



اَوْنِبُوْرَسِيْتِي تِي كُوْلُوْمِي مَارَا
UNIVERSITI
TEKNOLOGI
MARA

**TECHNOLOGY ENTREPRENEURSHIP
(ENT 600)**

NEW PRODUCT DEVELOPMENT

PURISTABABY

(AIR-PURIFIED STROLLER)

FACULTY AND PROGRAMME : Bachelor of Science (Hons) Food Science & Technology
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1. EXECUTIVE SUMMARY

The team is developing a baby stroller, a concept baby stroller that creates pure and clean microclimate for your baby. Inspired by a car that recirculates the inside air instead of outside unless you set it up to do so. This baby stroller purifies the air inside using a special designed filter and recirculate to protect your baby from polluted air. The glass lid works as a shield as protection from UV rays where parents can still communicate with their baby through a speaker, there's a built-in microphone inside the stroller. Parents can always mute the sound just in case the baby's sleeping. A product concept testing with a survey conducted among 40 classmate shows that when the concept is available in market, this device is conveniently for family that has a kid and toddlers. The concept will be tested with three families that have a kids and once product is ready, the product will be test at the market.

2. INTRODUCTION

1. Problem statement

All children in Malaysia live in an environment with unhealthy air because of pollution and smoke. Even moderate air pollution is attributed to reduced lung capacity in 1 out of 6 children and 10% increased chances of hospitalization. Children are highly vulnerable because of their developing immune systems, higher breathing rate, and exposure to higher concentration of vehicle exhaust due to low elevation from the ground. The current methods for reducing air pollution including the air smoke health impact are ineffective and crude. Air purifiers are large and designed for indoors use. Face masks are inconvenient for children and stroller covers protect only in strollers and don't protect against gas pollutants. Currently, there is only one individual product that can be attached to the stroller, not the air cleaning concept of the stroller itself. For example, in 1952, a number of air pollutants from cold winter weather, heating, automobile soot and factories created smog in London and many children died. Long-term exposure to high air pollution can lead to serious symptoms in children, affecting their respiratory and inflammatory systems (Defra,2017). Furthermore, Children with asthma may notice that they need to increase their use of reliever medication on days when

levels of air pollution are higher than average. My team think that if the air purifier built in the stroller was at that time, it could protect the health of the child enough.

2. Methodology

Our market research indicates that there is a demand for better air pollution protection for children. Through the built-in air cleaner of the stroller, when the baby is in the stroller, it blocks the fine dust from the outside. The seat of the stroller can be detached and easily attached to the inside of the vehicle. In addition, the pollution of the indoor vehicle can be measured and filtered, which can prevent air pollution from the child. The filtering method filters the air pollution through the frame of the stroller, and then purifies the air in the stroller. Purified air escapes through the holes in the back of the product. Through the LED screen attached to the handle, the user can touch the remaining amount of ultrafine dust, the temperature and humidity, and the temperature control indication. From our interviews indicate specific needs, which we are addressing in product design.

3. Limitation

Even though PURISTABABY comprise of high-tech functioning components, it's still have its own limitations. Our PURISTABABY is much costly compared to the usual stroller in the market. Plus, another limitation for this product is the lack of awareness or ignorance of some parents to understand the importance of clean air for their growing babies. Air pollution has been known to have the ability to disturb the development process of growing babies. Hence, providing a clean air and comfort to growing babies is crucial.

