



**SM 323 Fall 2021**

**Section A1 Team 4**

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### Statement of Authenticity

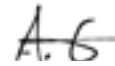
The following business plan is the original work of all members listed below. All facts and figures are authentic and have not been deliberately altered. All contributions from external sources have been acknowledged and properly cited. We have not utilized any past Core projects when composing our plan. We have honestly presented ourselves to all potential suppliers, customers and everyone else who assisted us with the formation of our business plan.

This project is solely for SM323's team experiential learning purposes only. We recognize that with the end of the course, any student is at the liberty of developing the ideas in this plan further without the students originally involved. Boston University and Questrom School of Business will not be responsible for any activity conducted later on, but organizations such as Innovate@BU may provide students with any assistance and advice on issues that come with evolving the idea further.

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## Executive Summary

With a 16% yearly increase in utility prices, Boston homeowners are not only feeling the effects of consumption on the planet, but now on their wallet. SmartCheck looks to address these trends by offering a unique environmental service that combines sustainable living with cost savings.<sup>1</sup> We are requesting \$4.4 million in total equity funding including \$3.1 million at startup time, and \$1.3 million in year one. We expect to breakeven in our first year of operations and begin reimbursing our angel investors, family, and friends, in year two. SmartCheck's total equity funding will be fully returned by year three in the form of dividends, making SmartCheck a strong investment.

Eight friends eagerly gathered into a small room in Pardee Library, placing their bags down and whipping their computers out to discuss ideas for their CORE project. Natalie complained that she had paid \$300 in utilities for the month for her three bedroom apartment. She felt helpless, and as if she had lost control. Living with two other people made it hard to monitor utility usage. At the same time, Natalie finds environmental change important, having participated in Boston's Earth day protest this year. Thereafter, SmartCheck was born. Natalie is not alone, since as we wandered the streets of Belmont, MA, many of our surveyors described feeling helpless towards their utility bills, especially those with larger families.

SmartCheck is a modern environmental startup that aims to reduce the costs and consumption of water, gas, and electricity for homeowners in the Greater Boston Area. Using a technologically advanced, in-home utility monitoring system, we aim to implement and provide smart, sustainable savings. While developing our service, our market research showed that over the last few years, especially during the pandemic, energy conservation and utilization has become an increasing concern for people.<sup>2</sup> With SmartCheck, we take into consideration

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<sup>1</sup> "Electricity Costs in Boston, MA (2022 Rates)." SolarReviews, September 2, 2022.  
[https://www.solarreviews.com/blog/boston-electricity-cost#:~:text=Electricity%20costs%20in%20Boston%2C%20Massachusetts&text=The%20average%20rate%20in%20Boston,\(22.9%20c%2FkWh\).](https://www.solarreviews.com/blog/boston-electricity-cost#:~:text=Electricity%20costs%20in%20Boston%2C%20Massachusetts&text=The%20average%20rate%20in%20Boston,(22.9%20c%2FkWh).)

<sup>2</sup> Kachaner, Nicolas, Jesper Nielsen, Adrien Portafaix, and Florent Rodzko. "The Pandemic Is Heightening Environmental Awareness." BCG Global. BCG Global, September 15, 2022.  
[https://www.bcg.com/publications/2020/pandemic-is-heightening-environmental-awareness.](https://www.bcg.com/publications/2020/pandemic-is-heightening-environmental-awareness)

environmental worries, and allow our customers to experience reduction in their monthly utility consumption.

There are currently no similar services available in the market that offer the same characteristics and advantages of SmartCheck. This is made even more advantageous with the growing popularity of adopting a more sustainable lifestyle. Through our analysis, we have decided to position our service to homeowners who currently engage in sustainable habits, and who feel a need to reduce their home utility spending.

Building this service requires advanced technology and high initial costs, however, the overall benefits and demand will provide a high internal rate of return of 45%. We have implemented our revenue maximizing price of \$30 a month to generate a year one revenue of \$6.69 million which will climb to \$7.91 million in year five.

