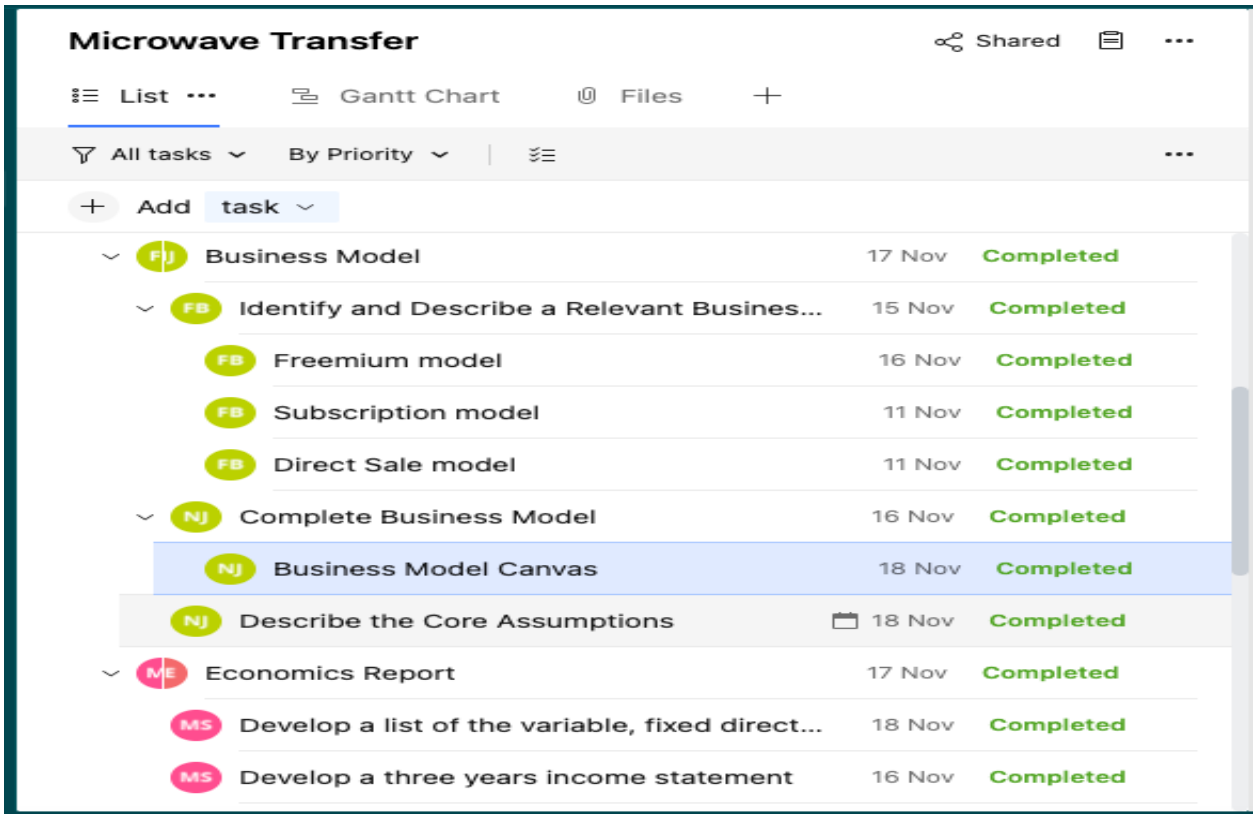
Project plan update :