4. NEW PRODUCT DEVELOPMENT

1. Definition

Our team plans to develop a baby stroller that can filter the outside fine dust, and can manage indoor and outdoor air for the child. There is an ultrasonic measuring device, and the air circulation can be seen through the LED screen. The built-in air purifier allows caring for child purifier the air whenever and wherever you feel irritated with air in the environment. PURISTABABY has three major components: clean air generating system (CAG), clean air distribution system (CAD) and clean air control system (CAC). CAG system, comprising of air filter pack and fan, reliably generates clean air. CAD system is connected to CAG system and is used for conducting and directing the air flow. PURISTABABY has a proprietary air curtain technology which forms a virtual canopy to keep pure air in and polluted air out. CAC system consists of a combination of sensors for monitoring air before and after filtration and notifying the user when filter needs to be replaced or cleaned. In addition, the sensors form a feedback loop along with the processor regulating air flow and providing smart adaptive filtration. Energy for PURISTABABY is provided by rechargeable batteries and can be harvested from the solar panels and rotation of stroller wheels. So, our product can purify the air in the surrounding on the go as the stroller is equipped with an air purifier. The power will be generated through the solar panel that will be place at the handle of the stroller so that people do not have to worry about ran out of power. This product able to give purify air to the babies

2. Classification of NPD

This product will be equipped with washable air filter, washable dust collector plates, activated carbon filter, high efficiency filter, germicidal UV light and solar panel. Our product will ensure that the parents can take their babies for a walk with safe mentality that their babies will not be harm by the pollute air. Puristababy solves our customer's problem because continuous, convenient, reliable and complete. It offers continuous protection from air pollution no matter where the child is. Its unobtrusive and child-friendly form factor is convenient for parents and

children alike. Pollution sensor systems ensure it's reliable at keeping polluted air out and clean air in, while proprietary filtration system and air curtain ensure complete protection against all the major pollutants. Puristababy stands for on-the-go clean air, comprehensive protection and a peace of mind.

3. New Product Development Process

1. Research & Development

Idea Generation

Idea generated by seeing a child suffers by the smoke produce by cigarettes smoker. It is long since the fine dust has polarized and the red light has been on the national health. Environmental and medical experts diagnose that children and the elderly who have been neglected will suffer from cardiovascular and respiratory illnesses. Children 0 to 3 years old are the most important growth period as the primary immunogenic. Children breathe in 50 percent more air per pound of body weight than adults do Parents should pay particular attention to their children. Based on these social issues, we tried to integrate them into products.

How It Works Global Youth Tobacco Survey showed that almost half of the world's children are exposed to second-hand tobacco smoke (SHS). Imagine what can the smoke does to babies that has not developed their organ fully.

2. Idea Screening

Our team considering two products which both can be purify air at anytime and anywhere it is:

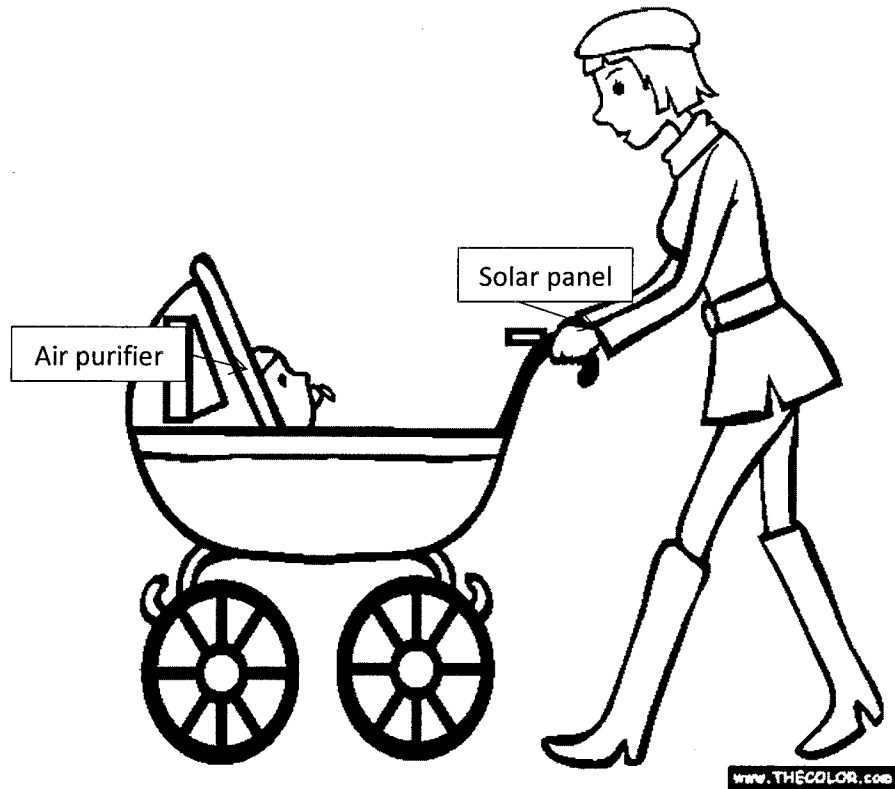
1. An air purifier that is portable with power bank as it source.
2. An air purifier that is equipped on the bag with solar panel as it source of power.

