Last Mile Electric Skateboard

New Product Development Plan

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Contents

Organizational Design and NPD Program

Organization

a) Company vision

"Guide people all the way home ecologically"

b) Company mission

"Our mission is to leverage sustainability and technology to bring people the best modes of final-mile transportation."

c) Team Structure

Because we are a start-up, the company consists of primarily three founders. We also serve as the primary sales, marketing, design, engineering, and supply procurement team. However, regarding areas of expertise that we lack, we'll be hiring part-time or seasonal experts, such as in finance and legal counsel, to reduce cost.

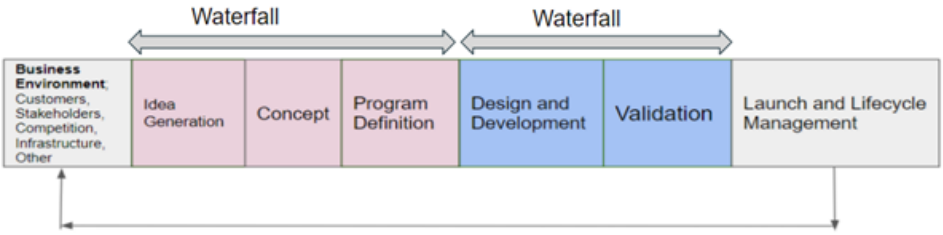
NPD Process

a) Describe the PD process to use

We will utilize a waterfall process to generate, define, design, validate, and launch the first product of this startup company.

b) Describe the management review process

The three founders of the company will design the product together, resulting in no need for a redundant management review process.



Problem and Opportunity

Problem Statement

1. Automotive traffic congestion
2. Automotive parking inconvenience
3. Physical energy / time-consumed in walking and other mechanical modes of transportation
4. Environment considerations
5. Increased ease in navigation (safety and convenience in freeing up one hand, to not hold phone)
6. Smaller size to carry (compared to bicycle, scooters)

Solution

Electric skateboard: reduce use of energy and time, easier to commute in urban environments.

World's transportation landscape is shifting each passing year as the companies like Uber, Google, Tesla make huge progress in AV sphere. Electric skateboard is one of the other things that is changing how we think of about getting from point A to B. Our product – the electric skateboard solves transportation gap between the endpoints – bus stops, train stations, subway stations and the final destination.

Current Alternatives

Meepo Electric Skateboards are our primary competitors.

There are currently no skateboards in market which have GPS enabled light navigation system to embed in its deck.

Riders hold the phone in their hand to continuously keep a tab on the route.

Bicycles come with a facility to mount the phone on the handlebar, but they have portability issues and require comparatively bigger storage space. Skateboard is also permitted on buses and other modes of public transportation.

Strategic Alignment and Business Value

We envision a world where electric skateboard would be used as a means of transportation by people. It would be a cleaner mode of transportation and would contribute towards solving the

mobility and the ever-growing pollution issue. Our company "The Last Mile" plan to introduce a line-up of electric skateboards with impressive designs and features.

Market Landscape

Overview

The primary industry of this product is the mobility industry. Currently, the largest players include traditional automotive companies, as well as emerging electric vehicle companies. Regardless, cars are the main transportation method currently.

However, substitutes, especially in urban areas, are emerging. This includes electric scooters, electric skateboards, Hoverboards, electric bicycles, etc. This results from political and social pressure for environmental sustainability and carbon neutrality. Therefore, although these electric products are still in the introductory phase, it has high potential going into the future.

Furthermore, something special about Last Mile skateboards is its support for environmental sustainability. The deck is made of recycled bottle caps, which reduces plastic waste (which often ends up in the ocean). This is a large differentiator for Last Mile.

Trends

The mobility industry is continuously growing due to the overall growth in economic abilities[1], but more importantly, it is undergoing change. Firstly, there is high political pressure for environmental sustainability. There is high push for electric-powered modes of transportation. In fact, one of the first acts for President Biden is to re-join the Paris climate act, emphasizing its importance[2]. The technologies are slowly emerging, yet still immature on a large scale; for example, the largest battery supplier, Nevada Giga, is essentially built on old technologies of simple small batteries cells[3]; furthermore, there is much lacking in infrastructure to support the electric vehicle shift (like charging stations).

Socially, with the trend of global urbanization[4], there is continuous increase in population in the cities. Whether it's the residents or workers, people in cities experience frustrations: the traffic is time-consuming and tiresome; parking is difficult to find and expensive to access; vehicle insurance cost is also much higher in cities than in rural areas[5]. As a result, the trend of mobility is shifting

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[1] "A global economic recovery is in sight", OECD

[2] Briggs, Helen, "What is the Paris climate agreement and why is the US rejoining?", BBC, 21 Jan 2021

[3] Hawkins, Andrew, "Tesla announces 'tabless' battery cells that will improve range of its electric cars", The Verge, 22 Sep 2020

[4] Ritchie, Hannah, "Urbanization", Our World in Data

[5] Rosanes, Mark, "Revealed: Most and least expensive places in the US for car insurance", Insurance Business America, 23 Sep 2020

toward increased flexibility. Especially in the younger generations, less are driving cars[6]; only 25% 16-year-olds even hold driver's licenses nowadays compared to 46% in 1983, despite the improvement in auto-vehicles[7]. People are drifting away from owning cars and getting into substitutes, such as electric scooters, electric skateboards, electric bicycles, etc., as demonstrated by the rise in companies like Spin, Bird, Ofo, Boosted Board, etc. This also aligns with the social trend of supporting carbon-neutral products.

This shift in mobility is also recognized by many large corporations as well. For example, Ford acquires Spin, the electric scooter company, for $100 Million[8]. China's bike-sharing platform, Ofo, received $580 Million in funding within two years, from large companies like Didi Chuxing, Xiaomi, and Digital Sky Technologies[9].

Barriers to Entry

There is predicted a medium level of barrier to entry.

The largest barriers are the engineering development required and the production aspects. Both require financial as well as human resources. The need for talent and funding will help reduce cost, increasing profit margin, and better appeal to market customers.

However, the advantage is that the product does not need all these aspects "scaled" before going to market. For instance, as soon as the product is designed and components decided, the largest need left is solely financial, as components can be purchased and assembly can be conducted in-house.

Because the product is indeed to-customer, there are some marketing concerns. However, due to the visibility and new-ness of the product as well as the lack of direct market competition, the product itself serves as a means of marketing.

Competitive Landscape

Core Competencies

This company is a startup based around this initial product. As a result of this, our core focus is on the success of the first skateboard. This means we aren't distracted by the needs of other product teams. We don't need to manage time, talent, or resources between multiple product lines. While other companies are having to manage manufacturing many products all at once, our manufacturing process will be optimized to a singular product.