When designing our service, we considered our customers' needs to create the most efficient operations schedule. We decided that an appointment-based schedule works best for our business. SmartCheck demonstrates operational efficiency by decreasing inventory costs, while being able to serve more customers. This allows for cost management as demand increases. We accounted for the high volume of materials being installed in customers' homes, and the need for adequate storage space. We will utilize both the 1,000 and 3,784 square feet of storage space in our storefront and storage warehouse respectively. Furthermore, we will address our increase in demand by increasing from 10 employees in year one to 14 employees in year five.

Through our location analysis, we decided the optimal storefront location is in Newton Center, Massachusetts. This location is in a heavily populated homeowner area with high foot traffic and adequate parking. With plenty of parking spaces and easy transportation, we are able to allow customers to easily access our store while being able to keep sufficient inventory levels on hand. Our store is also engineered to demonstrate our brand characteristics of being smart and environmentally friendly by keeping a clean and earthy aesthetic while concomitantly showcasing our service to customers.

SmartCheck understands that no investment comes without risk. This is especially true for initial startup investing. We have extensively analyzed a number of our qualitative and quantitative risks regarding marketing, operations, and finance. Through a sensitivity analysis and simulation test, we have identified and analyzed our most impactful quantitative risks of awareness rate, retention rate, and in-home display system price. We then formulated mitigation



strategies for our greatest qualitative and quantitative risks in order to make SmartCheck a more sound investment.

To acknowledge our Corporate Social Responsibility (CSR) as a commitment to our company image, we have decided to give back by having our employees give free lessons on sustainability to the community and utilizing electric service vehicles. While these actions have increased our costs, this shows our dedication to drive and help the environment around us.

The remainder of the plan explains our service in further detail to allow investors to consider investing in our company. We hope you can help us bring our vision of “*giving the Earth, and your wallet– a helping hand*” to life by investing in us.



## OVERVIEW

## Description of SmartCheck Consulting

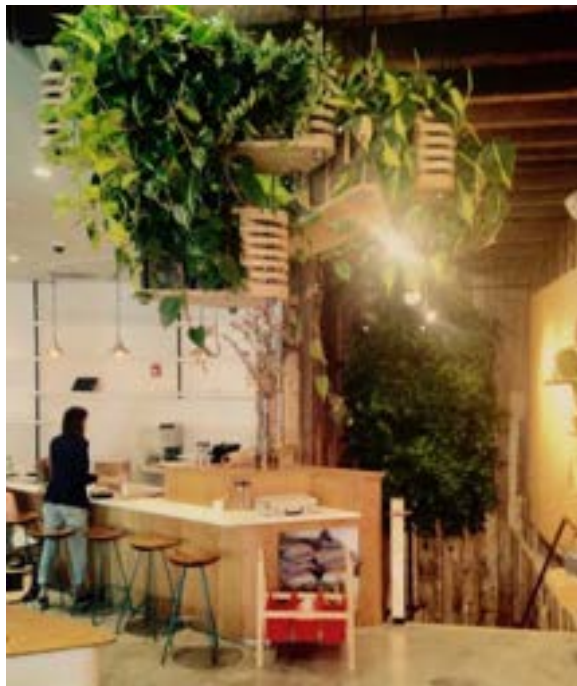
SmartCheck is an energy, water and gas consumption consultation service. Data is gathered from customers regarding their lifestyle, current usage, and environmental/saving goals. A meter is installed in our customers' home to measure energy, water, and gas usage throughout the entire residence. The consumption data is used by our consultants to curate a specialized plan in order to reduce consumption and environmental impact.

Our service aims to provide key benefits such as:

Reduce utility costs

Reduce environmental impact

Greater knowledge of consumption and usage data



## Mission Statement

**Our mission statement:** *SmartCheck Consulting is a sustainability practice that aims to provide customers with smart, sustainable savings*

SmartCheck Consultings' intent is to provide "Ecosystem Enthusiast" homeowners the opportunity to reduce their monthly water, gas, and energy consumption. This includes the ability to view real-time usage of their consumption level daily by presenting data in a user-friendly and easy to read format.