The team decided to combine the idea of the two products into one and made it into a stroller that is equipped with air purifier, after a serious discussion was made. This device will have both power sources on the go as well as it will protect the most susceptible human which are babies from polluted air.

Market Survey

Through discussion with the team members, we conclude that there are no other strollers from different brand that are equipped with air purifier. We believe that this product will benefit the parents as the safety of their babies is top priority to any parents

1. Product Design and Features



2. Concept Testing

A survey conducted among 40 classmate shows that when the concept is available in market, this device is conveniently for newlywed parents.

3. Build Prototype

The team will build the prototype once we got the grant from the government.

4. Test Marketing

The concept will be tested with five parents that have baby to test the effectiveness of the product.

3. Conclusion

Our team confidence that PURISTABABY has a potential to be commercialized as it it's comprise of high-tech functioning components, easy-to-use, compact, lightweight and provide comprehensive protection for baby. Hence, PURISTABABY is the right choice for customers who are concern about giving their growing babies full comfort and a clean air to breath in.

4. Reference

Birken, C. S., Lichtblau, B., Lenton-Brym, T., Tucker, P., Maguire, J. L., Parkin, P. C., & Mahant, S. (2015). Parents' perception of stroller use in young children: a qualitative study. *BMC public health*, *15*(1), 808.

Saxena, N., & Bhargava, R. (2017). A Review on Air Pollution, Polluting Agents and its Possible Effects in 21st Century.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

The team is developing a baby stroller, a concept baby stroller that creates pure and clean microclimate for your baby. Inspired by a car that recirculates the inside air instead of outside unless you set it up to do so. This baby stroller purifies the air inside using a special designed filter and recirculate to protect your baby from polluted air. The glass lid works as a shield as protection from UV rays where parents can still communicate with their baby through a speaker, there's a built-in microphone inside the stroller. Parents can always mute the sound just in case the baby's sleeping.

1.2 Purpose of Development

All children in Malaysia live in an environment with unhealthy air because of pollution and smoke. Even moderate air pollution is attributed to reduced lung capacity in 1 out of 6 children and 10% increased chances of hospitalization. Children are highly vulnerable because of their developing immune systems, higher breathing rate, and exposure to higher concentration of vehicle exhaust due to low elevation from the ground. The current methods for reducing air pollution including the air smoke health impact are ineffective and crude. Air purifiers are large and designed for indoors use. Face masks are inconvenient for children and stroller covers protect only in strollers and don't protect against gas pollutants. Long-term exposure to high air pollution can lead to serious symptoms in children, affecting their respiratory and inflammatory systems (Defra, 2017). Furthermore, Children with asthma may notice that they need to increase their use of reliever medication on days when levels of air pollution are higher than average. My team thinks that if the air purifier built in the stroller was at that time, it could protect the health of the child enough.

1.3 Product Concept

- Through the built-in air cleaner of the stroller, when the baby is in the stroller, it blocks the fine dust from the outside.
- In addition, the pollution of the indoor vehicle can be measured and filtered, which can prevent air pollution from the child. The filtering method filters the air pollution through the frame of the stroller, and then purifies the air in the stroller. Purified air escapes through the holes in the back of the product.
- Through the LED screen attached to the handle, the user can touch the remaining amount of ultrafine dust, the temperature and humidity, and the temperature control indication.