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[6] Fanderl, Harald, "Driving the automotive customer experience toward the age of mobility", McKinsey & Company, 7 Mar 2019

[7] Beck, Julie, "The Decline of the Driver's License", 22 Jan 2016

[8] Lee, Dami, "Ford buys e-scooter company Spin for $100 million", The Verge, 7 Nov 2018

[9] Chen, Lulu, "One Startup Builds $1 Billion Business Out of 15-Cent Bike Rides", Bloomberg, 28 Feb 2017

Our young team brings energy and passion to the table. Our ability to split work among the three of us means that we are not stifled by a larger bureaucratic company structure. We each have some experience with personal transportation devices, such as scooters and skateboards. The only product we intend to bring to market initially is the electric skateboard. Due to this, there are no additional products or services.

Competitive Advantages

While typical skateboards require pushing off the back foot to move, our skateboard will use a battery and motor design to electronically propel the board forward. The user will use a remote control to toggle acceleration and simply balance on the board to get from place to place.

To set our board apart from other electric skateboards, ours will sync with the navigation app of choice (Google Maps, Apple Maps, etc). Some users need navigation to get from place to place, but it is unsafe to hold your phone up while riding the board. A typical solution is to listen to voice prompts through headphone, but they cover up important road noise like car horns, posing a potential safety hazard. Our board solves these issues by shining LED lights on the pavement to indicate upcoming right and left turns based on the data send by the navigation app. This allows the user to keep their phone in their pocket and their ears uncovered by headphones.

Differentiation

Our unique feature within the electric skateboard market is the ability to sync with the user's navigation app of choice. This helps keep users safer while traveling to new places in busy urban environments. Our board inspires our users to explore without a feeling of uncertainty or a lack of safety.

Competitors

We are competing against a variety of products and business models. First, we are competing against other consumer products that take travelers short distances. These include regular skateboards made by many companies, including Element, Globe, Zero, Creature, and Santa Cruz. These also include scooters and small bikes, including Razor Scooters, Trek Bikes, Giant Bikes, and Cannondale Bikes.

Some electric skateboard companies also take up market space. Their products include the Onewheel, the Meepo Mini, Meepo V3, Halo Board Beat, and Backfire skateboards. Some companies also sell an electric board converter kit to turn analog boards into electric boards, like the Revel Boards Bolt-on Kit.

We are also competing against the newly established rental companies. They tend to drop small travelling devices with charging pods around cities and allow users to rent them using an app. These include rideshare electric scooters by Bird, Lime, Lyft, and Spin and other rental device companies.

Competing Products

Features	LastMile Board	Boosted Board Mini X	Meepo Mini 2	Onewheel Pint
Battery Size (Range)	200 Wh	199 Wh (14 miles)	11 miles	6-8 miles
Hill Climb (Torque)	20% Grade	20% Grade	30% Grade	10% Grade
Top Speed	20 MPH	20 MPH	29 MPH	16 MPH
Controller – Wheel Style	Improved (Intuitive Design)	Yes	Yes	No Controller
Waterproof	IP5	No	No	No
Regenerative Brakes	Yes	Yes	Yes	No
Navigation Indicators	Yes (LED bar light signal)	No	No	No
Solar Charging	Yes	No	No	No
Bluetooth Pairing (with Phone)	Yes	No	No	Yes
USB C Charging	Yes	No	No	No
Cut-out Handles	Yes	No	No	No

Table 1: Competitor Feature Analysis

Product History

Other companies have tried to fill the entry-level consumer electric board market. Meepo presents a currently successful model of how to address consumer needs with a limited product lineup with a variety of sizes for user to choose from. Boosted Boards is a now defunct company that presents what has failed at a similar value-price point. Boosted ultimately stretched themselves too thin with new product designs without enough market support to avoid bankruptcy.

Market Needs

As discussed in Market Analysis, there are numerous pains in the current mobility products offered. Firstly, in a city with a car, a driver experiences frustrating traffic, risks being late, park

expensively and inconveniently, and pay high insurance costs. However, without a car, a person usually takes public transportation, oftentimes during crowded hours or with multiple transfers. Or a person can choose to walk, which can be inconvenient, slow, tiring, and sweaty (ruining makeup, hair, outfit, etc.).

There is a high need that bridges public transportation to the destination or replaces the original mobility mode altogether. With the electric skateboard, users can tirelessly and quickly skateboard, directly to their destination. Alternatively, users can take public transportation for some distance and skateboard the rest of the way, saving time and energy.

As for owning a car, even though this product will not directly replace some purposes in driving a car (such as for long distance or on rural and rough terrains), depending on the need, people in the cities may now reconsider whether they truly need to own a car. And if not, there are alternatives which can also eliminate energy exertion, save time, reduce sweating, and avoid large crowds.

Currently, the market size is around 35 thousand; the company predicts to sell 35 thousand within three years or so. This is calculated based on the number of men in New York City between age 20 and 40 (1.7 billion) and 3%. The reason is that New York City is predicted to be the largest, thus primary targeted segment. Furthermore, this estimate is more conservative, by taking in only men and the small 3%.

Personas

Buyer & User Persona

Fred is a young worker in the city of New York, in which he spends almost all his days. He works in software and is up to date on technology news. He is in moderate health conditions and does not like to sweat when commuting to work. He also loves to explore the city, and often relies on Google Maps. He is also aware of the global environmental concerns, for which he tries to contribute in small ways (such as recycling, saving water, etc.)

Buyer & User Persona: Fred

Characteristic	Description
Quote	"As a healthy and young worker in the city, I want to more conveniently and tirelessly get to places, such as travelling the final 3-block after getting off the subway to work, grocery-shopping, exploring new places in the city, and going to friends' places. I also like to rely on navigation apps for direction. I also try to contribute in small ways to not hurt the environment (such as recycling, saving water, etc.)."
Goals	Be punctual Save time Reduce walking & sweating Appear cool Not hurt the environment
Role	Software Engineer for a start-up in NYC Unmarried, without children, and frequent interaction with friends Explorer (likes to try new restaurants in the city) Responsible for his own living (including grocery-shopping) Responsible for the environment
Background	Bachelor's degree Technical career $130k income Works in-office 9-5 weekly year-round Good health condition High interest and capability regarding technology Does not own car (takes public transportation then walks the final 3-block to work)
Attitudes	Technical background Attends tech conferences Tech-savvy and up to date with new technology and trends Aware about environmental impacts, enough to affect every-day decisions Likes trying new products if relevant to his daily life and within a reasonable and affordable price range
Behavior	Grocery-shopping Goes to hack-a-thons and tech conferences Visits friends' places Explores the city Not very good with directions and often relies on digital maps
Insights	Tech-savvy but realistic (prefers products with some relevance and benefit) Needs navigation to explore new places

Needs

Functional

As explained previously, looking at young workers living or working in urban areas as the main target market segment, their main goal is to travel with ease, as there are many current pains in the existing transportation devices (specifically personal cars and public transportation), including

traffic congestion, parking inconvenience, high parking cost, high insurance cost, high accident risk, crowdedness, need to walk the final mile, etc.