Our service goal is to reduce utility bill expenses, while also gathering information about the homeowner's environmental impact. Not only is there a cost savings advantage, but also a learning opportunity for users to better understand their consumption habits. Most importantly, we pride ourselves on reducing the negative environmental impact of residential buildings. We will accomplish this by ensuring that all marketing practices are sustainable and green which will be emphasized through our CSR initiatives.

## Market Trends

Over the course of our market research process, we identified several trends that we predict will have a positive impact on the environmental consulting and energy conservation industries.

### **COVID-19 Has Created More Opportunities in the Environmental Consulting Industry**

The environmental consulting market is growing exponentially, especially since the onset of the COVID-19 pandemic. During the pandemic, carbon emissions decreased significantly because less cars were present on the road. This led to an increase in awareness of our environment, which in return, caused a boom in the environmental industry.<sup>3</sup> The market is worth \$56 billion in the US alone.<sup>4</sup> In addition, the industry reached a high demand in the U.S in 2021, and currently takes up 40.6% of the global market.<sup>5</sup>

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<sup>3</sup> "Research and Markets Releases Report: Environmental Consulting Services Global Market Opportunities and Strategies". <https://advance-lexis-com.ezproxy.bu.edu/api/document?collection=news&id=urn:contentItem:668V-C0F1-F06S-P17C-00000-00&context=1516831>.

<sup>4</sup> "Research and Markets Releases Report: Environmental Consulting Services Global Market Opportunities and Strategies". <https://advance-lexis-com.ezproxy.bu.edu/api/document?collection=news&id=urn:contentItem:668V-C0F1-F06S-P17C-00000-00&context=1516831>.

<sup>5</sup> Research and Markets Releases Report: Environmental Consulting Services Global Market Opportunities and Strategies. <https://advance-lexis-com.ezproxy.bu.edu/api/document?collection=news&id=urn:contentItem:Research and Markets Releases Report: Environmental Consulting Services Global Market Opportunities and Strategies>.

Environmental consulting applications can be separated into categories such as: environmental management system, geotechnical engineering, and making green claims.<sup>6</sup> Specifically, for environmental services, there is a high demand for general environmental supervision, site decontamination, and waste management.

### **Rising Energy Costs in the World Leading to Boom in the Energy Conservation Industry**

Energy conservation is important to consumers as it directly affects their monthly utility bill. It is anticipated that raising consumer awareness regarding energy conservation will have a positive impact on this market in the future.<sup>7</sup> Consumers also prefer advanced green technologies as the government places restrictions on plastics and other non-environmentally friendly items.

Energy prices are increasing globally due to the Russia-Ukraine war which makes it an opportune occasion for people to start considering alternative energy options, or green energy.<sup>8</sup> The need for alternative energy resources and the increased consumer interest in sustainable trends puts SmartCheck in the perfect position to offer a solution. The global thermal insulation market is predicted to secure \$29 billion in 2022. In addition, this market exhibited a compound annual growth rate of 4.3% throughout 2022-2032.<sup>9</sup> This increasing growth of thermal insulation will enable a great solution in the reduction of energy consumption.

### **Service Category**

Our service category is in the environmental consulting service market. We aim to educate our customers on their utility consumption with digestible and real time information, which will give them the tools to be able to reduce their utility bills. These attributes that

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<sup>6</sup> Research and Markets Offers Report: Global Environmental Consulting Market". <https://advance-lexis-com.ezproxy.bu.edu/api/document?collection=news&id=urn:contentItem:6551-6SJ1-F06S-P4KT-00000-00&context=1516831>.

<sup>7</sup> "Insulation Market Size, Share & Trends Report, 2030." Insulation Market Size, Share & Trends Report, 2030. Accessed December 5, 2022. <https://www.grandviewresearch.com/industry-analysis/insulation-market>.

<sup>8</sup> Tollefson, Jeff. "What the War in Ukraine Means for Energy, Climate and Food." Nature News. Nature Publishing Group, April 5, 2022. <https://www.nature.com/articles/d41586-022-00969-9>.