1.4 Application

Our product will ensure that the parents can take their babies for a walk with safe mentality that their babies will not be harm by the pollute air. PURISTABABY solves our customer's problem because continuous, convenient, reliable and complete. It offers continuous protection from air pollution no matter where the child is. Its unobtrusive and child-friendly form factor is convenient for parents and children alike. Pollution sensor systems ensure it's reliable at keeping polluted air out and clean air in, while proprietary filtration system and air curtain ensure complete protection against all the major pollutants. PURISTABABY stands for on-the-go clean air, comprehensive protection and a peace of mind.

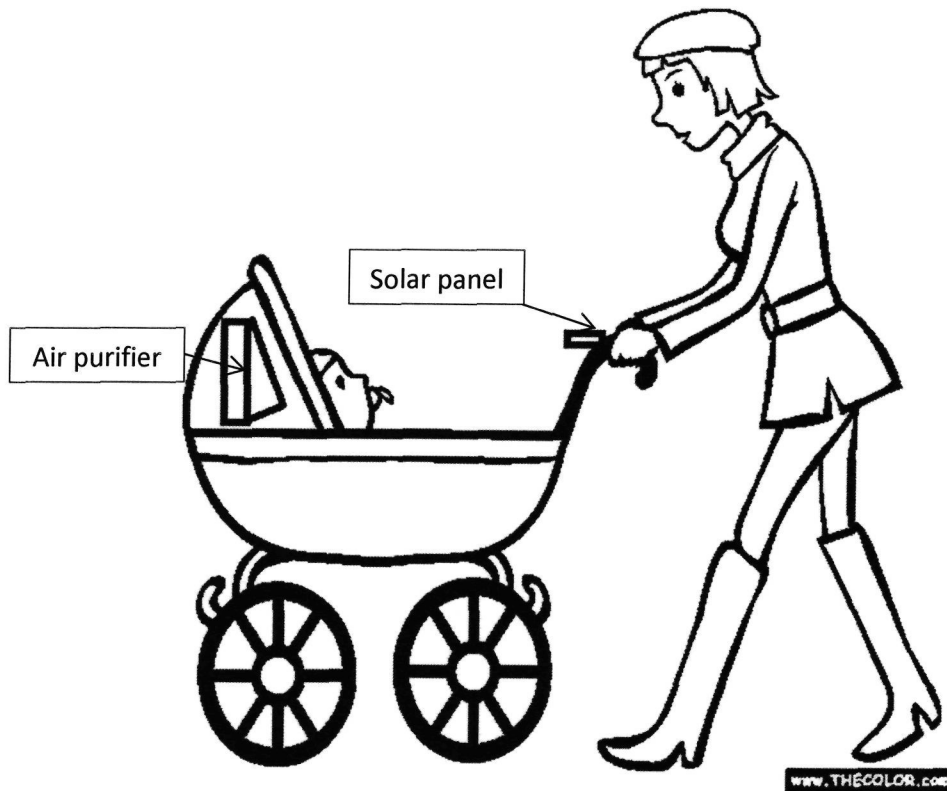
1.5 Unique Features

This product will be equipped with washable air filter, washable dust collector plates, activated carbon filter, high efficiency filter, germicidal UV light and solar panel.

CHAPTER 2

TECHNOLOGY DESCRIPTION

2.1 Overview of Product Prototype



There is an ultrasonic measuring device, and the air circulation can be seen through the LED screen. The built-in air purifier allows caring for child purifier the air whenever and wherever you feel irritated with air in the environment.

PURISTABABY has three major components: clean air generating system (CAG), clean air distribution system (CAD) and clean air control system (CAC). CAG system, comprising of air filter pack and fan, reliably generates clean air. CAD system is connected to CAG system and is used for conducting and directing the air flow. PURISTABABY has a proprietary air curtain technology which forms a virtual canopy to keep pure air in and polluted air out. CAC

system consists of a combination of sensors for monitoring air before and after filtration and notifying the user when filter needs to be replaced or cleaned.