Compatibility

In terms of mobile phones, the two major platforms to be made compatible with are Android (71.9% market share) and iOS (27.3%); the other minor system is Tizen by Linux (0.22%).[10] However, this is not as big of a concern as the major mapping software used. To linking the navigation app to the skateboard, Bluetooth is the key, of which the technology is generally similar even across platforms. However, more difficultly, different apps may present challenges to the integration of navigation directions to the lightings on the skateboard. Therefore, to be compatible with the major software, starting with Google Maps, will be important.

In terms of battery and charging, the device's charger needs to be compatible with 120V wall outlets (in North America, which is our initial and primary target geography). The battery would ideally be USB-C charging; this offers fast charging, but more importantly compatibility with common chargers (such as for most laptops today). This also offers an advantage over most competitors, who require a charger specific to the skateboard.

Security

Because there is no actual software or app to go with the skateboard, there is no user data security concerns.

However, because the skateboard requires Bluetooth pairing with mobile devices (if desired), there should be prevention of Bluetooth connection to random and unrelated users and devices. Some hardware check (such as clicking a button) should be required to initiate a pairing; confirmation on the mobile device would also be important.

A disclaimer: the skateboard itself is not intended to track geographical data (or data of any sort); however, there may still be data tracking and usage by the external navigation apps, outside of the company's control.

Performance

The skateboard would be expected to function in urban areas, which are relatively flat and smooth. The skateboard should also last a fair number of miles before needing to be charged. After analyzing close competitors, the specific expectations are 5-15% hill climb, 14 miles per charge, and 20MPH top speed[11]. However, within the industry, there are also highly advanced electric skateboard that have high inclination tolerance, large battery size, high speeds, etc. However, these are not direct competitors, as they target a more niche market of electric skateboard enthusiasts; indeed, their price point is multiple times that of the company's direct competitors.

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[10] "Comparison of mobile operating systems", Wikipedia

[11] Daniel, "Charge Time for Electric Skateboards compared – How long?", E-Skate

Usability

The target market segment is young workers with moderate health considerations. However, certainly, any person with great health could use the skateboard if needed. The product is not intended to be used by every single person, as it is somewhat related to some sports in nature.

Operational

There is no environmental expectation; the production process is mostly similar to a regular skateboard. If anything, the battery must be safe; this would be ensured by purchasing through a reliable and reputable battery supplier.

Customer service is also necessary; warranty for non-external damage should be available for up to a certain period, as this is the expectation for most hardware products in the market. This will also help with the gamma testing post-launch.

Internationalization

To start, the targeted geography is North America. This is because of the start-up nature of the company; the plan is to start small; as order volume increases or investments roll in, the company can then consider scaling up. However, for now, the most feasible and realistic target geography is North America.

There is no language indicator, such as voice command or written instructions relating the skateboard's core functionality; therefore, language is not a major concern. However, the user manual will be designed in common languages. Also, depending on the budget for website design, the website may be designed in languages more than English, such as French, Spanish, and so on.

Documentation

Firstly, a user manual is needed. This will allow a more user-friendly and pleasant user experience. It will be designed in multiple languages; however, most of the content of the user manual will be visible, such as diagrams of arrows to key parts, company information, customer service phone number, phone interface instructions (to set-up), etc.

Support

Because the product is solely the electric skateboard, hardware service (including return and repair) will be the most common need of support from customers.

The company plans to provide a 30-day limited warranty, for non-accidental malfunctions. For example, within 30 days, a battery that dropped charging will be under warranty, given there is no visible external damage.

To contact the company, customers will be provided a link on the user manual. Similarly, the link will also be on the company website. The customers will be asked to fill out a form, on which they will explain the issue, provide photos (to ensure no damage), and fill out their preferred time and way of contact. This way, the company will call them or email them once it's processed and discuss future steps to solving the issue.

In fact, even for general assistance, the web form will be the way of contact.

Distribution and Packaging

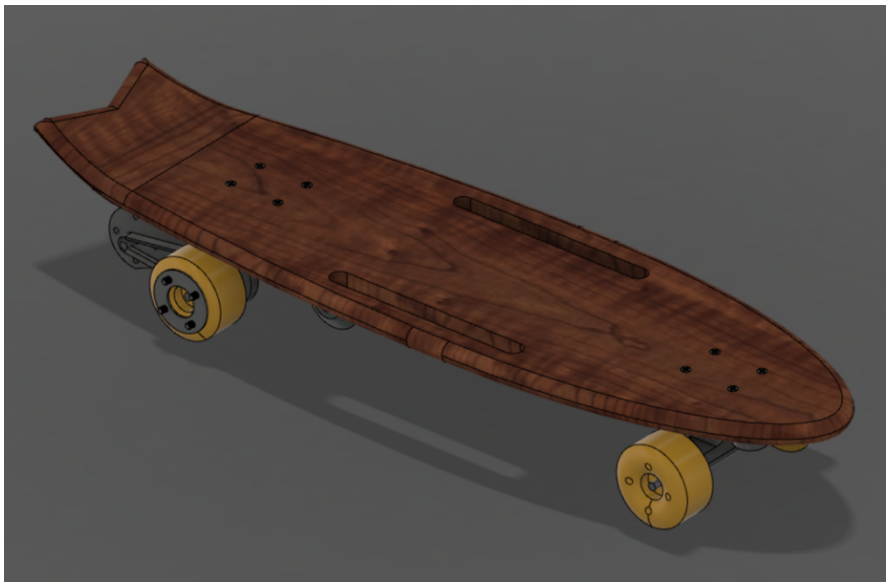
The distribution method will be direct from company. The method of product delivery will be shipping. The company does not plan to hold warehouses or inventory across the country; rather, everything will be shipped from office. This may result in slight delay in product arrival, but we do not expect customers to complain because we will communicate clearly ahead of time. Furthermore, we assume that a few more days of wait will not be an issue but may even increase the level of excitement, as this will not be a re-occurring purchase.