<sup>9</sup> "With 4.3% CAGR, Building Thermal Insulation Market Size To Hit USD 44,233.7 Million By 2032 | Report By Future Market Insights, Inc.". <https://advance-lexis-com.ezproxy.bu.edu/api/document?collection=news&id=urn:contentItem:667P-Y071-JBR8-B3YW-00000-00&context=1516831>.

SmartCheck provides as an environmental consulting service are what differentiates us from our competitors such as Ecolab, Eversource, and National Grid.

### Analysis that Differentiates Smartcheck from its Competitors

Service	Key Benefits	Price	Differentiation
<b>Smart-Check</b>	Real-time information on utility usage to help reduce costs.	\$30/month	Real-time updates that are digestible for our consumers to read coupled with a consultation service for utility consumption savings recommendations.
<b>Ecolab Inc.</b>	Wastewater treatment consulting service Global leader in water, hygiene & infection preventions Maintain clean & safe environments Achieve sustainable goals.	N/A	EcoLab aims to create a wastewater treatment consulting service for a cleaner environment, whereas our service provides consultation for consumers to reduce their overall utility and water bill prices to increase their environmental impact in the community.
<b>Eversource</b>	Provides energy services in Massachusetts, Connecticut, and New Hampshire. Sustainable electric, water and gas. Recognized as one of America's "most just" companies Major initiatives in reliability, sustainability, and community.	\$186/month	Our service is not an energy provider. Eversource tries to create sustainability on the front end, however they have little impact on the usage itself. Our service aims to reduce consumption regardless of the sustainability of suppliers.



<b>National Grid</b>	Transform natural gas and electricity with cleaner & more resilient energy Goal: reducing greenhouse gas emissions Largest investors owned energy company in the US.	\$186/month	Similar to Eversource, National Grid is the electricity supplier for much of Western MA.
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## Corporate Social Responsibility Initiatives

### **SmartCheck’s Community Sustainable Clinics Aim to Raise Awareness to Live More Sustainably**

SmartCheck will implement two CSR initiatives that align with our business ethos. The first CSR initiative corresponds to the corporate philanthropy community of sustainable clinics. That said, SmartCheck will host free community classes at their retail space in Newton, MA, facilitated by their employees twice per year. These classes aim to generate awareness for environmental sustainability, while also teaching and providing recommendations on how to save money on utility bills.

We will communicate this CSR initiative through the Boston Mom’s Facebook Group which aligns with one of our integrated marketing communications processes. We will thereby post monthly ads in this group and customers will have the ability to interact with us by asking questions regarding our services (Marketing Appendix 2). We have chosen Facebook as our platform of choice because this is where adults interact most frequently when using social media as 71% of Americans use Facebook as a whole<sup>10</sup>.

The intent for targeting adults, and specifically mothers, is because they likely have the purchasing power necessary to buy our services, and because they may value sustainability more strongly to ensure their children grow up in a safe environment. This idea that parents are concerned for their climate related actions is further supported by a study from Thomas et al. (2018), which suggests that “having children leads parents to consider the legacy left to offspring

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<sup>10</sup> “How Many Americans Use Facebook in 2022?” Techjury. Accessed December 6, 2022. <https://techjury.net/blog/how-many-americans-use-facebook/#gref>.

in respect of environmental quality”.<sup>11</sup> Therefore, this group aligns directly with our intended target segment, further emphasizing why we will communicate this CSR through Facebook ads.

This initiative will have a positive impact on our community while also creating awareness for our brand equity. We expect that hosting in-person clinics will generate a lot of foot traffic for our service and create additional awareness. This is projected to lead to an increase in our purchase intent by 1.2% and therefore raise the number of consumers who subscribe to our service.

SmartCheck believes that this CSR initiative is beneficial because it provides the community with the knowledge required to help them stay informed about sustainability related actions, all while promoting the SmartCheck brand. Moreover, our consultants will be paid based on a fixed hourly wage and the number of times they teach these classes. This is determined from their first-year salaries. These costs are accounted for in our inventory balance sheet as well as in our variable costs in the income statement.