In addition, the sensors form a feedback loop along with the processor regulating air flow and providing smart adaptive filtration. Energy for PURISTABABY is provided by rechargeable batteries and can be harvested from the solar panels and rotation of stroller wheels. So, our product can purify the air in the surrounding on the go as the stroller is equipped with an air purifier. The power will be generated through the solar panel that will be placed at the handle of the stroller so that people do not have to worry about running out of power. This product is able to give purified air to the babies.

CHAPTER 3

MARKET RESEARCH AND ANALYSIS

3.1 Target Consumer

To ensure that marketing effort fulfill customers' needs and wants as well as bring profits, we have taken steps to identify and focus our effort on a selected group of customers. This is to ensure that the marketing efforts taken are within our scope and capabilities of our business. Target market is defined as the group of customers with needs and wants that can be satisfied by business through supply goods and services.

For our air purified stroller, our main focus is to convince parents, expected parents or a set of families that could benefit from our stroller. This would be the first stroller to ever be produced that offers purified air whilst operating; therefore it really could attract our target consumer.

3.2 Market Size

- Malaysia 2017 population = 32.0 million people (Source: <https://www.dosm.gov.my>)
- Estimated no. of family (6 people per family) = $32.0/6 = 5.33$ million family
- Family with children below 5 years old (24.1%) = 0.241×5.33 million = 1.28 million family (Source: <https://www.dosm.gov.my>)

3.3 Market Share

- Estimated of family buying (10%) = 0.10×1.28 million = 128 000 family

3.4 Estimated Sales Forecast

From family with children under 5 years old that will purchase the product:

$$= 128\ 000 \text{ people} \times \text{RM } 1040$$

= RM 133 120 000

3.5 Competition and Competitive Edge

Since PURISTABABY is a new invention of baby strollers, it will be hard for us to penetrate the market segment as the consumer will need justifiable excuses and assurance that our product is better than the rest of the baby strollers that has been long established in the market. Besides that, the consumer will compare the prices with other baby strollers in the market to make sure that their purchase is well justified. This will incur a few setbacks to our product because being a new invention company; the market penetration would be a challenge to our company.

3.6 Marketing Strategy

Location

The most strategic and convenient place for us to showcase our stroller to the market segment is by entering the market through malls and supermarket, especially stores that carry baby supplies since most parents will opt baby supply stores as their first option in purchasing. We will also be selling our product through major hypermarket that has supermarket and department stores under one roof such as Carrefour and Aeon. This is another alternative as people are keen towards hypermarket due to the convenience having everything under one roof. Besides that, we are also planning to enter the baby supply market by joining exhibitions conducted by the authorities. It is an opportunity by joining such project as exhibitions are only conducted on a several times a year, thus people are looking forward towards such exhibition as usually the price are discounted.

Attractiveness

Since baby strollers are not a new thing in the market segment, we would like to focus on the extra benefits that our product could offer such as air purifier, dust collector shields and pollution detector. Not many of us are aware of the effect of the UV rays emitted to our skin, and if only a small amount could already affect the adults, can we imagine what our children have to go through on daily basis. Exposure towards UV rays could lead to many types of skin diseases and now that our air is thinning up due to serious air pollution issue, UV rays could easily be entering our atmosphere. Thus, with the extra protection that we could muster through our baby stroller, it could help protecting our children from any unwanted diseases.

CHAPTER 4
FINANCIAL PLAN

4.1 Start-up Cost

ONE TIME START-UP COSTS	RM
Business fixtures and equipment	5000
Machineries/Equipment	2000
Basic Renovation	1000
Rental deposit (2 months)	4000
Utilities deposits (1 month)	500
Legal and professional fees	1000
Licenses and permit	800
Insurance	500
Fees of Expert Services	20,000
A. Total one-time start-up costs	34,800

4.2 Working Capital (6 Months)

6 MONTHS EXPENSES	RM
Rent	2000
Utilities	500
Office supplies	500
Miscellaneous	1000

Total monthly working capital required	4000
B. Total 6 months expenses (ax6)	RM 24,000