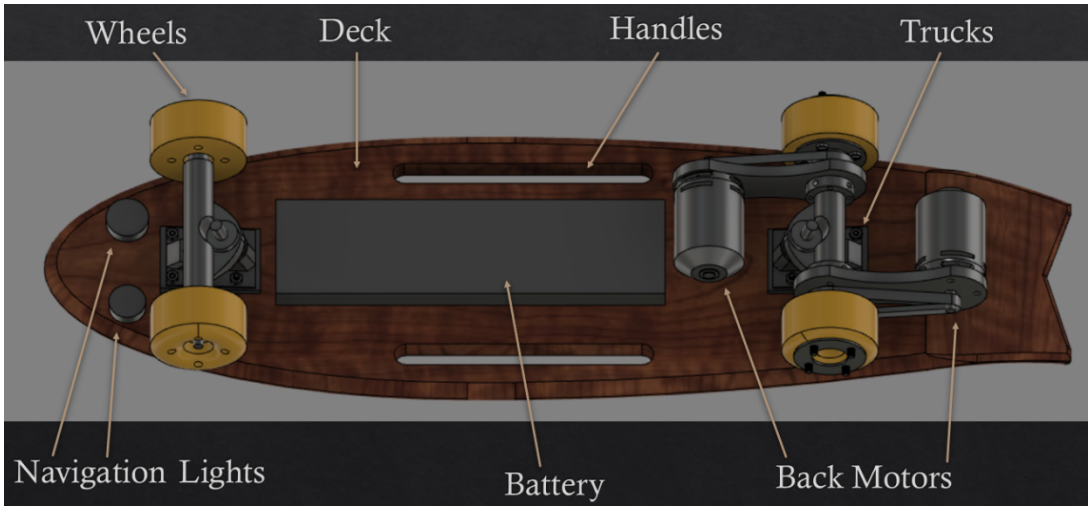
Product Description

The Last Mile – is a portable electric skateboard made up from the recycled plastic. Its deck has a surf inspired design comfortable for long haul ridding across multiple terrain types along with cut out handle which makes it easy to carry around.

It has two different modes to choose from - eco mode which offers 40% power and power mode which offers full 100% power available to climb steepest hills and provide relentless acceleration, with max. speed reaching 20mph. The skateboard has a battery size of 200WH which can easily take you to 14-mile distance and can conquer up to 20% grade hill with ease. Its wheels are extremely intuitive to control which makes the skateboard absolute blast to ride.

It also has regenerative braking built into it that slows down the skateboard and at the same time charges the battery. Apart of these it has few other features which make it stand out. First, it is a water-resistant skateboard with IP5 rating. Second, it has embedded navigation indicators which uses the GPS to navigate you to your destination. Third, it comes with USB C charging port which makes it convenient to charge





Features

Functional

We are in the market to make people's life better each day by shortening wasted time in traffic or walking down to last leg of their journey and increasing valuable, productive time by providing them with lighter, faster and a cleaner mode of transport – an electric skateboard. It solves the huge mobility problem.

Compatibility

The skateboard will be compatible with the latest Bluetooth 5.0 version. Customers will be able to pair their phones with the skateboard. Devices will share a common secret key which would allow them to bond whenever they want to ride it in future. The navigation assist lights which will use customer GPS application will be compatible with Google maps.

It allows USB-C fast charging which offers easy accessibility and compatibility.

Security

- Regenerative Braking system
- Secure Bluetooth pairing

Performance

It supports regenerative braking and lasts up to 14 miles or 22.5 km on full charge. The boards surfboard design with cut out handle adds to its beauty and provide a great help in carrying it around. The board is capable of driving on steep hills with up to 20% gradient. It has an impressive top speed of 20mph.

Usability

- It has a battery charge level indicator.
- It comes with cut out handles which provide ease of portability.

- It has a sleek, smooth, and aerodynamic design.
- The wireless handheld controller fits in the hand and will let you change the driving mode and speed settings.

Operational

- Our mission is to keep plastic out of the waterbodies. So, we plan to make the decks of our skateboards out of plastic waste. We plan to join hands with social enterprises such as PlasticBank, 4Ocean, etc.
- We have navigation assisting lights embed in the board which are triggered by the user's mobile phone GPS coordinates. We have created the firmware for this in-house.
- We will outsource the manufacturing of different parts (decks, wheels, battery, etc.) of the skateboard but design and assemble them in-house.
- Services & support management- It has a limited 60-day warranty for any manufacturing defects out of the box.

Internationalization

The product comes with a user guide with required instructions explained in two languages – English and Spanish.

Product liabilities claims are of three basic forms – Design Defect, Manufacturing Defect and Failure to warn of a risk presented by the product.

Few states in U.S. including California define **Design defect** as – if the product fails the consumer expectation test which means it should perform as safely as an ordinary consumer would expect.

A **manufacturing defect** occurs when a product departs for its intended design even after possible care have been taken in manufacturing.

Lastly, **failure to warn defect** when foreseeable risk of harm caused by a product could have been avoided by a warning or if instructions were provided.

Documentation

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Support

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Legal, Regulatory, and Compliance

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Distribution and Packaging

The distribution method will be direct from company. The method of product delivery will be shipping. The company does not plan to hold warehouses or inventory across the country; rather, everything will be shipped from office.

Architectural Vision – Product Design

Long term objective is to build a line-up of electric skateboard with new impressive features. We would develop a website that will be the sole platform of selling and getting reviews. We would be developing the firmware that helps trigger the navigation lights on the board using the GPS. We also plan to build an app in the second release that helps users keep track of the battery life, distance travelled, update software and along with other features.

High Level Development Scope

Resources

- Sign contract with manufacture to build and supply required parts of the skateboard.
- Partner up with social enterprise like PlasticBank or 4Ocean that collect plastic from oceans to provide required quantity of plastic to build the skateboard decks.
- We would recruit a team of people to assemble the electric skateboard.
- We would need to recruit a small team of 2 members that handle marketing and sales for us.

Tools

Expected Release Date and Milestones

We plan to start the project in April 2021 with our first key milestone being deployment of our website.

We plan to get done with the Beta Testing of our product by 21st Feb 2022.

We have a target to produce 2000 of skateboards within a span of 12 **months after our launch**. These skateboards would have all the features that we have planned for Release-1 which is planned for **22nd April 2022.**

Key Milestones

- Building the firmware for GPS triggered navigation lights that would be embedded in skateboard.

[12] "Skateboard Product Liability", Skateboarding, 29 Feb 2020

- Integrating/assembling first electric skateboard and doing an alpha testing on it. Make the required changes if any issues are found.
- Deliver the skateboard to our Kickstarter backers, social media influencers and electric skateboarder enthusiasts to test ride them and provide feedback as part of Beta Testing.
- Start manufacturing full speed ahead.