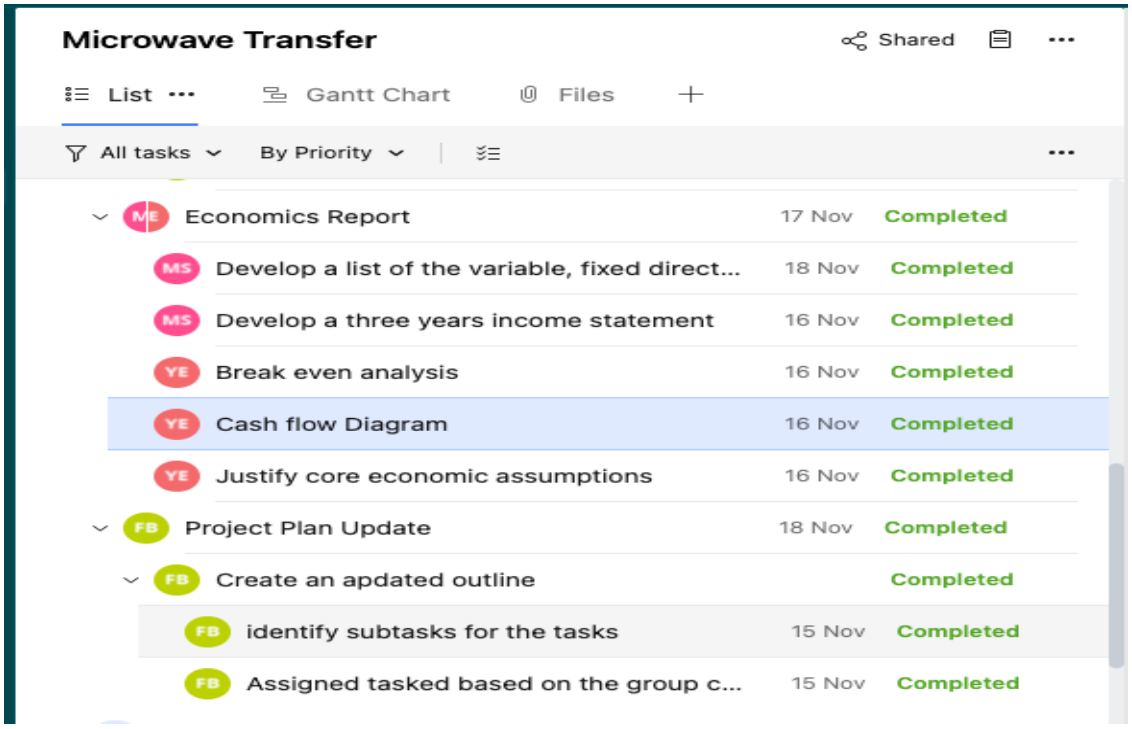
An updated outline for the project plan for deliverable G :
A list of the tasks of deliverable G that we are working on completing can be found in the table down. It is important to notice that each letter in " team member " refers to the first letter of each of the team members.

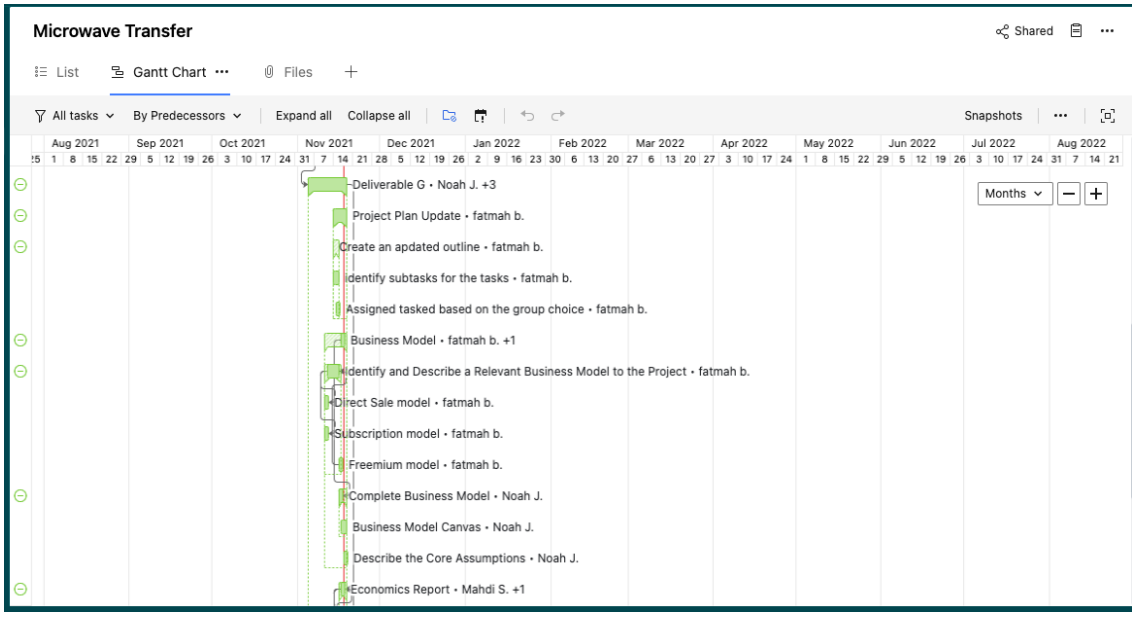
Tasks	Description	Due date	Team member
Business model	Identify and Describe a Relevant Business Model to the Project	17- 18 th Nov	F
	Complete Business model	17th Nov	N
	Describe the core assumptions	18th Nov	N
Economic Report	Develop a list of the variable, fixed direct, and indirect costs	15-18th Nov	M
	Develop a three years income statement	17-18th Nov	M
	Break even analysis	16-18th	Y
	Cash flow Diagram	17-18th	Y
	Justify core economic assumptions	18th	Y
Project plan update	Identify subtasks for the tasks	14th Nov	F
	Assigned tasked based on the group choice	14th Nov	F