4.3 Cost of Component per Prototype

Components	RM/unit	UNITS	RM
Baby stroller	100	1	100.00
UV protection glass	80	1	80.00
Mini speaker	50	1	50.00
LED screen	140	1	140.00
Solar panel	50	1	30.00
Carbon filter	30	1	30.00
Washable air filter	130	1	130.00
Washable Dust collector	180	1	180.00
Air purifier	200	1	200.00
Dynamo wheel	100	1	100.00
Total Cost Per Prototype			1040.00
C. Total Cost of Prototype x 10 Quantity			10400.00

$$\begin{aligned}
 \text{Total Cost (6 Months)} &= \text{Total Cost A} + \text{Total Cost B} + \text{Total Cost C} \\
 &= \text{RM}34,800 + \text{RM}24,000 + \text{RM}10,400 \\
 &= \underline{\underline{\text{RM}69,200}}
 \end{aligned}$$

CHAPTER 5
MANAGEMENT TEAM

5.1 Organization Chart



5.2 Key Management Personnel

Name/ Position	Background/ Responsibility
General Manager/ Administration Manager Anis Nedyia binti Ramli	<u>Background</u> i. Master’s Degree in Business Administration-Finance, Universiti Sains Malaysia ii. Bachelor’s Degree in Human Resource, University of Southampton, United Kingdom iii. Bachelor in Business Studies, UiTM Kuala

	<p>Pilih</p> <p><u>Responsibility</u></p> <ul style="list-style-type: none"> • To lead the other manager to manage their work • To provides direction and guidance • To help firm allocate resources • To define corporate culture
<p>Marketing Manager/ Research and Development</p> <p>Munirra binti Mohd Mazlan</p>	<p><u>Background</u></p> <p>i. Master's in Marketing , Tokyo University</p> <p>ii. Bachelor of Science in Resource Economics , Tampa University</p> <p>iii. Diploma in Business Management, UiTM Shah Alam</p> <p><u>Responsibility</u></p> <ul style="list-style-type: none"> • To develop marketing strategy • To determine the product or service • To make forecasting sales
<p>Production Manager/ Financial Manager</p> <p>Muhammad Hariz bin Hashim</p>	<p><u>Background</u></p> <p>i. Master in Economics Financial, Seattle University</p> <p>ii. Bachelor of Business Administration-Finance, Universiti Sains Malaysia</p> <p>iii. Diploma in Accountancy, UiTM Shah Alam</p> <p><u>Responsibility</u></p>