Quality and Test Plans

I. Market testing:
   a) Put up social media ads (especially Instagram) and collect click through rate to gage interest
   b) Put up fake door on official website prior to release (to gage interest); after the fake door, put up information on the final product and planned release date, where customers can put down their contact information (to be notified when product actually releases)
   c) Put information, cost, product details onto Crowdfunding website, Kickstarter; this will gage interest as well as act as a method of marketing
   d) Attend CES with the product; collect contact information from interested audience and take pre-orders

II. Alpha:
   e) Three major stages of prototypes (each stage could have multiple versions):
      i. CAD (demonstrate later) – crowdfunding will begin during this stage
      ii. In-house design & assembly (process to select components) – beta and other market tests will occur during this stage
      iii. Final product (process to select vendors)

III. Beta:
   f) Work closely with 7-10 people from the target segment – offer product for free in exchange for regular interviews and feedback

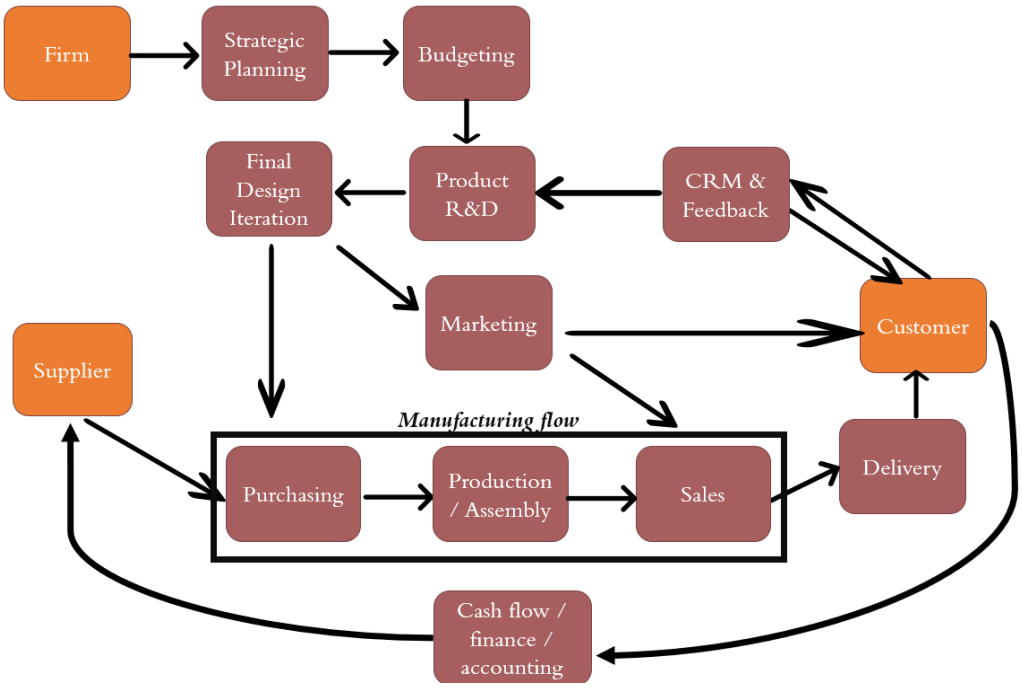
IV. Gamma:
   g) Receive feedback from influencers, who help promote the product to their audiences; they likely have good understanding
   h) Continue monitoring customer feedback, product issues, and other concerns with the repair request, customer assistance web forms; utilize these feedbacks to improve the next generation / release of the roadmap [fair to assume no response is good experience]
   i) Interview regular users on understanding unfulfilled needs
   j) Interview new market segments and start planning for scale-up

One specific metric to ensure quality is the number of repair requests (through our online official website). The goal is to have the number under 5%.

Similarly, another important metric relating customer satisfaction is repair and inquiry resolution time. The goal is to have the average resolution time to be under 5 business days.

Production & Operations Plan

Production



All parts of the last mile board must be produced by third parties, the assembled by our team. Facilities required includes a production/assembly line and a packaging process. All boards will be delivered direct-to-customer, so final packaging must protect the components during shipping.

Process strategies

The Last Mile Board will be produced through an assembly line process. Most components of the board will be purchased and simply assembled by our team before packaging and distribution. The design of the board is based on using cheaper standardized parts to assemble the more expensive specially ordered parts. Specifically, every screw, bolt, and nut is a standard size that can be purchased in bulk from McMaster-Carr or any other hardware supplier. The battery and skateboard trucks are more specialized, so they will need to be ordered to be made to our specifications by a battery and truck manufacturer. Ensuring the battery, belt motors, and trucks can properly work together is of utmost importance for the success of the product's main function. Our use of standardized parts will reduce waste of defect parts. Our waste management goal is to use more recycled plastic in the decks than we produce on any other part of the board. Hitting this goal of net zero waste affirms our company mission.

Inventory

First, we must obtain a sizable number of decks, batteries, and belt motors to construct all necessary boards. Luckily, we are revealing the board month in advance at CES and amount social

media influencers. This will lead to many folks preordering the board, further informing us of how many boards will be needed to complete a successful product launch.

Supply Networks

The most important parts of the board are the deck, the battery, and the belt motors. The failure to obtain any of those parts for any extended amount of time would lead to massive production slowdowns. The deck is a specially designed deck that features the use of ocean-waste plastic. The battery is specially designed to fit on the board while maximizing the available space for the most Watt-hours possible. The belt motors connect to the battery and are the key functional-mechanical part of the entire product. While other defects can be easily replaced on a board already sold to a customer, any belt motor defect would require the customer to completely return the product to get a properly working device.

Risk Plan

Risk	Trigger	Probability	Impact	Mitigation Plan
Injury – potential class action if we are possibly liable	Customer met an accident due to technical issue in the product and gets injured	Medium	High	Mitigate three basic forms of liability claims : • Design Defect • Manufacturing Defect • Failure to warn of a risk presented by the product
Incompatible components from supplier	• Inaccurate product plan from us. • Lack of directions from us • Poor quality by supplier	Medium	High	• Digital simulation (thoroughly validate compatibility before sending to supplier) • Product prototype in-house (before supplier production) • Choose suppliers carefully / check credibility
Competitor patenting their technology in direct competition as ours	• Slow in patent on our part • Unthorough patent on our part • Competitor patent got approved faster than ours	Low	Medium	• Thorough patenting and trademark application • Timely patenting and trademark application • Request confidentiality forms by employees and suppliers
Leak of idea & Resource Leaving the firm.	• Employee leaving and taking idea and people with them • Data insecurity or hacking	Low	Medium	• Non-compete, non-disclosure, and non-solicit agreements (employee) • Offer benefits, autonomy, value, etc. to retain talents • Obtain patent and trademarks for technology & ideas • Secure sensitive information at Cloud data firms