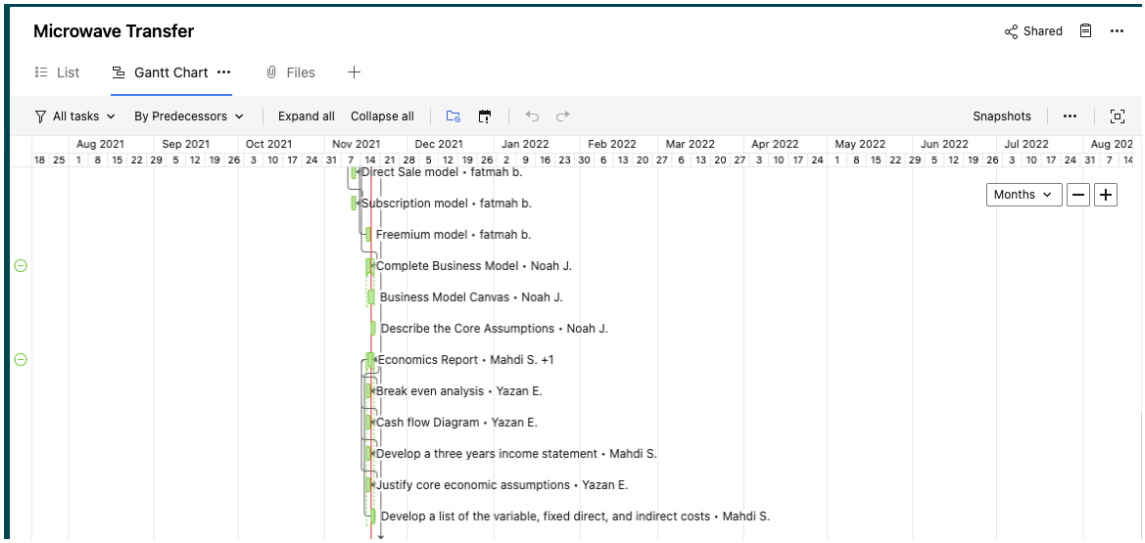
A Gantt Chart outlining the the required steps to complete Deliverable G is down :






Microwave Transfer
Shared
List
Gantt Chart
Files
All tasks
By Priority
Economics Report 17 Nov Completed
Develop a list of the variable, fixed direct... 18 Nov Completed
Develop a three years income statement 16 Nov Completed
Break even analysis 16 Nov Completed
Cash flow Diagram 16 Nov Completed
Justify core economic assumptions 16 Nov Completed
Project Plan Update 18 Nov Completed
Create an apdated outline Completed
identify subtasks for the tasks 15 Nov Completed
Assigned tasked based on the group c... 15 Nov Completed


Microwave Transfer
Shared
List
Gantt Chart
Files
All tasks
By Predecessors
Expand all
Collapse all
Snapshots
Aug 2021
Sep 2021
Oct 2021
Nov 2021
Dec 2021
Jan 2022
Feb 2022
Mar 2022
Apr 2022
May 2022
Jun 2022
Jul 2022
Aug 2022
Months
Deliverable G • Noah J. +3
Project Plan Update • fatmah b.
Create an apdated outline • fatmah b.
identify subtasks for the tasks • fatmah b.
Assigned tasked based on the group choice • fatmah b.
Business Model • fatmah b. +1
Identify and Describe a Relevant Business Model to the Project • fatmah b.
Direct Sale model • fatmah b.
Subscription model • fatmah b.
Freemium model • fatmah b.
Complete Business Model • Noah J.
Business Model Canvas • Noah J.
Describe the Core Assumptions • Noah J.
Economics Report • Mahdi S. +1


Microwave Transfer
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Expand all
Collapse all
Snapshots
Aug 2021
Sep 2021
Oct 2021
Nov 2021
Dec 2021
Jan 2022
Feb 2022
Mar 2022
Apr 2022
May 2022
Jun 2022
Jul 2022
Months
Direct Sale model • fatmah b.
Subscription model • fatmah b.
Freemium model • fatmah b.
Complete Business Model • Noah J.
Business Model Canvas • Noah J.
Describe the Core Assumptions • Noah J.
Economics Report • Mahdi S. +1
Break even analysis • Yazan E.
Cash flow Diagram • Yazan E.
Develop a three years income statement • Mahdi S.
Justify core economic assumptions • Yazan E.
Develop a list of the variable, fixed direct, and indirect costs • Mahdi S.