Overall, these community sustainable clinics implemented will have low costs and potentially increase our purchase intent. Therefore, this will create both a positive financial value as well as positive brand equity and is integrated into our marketing strategy.

*CSR Initiative Exhibit 1: Clinic Impact on Purchase Intent*

Total strongly agree	26
% of total	46.43%
Lift to purchase intent	<b>1.16%</b>
Total somewhat agree	20
% of total	0.36
Lift to purchase intent	<b>0.54%</b>

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<sup>11</sup> Thomas GO, Fisher R, Whitmarsh L, Milfont TL, Poortinga W. The impact of parenthood on environmental attitudes and behavior: a longitudinal investigation of the legacy hypothesis. *Popul Environ.* 2018;39(3):261-276. doi:10.1007/s11111-017-0291-1.



## **SmartCheck Aligns Our Transportation Methods to Our Mission Statement by Using Electric Vehicles**

SmartCheck's second CSR initiative aims to reduce negative individual behaviors by having our installation technicians drive Tesla Model Y service vehicles. These 100% electric vehicles will be branded with our company logo to indicate the company's association all the while promoting clean air. The message will be communicated through labeling on the vehicles which will distinctly represent our company. The vehicles will be strategically parked in high foot traffic areas for increased exposure.

Using these electric vehicles will help reduce our green-house gas emissions which directly aligns with our mission as an environmental impact service. We strive to be sustainable and help people reduce their environmental impact in society. Associating ourselves with a recognizable and well reputed brand like Tesla will generate a lot of positive awareness and solidify our company as having similar environmental values.

The costs of the electric vehicles are included in our capital expenditure startup costs and the maintenance costs for these cars as part of our outbound logistics costs.

Although this seems like a costly initial investment, we decided that investing in the Teslas will be worthwhile because of their overall cost efficiency and positive reputation, which contributes positively to our public image. This CSR initiative is equally beneficial to business operations because our technicians will often be traveling to and from customer locations to install systems in their homes. That said, we will need low emission vehicles, like the Model Y, to reduce traveling costs on a yearly basis.

Overall, this project will increase our purchase intent by 1.1%. Therefore, this CSR initiative has integrated our desire to be environmentally conscious (zero fuel cars), our marketing strategy for increased customer visibility, and our operations strategy for cutting costs (low emissions) while driving between customer locations.

*CSR Initiative Exhibit 2: Tesla Impact on Purchase Intent*

Total strongly agree	25
% of total	0.4464285714
Lift to purchase intent	<b>1.12%</b>
Total somewhat agree	24
% of total	0.43
Lift to purchase intent	0.64%

The background is a soft watercolor wash in shades of light green and yellow. Scattered around the edges are several green leaves of various shapes and sizes, some with visible veins. In the center, there is a faint, light yellow flower-like shape. The overall aesthetic is clean, fresh, and organic.

## **MARKETING SECTION**

## Marketing Objectives

A major component that contributed to our team's idea generation was developing a service that was beneficial and simple to navigate. Following these criteria, and aligning it with the environmental services subcategory, SmartCheck was created.

Our service was designed to combine environmental change with cost savings. We install a smart tablet that reflects the energy consumption of specific appliances all throughout the house. Consumers can get a better understanding of which parts of the house are associated with the highest utility costs. Our consultants would then take that data, and formulate optimal improvement plans for consumers. We aim to help the households in the Greater Boston Area reduce their overall utility consumption levels.