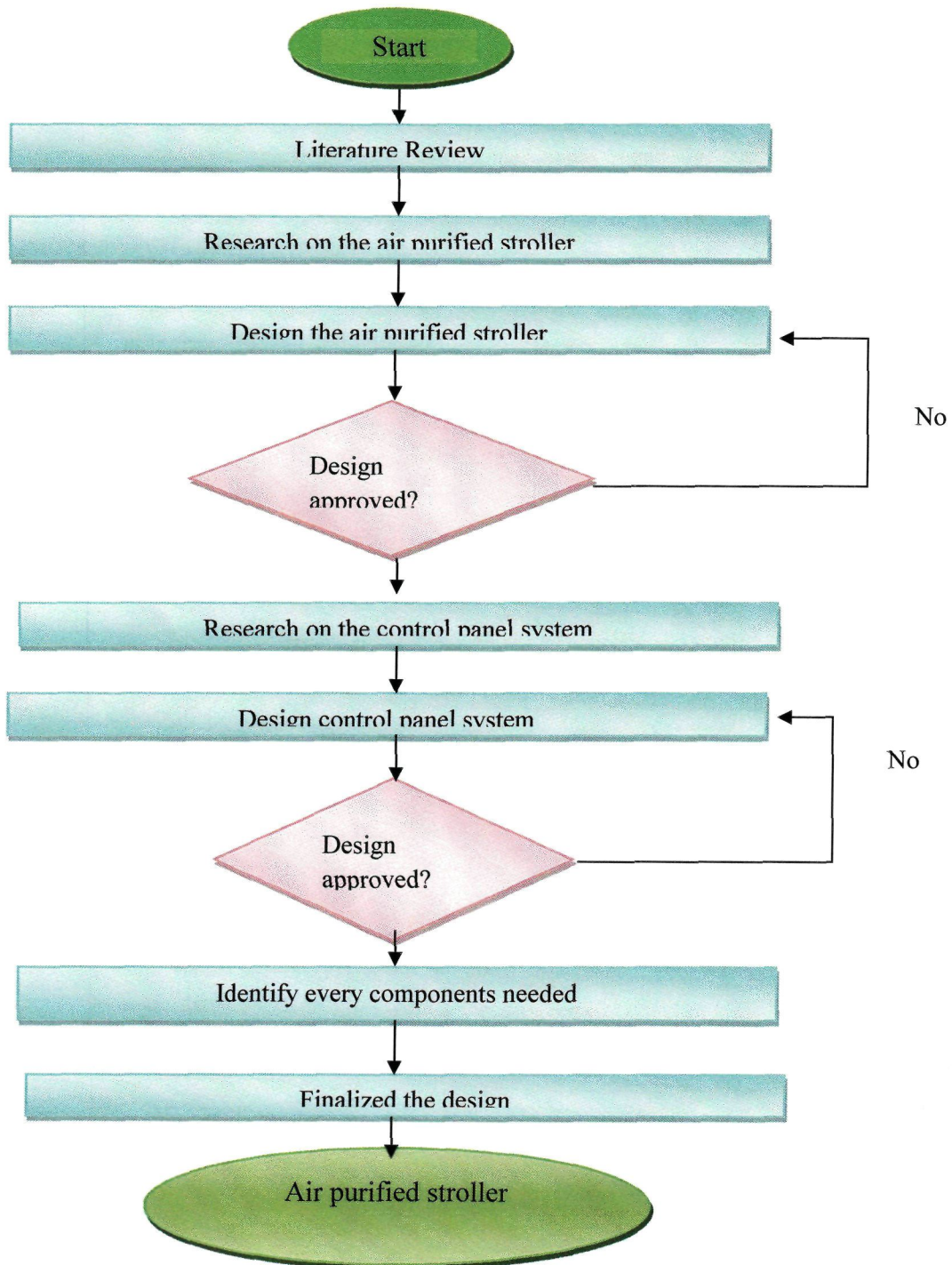
	<ul style="list-style-type: none"> • To determine the size of investment • To identify and purpose the relevant sources of finance • To perform basic financial analysis • To ensure that the initial capital is sufficient
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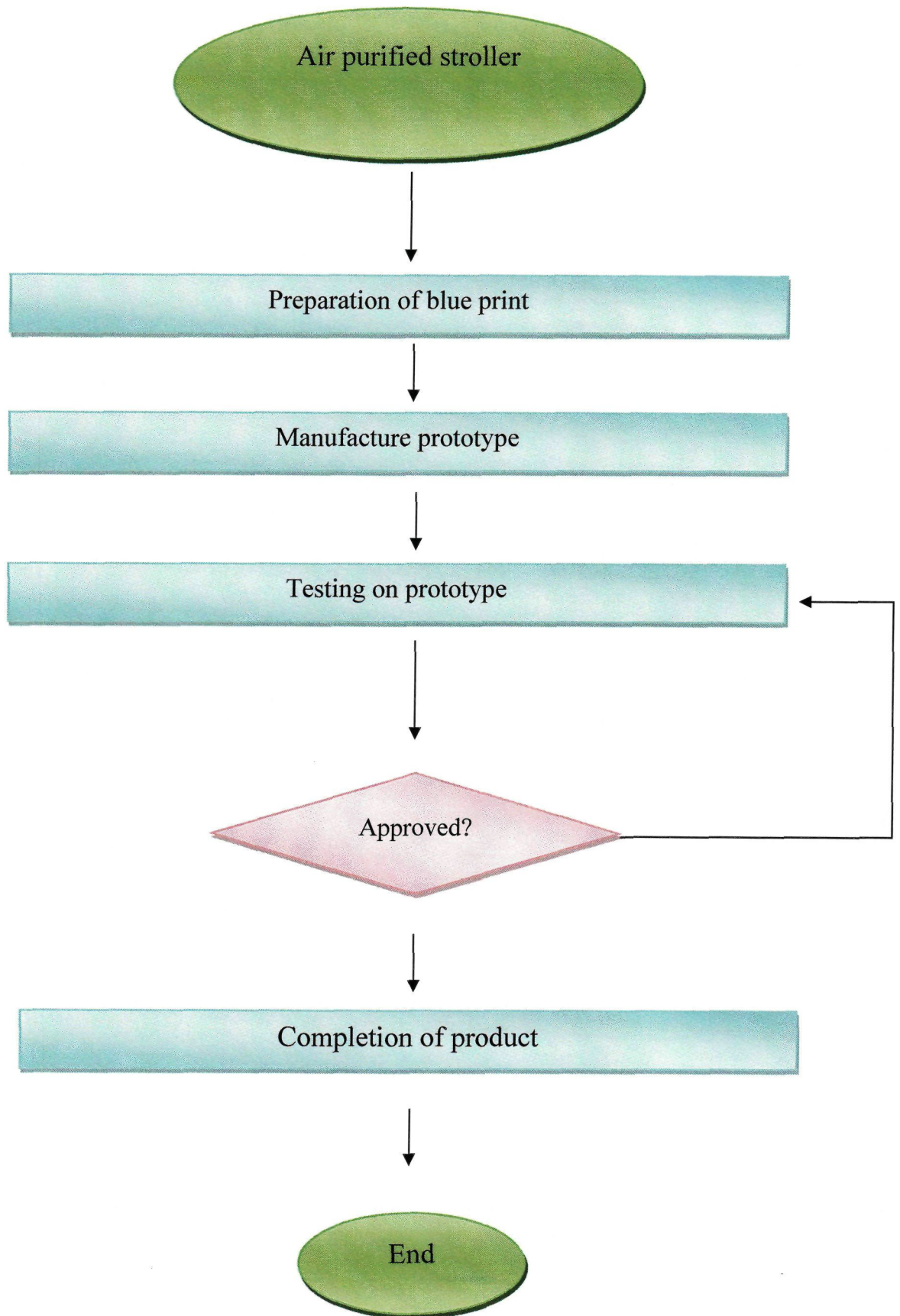
5.3 Other Required Expertise