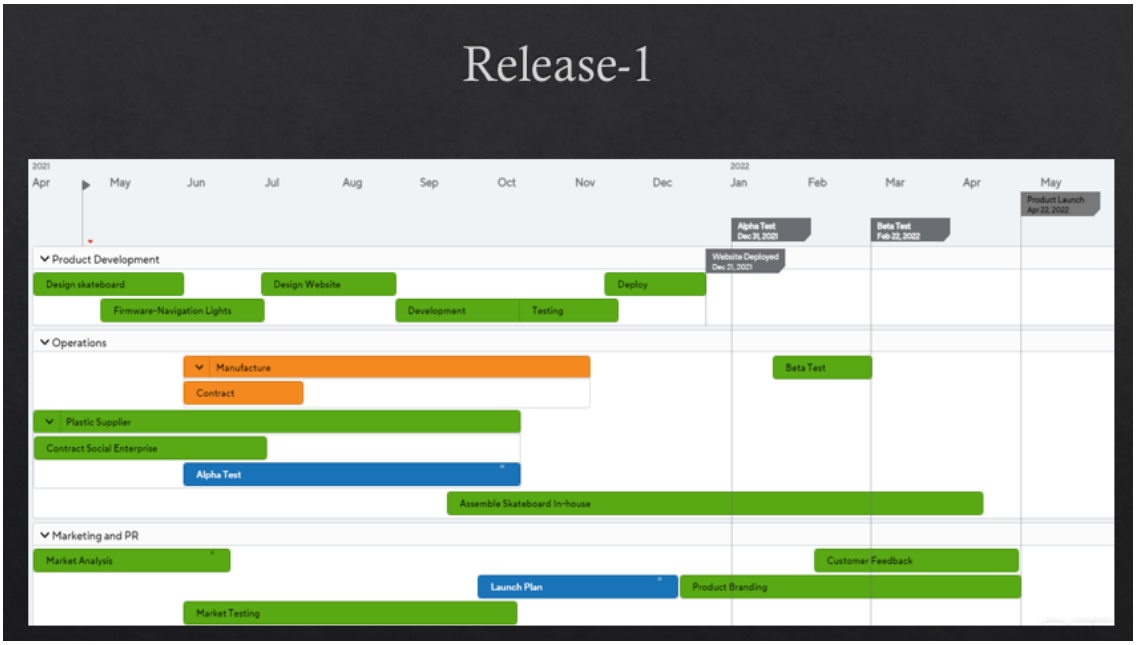
Product Roadmap

Roadmap Strategy

Release -1

Design and develop first version of the electric skateboard which has following features-

- Deck made up of recycled plastic bottle waste.
- Urethane wheels
- 200WH Lithium-Ion Battery
- Remote with Speed and Mode change feature.
- USB-C Charger with fast charging capability
- Bluetooth compatibility with most common OS



Release-2

- Launch our second electric skateboard Last Mile – Aether.
- Decks with different designs
- App to update board to latest software and fix bugs.
- App will enable users to estimate range based on battery level, mode, and rider s**ettings.**

Release –3

- Launch our third electric skateboard Last Mile Sceptor.
- Launch our own riding gear lineup.
- Provide best in-class urethane wheels.
- Attachable Solar charging Strip.

Go to Market Plan – Launch Plan

Pricing

When first released on Kickstarter with just the concept, the pre-order price will be low; but as the real date of launch approaches, the prices increase as well. The price on launch day will be determined based on cost – a 150% mark-up from the product cost, as much of the value in the product is intangible, like intellectual properties, design, innovation, and environmental concepts. After launch, the price will slowly go down as volume increases; there may also be promotional prices based on season and market popularity.

Details are explained in the Financials section.

Distribution

The first and only distribution channel selected is direct from company. The company will use third-party shipping companies for delivery, such as FedEx and USPS.

The company decided not to sell through retailers like Amazon because of the referral and variable closing fees, ranging from 6% to 25%.[13]

Marketing Plan

Situation Analysis

Market Landscape

As described in the earlier section of Market Landscape, the product focuses on environmentally friendly skateboards, by using recycled materials for decks and electricity for power. There actually is not a direct competitor with the same product offering stance as of now. We believe the approach could highly appeal to younger generations, who also have a need for urban transportation. Therefore, the company believes it has a unique but effective market position.

History

There have not been any attempts of broad marketing yet, due to the limited time and early stage of the start-up. However, there has been some input from several Duke students, who have given their feedback concerning feasibility of the concept.

Overall, the students like the idea and see it as having potential. However, some were also concerned for the number of features involved (and the high price expected). As a result, the team has taken in the feedback and proceeded to limit the number of features within our first release, including solar charging and holographic navigations. The goal is to provide a useful high-technology skateboard, with just the right number of features, for a reasonable price, aiming to appeal to young workers with a steady income.

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[13] Johnson, Tara, "How To Sell on Amazon in 2020: Setup, Fees, & Strategy", Tinuiti, 2 Mar 2020

Opportunity

There is a large gap in the market currently.

The trend of mobility is shifting to smaller and environmentally friendly methods; this includes electric scooter, electric cars, and car-sharing and car-owning platforms. More specifically, truly portable or affordable options are limited, including Boosted Board (bankrupted), Meepo, Spin, Bird, Ofo, Uber, Lyft, etc. However, none uses recycled materials for decks or involve navigation systems on board. These are all technologies that follow the social and political trends, yet to be fulfilled by the current products.

Resources

The assumption is that we have sufficient capital. However, to be realistic, we plan to outsource or procure most components and only assemble in house. The strategy is to grow a strong brand, relating environmental friendliness and practicality in the product design. Indeed, the company will focus solely on design and assembly. This would free up capital (by avoiding setting up production lines and hiring for labor). On the other hand, this would require more time as resource, as coordination, communication, and contracting with vendors are expected to be more time-consuming.

Marketing Objectives and Strategy

Objectives

The marketing objective is to build a strong brand that speaks environmental friendliness. A quantifiable metric is achieving a market awareness percentage of 15% by young workers in urban areas, regardless of whether they have ever used the board. As for the environmental friendliness aspect, 50% of people who know this brand should realize its position is environmental friendliness. To test this, surveys should be sent out, to first verify the surveyed is indeed under 40 years old ("young"), then ask if they know of the brand. To be more accurate, some competitors, like Bird, Spin, Meepo, and Boosted Board will be named to gauge whether the surveyed is at all familiar with the industry, and only if s/he is, then would the survey be considered valid. Then, to test whether the brand speaks of environmental friendliness, the surveyed will be asked to choose from several brands of which they believe to be the most environmentally friendly. If the two numbers exceed 15% and 50%, then did the marketing campaigns fulfill the set metrics.

Marketing Strategy

Firstly, the company plans to introduce itself over Kickstarter, a crowdfunding platform. This will not only gain capital, but also promote brand recognition. Kickstarter is the primary method of marketing. This is appropriate because Kickstarter's primary audience is people who are kept up to date on the technology development, and supportive of the more niche markets.

Other means of marketing include social media ads (specifically Instagram, Youtube, and Twitter). These platforms are chosen because they are the primary social media younger generations use. Also, by analyzing the related data (such as click through rate), we can also gauge interest.

The company also plans to promote on universities and at local companies (that show support for start-ups). For example, the founders, being Duke students, may be allowed to promote to the fellow Duke classmates, such as by tabling or hosting promotion events. Local companies may also help promote the company if the values align, specifically, environmental sustainability.

Furthermore, if the budget allows, the company may also choose to market the product on local subways. It is expected that people who take the public transit are more likely to need a last-mile transportation device.

Lastly, the company plans to attend one CES conference to gauge market interest and to increase brand presence.

Considerations

The company plans to release the skateboard in the beginning of summer, when weather just begins getting hot and walking the last mile is getting unpleasant. A more specific time is Earth Day in late April, which aligns with the company mission and values.

Program Mix

Branding/Messaging

The tagline is "Completing Your Urban Commute Ecologically", which describes exactly what and how the product does/works.

Advertising

As mentioned in the Introduction to the section, the company plans to market on Kickstarter, social media (Instagram, YouTube, and Twitter), university campus, and local companies that are supportive of start-ups. Potentially, the company would also put-up ads in urban area subways, as that mode of transportation fits our persona and target segment. Also, going to CES would help increase brand and product presence.

Social Media Plan

The company plans to post ads on four platforms: Instagram, YouTube, and Twitter.

These selections are related to the primary age group associated. There is correlation between age and awareness on environmental sustainability; the young workers are the target segment of the product as well.

More specifically, in 2021, two thirds of Instagram users are under the age of 34 years old, of which one third is between 25 and 34[14]; this makes Instagram an appropriate medium of advertisement. Furthermore, Instagram utilizes targeted ads, which would be helpful in reaching the correct audience. However, in general, the product may end up reaching more people than originally planned (for the urban young workers).

YouTube is the second choice; YouTube is indeed the most popular with age groups of under 35; in fact, there are large market segments between older than 35 as well. However, this is also feasible

[14] Tankovska, H., "Instagram: distribution of global audiences 2021, by age group", Statista, 10 Feb 2021

and appropriate as older people can still purchase our products, such as for their children or grandchildren. This would be appropriate for the release day for early summer in late April as well.

Twitter is appropriate as 32% users have college or higher education background, which fit the urban office young worker persona. It also has 70% male. The largest age group is 25-34 years ago (composing 29%), which again, fits the target market[15].

The reason TikTok is not chosen is due to its skew to the younger audience. More than 70% of TikTok users are under age 25. Furthermore, the ratio between female to male users are 2:1, which is not exactly the persona of the market segment; we predict females to have higher concern with their professional attire and accessories (hair and hand purse), which may prevent them from choosing a sports equipment of electric skateboard.

Public Relations

The company website will be the sole platform of selling (thus reviews). Therefore, the reviews, announcements, and all other official information will be hosted on the website only.

The company also wishes to utilize technology influencers on the internet as a marketing platform. The company will send free products to these influencers two to three weeks before the launch, in hopes to convince the audience of the benefit of the product.

The company will also partner with selected local businesses (based on store popularity, buyer demographics, and location), such as cafés, game store, etc., to host raffle events: with the purchase of the local business' product, they get entered for a raffle for a free Last Mile board. This helps increase brand recognition, thus volume. Similarly, Last Mile may also target small businesses directly and sell the boards to them at a volume-based promotion price, which may serve as gifts or rewards to the employees from the company.

Direct Mail

One of the marketing plans is using fake doors on the company website to gage customer interest before the launch of the product. Through this, the website will encourage users who clicked through to leave their contact information, with which the company can send email about launch information in the future.

Other means of promotional communication are also primarily over email; with past customers, these emails will most likely be referral program contents, as it is expected a user would not repeatedly buy the same product numerous times. However, the word of mouth would be valuable.

Trade Shows & Events

The company plans to go to CES, the Consumer Electronics Show; it is the largest technology trade show, hosted annually in January in Las Vegas. This helps not only to market the concept and brand to users but also help identify future potential vendors (for future products). However, by the time, the company should have had their technologies and concepts patented and trademarked already. The skateboard should also be ready for showcase. The purpose of the visit is to officially

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[15] Newberry, Christina, "36 Twitter Stats All Marketers Need for Know in 2021", 3 Feb 2021

set the date of release, which is Earth Day (in late April). The company will also be taking pre-orders.

Financial Plan

Financial and Impact Analysis

Part Name	Price	Quantity	P x Q
216 Wh Battery	$300	1	$300
LED Navigation Lights (RGB)	$5	2	$10
Large Bushing	$0.50	4	$2.00
Phillips Machine Screw 18-8	$0.10	8	$0.80
Steel Hex Nut	$0.10	8	$0.80
10.0” Trucks	$40	2	$80
Wheels	$10	4	$40
Belt Motor	$25	2	$50
Bottle Cap Deck	$80	1	$80
			$563.60

Table 2: Bill of Material (Component Cost per Board)

As shown in the BOM above, the unit cost for components only is $563.60.

Firstly, using the BOM total cost, a price is determined. Using a pre-determined mark-up percentage of 150%, as recommended by Dr Dina Requena (discussed in Pricing previously), the price of each skateboard is $1409.00, which is reasonable considering market landscape and comparing to direct competitors (such as Boosted Plus, OneWheel Pint mentioned in Competitive Landscape)[16].

[16] Daniel, “Electric Skateboard Comparison 2021 – ultimate Table and Drag’n Drop Tool”, E-Skate

However, in year 2 and 3, Last Mile plans to continuously decrease the mark-up percentage, due to the increase in competition, age in the innovation, and increased volumes on the market. By year 3, the mark-up percentage would be 130%.