Expertise	Job Description
Mechanical Engineer	Design and improve operating product efficiency, research and development.
Computer Engineer	Develop, build and improve software and hardware programs that run the programmed inside the control system.
Electrical and Electronic Engineer	Build and explore the best electrical circuit for the product.
Worker	To manage their work time schedule

CHAPTER 6
PROJECT MILESTONE

6.1 Flowchart Project Design Planning





6.2 Project Schedule

Table 1: Schedule for applying fund (6 months)

Progress	Month					
	1	2	3	4	5	6
Preparation of Technology Blue Print						
Application for preseed fund						
Fund Approval						

Table 2: Schedule for setting up the premise and develop product (6 months)

Progress	Month					
	1	2	3	4	5	6
Set up premise/ purchase equipment and material						
Develop prototype						
Test prototype						
Final prototype						
Documentation and submission						

CHAPTER 7

CONCLUSION

7.1 Summary

PURISTABABY air purified stroller provides a built-in air cleaner of the stroller. When the baby is in the stroller, it blocks the fine dust from the outside. Furthermore, the pollution of the indoor vehicle can be measured and filtered, which can prevent air pollution going towards the child. The filtering method filters the air pollution through the frame of the stroller, and then purifies the air in the stroller. Through the LED screen attached to the handle, the user can touch the remaining amount of ultrafine dust, the temperature and humidity, and the temperature control indication.

7.2 Conclusion

Our team will proceed with the grant application from Malaysia Digital Economy Corporation Sdn. Bhd. (MDEC) for the amount of RM 69, 200.