		Year 1	Year 2	Year 3
	Unit of sales	2000	10000	23000
	Cost per Board ($)	$ 563.60	$ 563.60	$ 563.60
	Overhead & Capital Cost %	30%	32.50%	35%
	Overhead & Capital ($)	$ 169.08	$ 169.08	$ 169.08
	Marketing Cost %	15%	12.50%	10%
Unit Cost	Marketing ($)	$ 84.54	$ 70.45	$ 56.36
	Mark-Up Percentage	150%	140%	130%
Price	Price per Board ($)	$ 1,409.00	$ 1,352.64	$ 1,296.28
	Revenue	$ 2,818,000.00	$ 13,526,400.00	$ 29,814,440.00
	Cost	$ 1,635,340.00	$ 8,035,800.00	$ 18,158,270.00
	Profit	$ 1,182,660.00	$ 5,490,600.00	$ 11,656,170.00

Table 3: Financial Spreadsheet: Units, Cost, Revenue, & Profit

This BOM total cost becomes the referencing point for additional costs, such as capital, overhead, and marketing costs. Specifically, in the first year, the capital and overhead rate for a start-up is estimated to be 30%, while the marketing rate is 15%. The specific cost values are calculated by multiplying the rate percentages to the unit cost of component for each board.

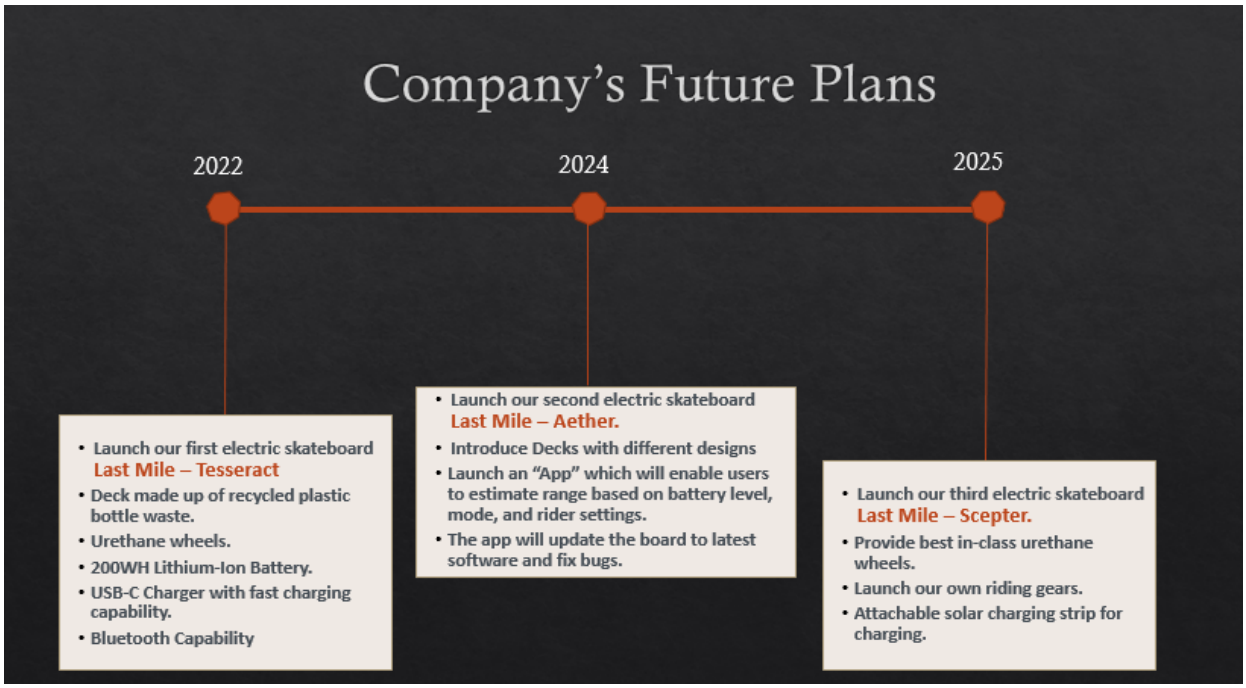
It is clear, that even by selling 2000 boards only in year 1, the revenue is high ($2.8MM); however, the cost is high too ($1.6MM). This requires the company to obtain sufficient capital investment before going into production. The company believes $0.8 to 1MM would be needed. Then, as product eventually starts selling, cash would finally flow in, supporting future costs. Finally, the profit in year 1 is $1.2MM, which is significant. However, it is difficult to determine the time of break-even, as there is no data for current capital yet; as discussed in Launch Plan, the funding process on Kickstarter and with investors has only just begun. Realistically speaking though, break-even point will likely occur in year 2 or even 3.

Over three years though, volume increases, with 10,000 and 23,000 units to sell in year 2 and 3 respectively. These three years' units of sale add up to 35,000, which is our predicted market size. It is also worth noting that the rate for capital and overhead increases (due to the shift from outsourced assembly to in-house manufacturing and general increase in order volume), but the marketing rate decreases (due to increased brand recognition over time). Lastly, with increased volume, profit also increases.

Lastly, something not yet mentioned is the BOM total cost over time. This cost has been reflected in the table above to remain constant over the three years; however, realistically, the cost will go down due to in-house manufacturing, long-term partnership with suppliers, and increased volume of orders, etc.

Life Cycle Management and End of Life

The two new electric skateboards are initially and currently planned for 2024 and 2025. The current electric skateboard Tesseract is also planned to remain in market for at least three years. Because of the distant timing as well as the immaturity of the company as of now, there are no specific details on end-of-life management yet. However, there will be continuous monitoring of customer feedback and continuous development of requested features.



Manufacturing Plan

We plan to manufacture current electric skateboard Tesseract for atleast three years as it is planned to remain in market for at least three years and there are no specific details on end-of-life management yet.

Spare parts supply plan

We plan to manufacture the spare parts of the skateboard and they will be available on the website for customers to buy.

Upgrade Assistance

To a customer who already has a Last Mile Skateboard and wants to upgrade we would provide a discount of 10% on the price of the new version of the skateboard.

Customer Support Options

As part of our first release, we will build a website that will have “Live Chat” feature along with the email ID to contact us.

We plan to have an app in future that help keep track of any software bug or update.

Technical Support Plan

- We have a “live chat” and email option on website for customers to get any assistance.
- Website will also provide answers to commonly asked questions under the FAQ section.
- We plan to come up with a hotline to answer customer questions related to technical support.
- Customer will also get first two services free for their skateboard under warranty.

Compatibility

- The company website will be updated to showcase new skateboards added to the existing lineup.
- The app which will be part of release-2 will be updated as and when new software update is required.
- The company will provide an option to change wheels of the skateboard at a discounted price.

Trade-In or Upgrade Programs

We don’t have a plan in place as of now but in future if we extend our product line, we might offer discount coupon on returning the used board. This coupon could help you get discount on new skateboard or riding gears.

Appendices

CAD Prototype