Marketing Objectives	SMART Goals Associated With the Objectives
In order to reduce our competition as the years go on, we need to increase our service awareness by being active on our social media platforms and the different trends that come up over the years.	Expand our awareness through our influencer marketing that accounts for an additional 1% each year which will account for an awareness of 23.45% at the end of Year 5. [Marketing Appendix 6 ]
Attempt to attract new target consumers through our guerilla marketing campaign but displaying our gashapon machine in 4 different locations to generate awareness.	Grow our awareness each year by 2.7% with our guerilla marketing campaign by doing so in each of the 4 locations we believe will attract the most target consumers. [Marketing Appendix 2]
Inform and motivate SmartCheck's target market about our sustainable CSR initiatives as they correlate with our environmental friendly service.	Keeping up with our online advertising through influencer marketing specifically Boston Mom's Facebook group as this generates 6.3% awareness, and increases each year. [Marketing Appendix 2]

## Segmentation

### **SmartCheck's Target Market is Distinguished by Our Interest in the Environment**

Our primary target market, the "Ecosystem Enthusiasts" (Marketing Appendix 1), are homeowners in the Greater Boston Area who are actively trying to make a difference in the environment, as we believe that these are the people who will be interested in utilizing our service. Some factors that we considered initially when deciding our target market included the number of children at home, years of education received, and political party affiliation

(Marketing Appendix 1). We decided not to include them when creating our target segment as these variables were either too broad to measure or deemed irrelevant to our final target market.

*Marketing Exhibit 1: Segmentation Tree*



Through research and analysis, we finalized several factors that assisted with deciding what service elements needed to be implemented (Marketing Exhibit 1).

### **Local Interviews Stress Important Factors Consumers Would Like To See**

Price is an important factor in determining whether consumers will subscribe to our service. Through interviews with families, friends, experts, and consumers we learned that another important aspect our potential customers would like to see in our service is having access to their detailed utility consumption levels. This will allow them to understand where their energy usage goes during each month, mainly for environmental reasons. All interviewees noted our service needs to save more on utilities to justify the price.

- “I am concerned about my utility bills due to both monetary and environmental reasons” Maria Ponciano, family friend, age 59 (Marketing Appendix 11)

- “The service would have to cost me a fraction of what I am saving” Shari Mahan, family friend, age 56 (Marketing Appendix 11)

### **Social Media Listening Highlights Community Desire for Environmental Change**

Through Social Media Listening, we gathered that, overall, Google trends show an increase in searches for “sustainability” in the last five years.<sup>12</sup> Environmental sustainability is also trending on social media apps such as TikTok especially with the younger generation. They explain how they are losing “hope” in our world, therefore, are driven to shop “smarter” and more sustainably. They encourage the idea that people can shop sustainably, yet affordably.<sup>13</sup>

### **Positioning**

#### **Comparisons With SmartCheck’s Competitors Exhibit Our Unique Competitive Positioning**

Through researching our competitors such as Tetra Tech, AEI Consultants, Commonwealth Energy, and more, we gathered attributes that our competitors’ services did not offer to plot our positioning maps. We also utilized House of Quality and our Conjoint Analysis to understand what factors would be most beneficial to our service when creating our maps and statements. The House of Quality indicates the main customer attributes are price, on demand consulting, and real time updates. Our conjoint analysis yielded the two primary attributes are price with 49.4% importance, followed closely by information delivery with an importance of 34.1% (Operations Exhibit 1).

The first positioning map is based on digestible, easy to understand information and accurate data. These were two customer attributes that were mentioned multiple times when we conducted our interviews. These customer attributes depict what our service will entail, and how it differentiates from our competitors. This also allows us to see where we lie with our competitors in comparison, with the same attributes.

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<sup>12</sup> Sustainability Google Explore Search. Google. Accessed December 5, 2022.  
<https://trends.google.com/trends/explore?date=today%205-y&geo=US&q=sustainability>.

<sup>13</sup> “Taking #ClimateAction With The Global TikTok Community At COP26.” TikTok, October 27, 2021.  
<https://newsroom.tiktok.com/en-us/taking-climate-action-with-the-global-tiktok-community-at-cop-26>.

The second positioning map is based on real time updates and accurate data as real-time updates was our second main customer attribute from our House of Quality. Again, we wanted to see how we differentiate with our competitors with these variables.

The final perceptual map we built is based on digestible information and real-time update, as these were two customer attributes that were also highly chosen elements when we conducted our interviews (Marketing Exhibit 2). These elements will allow us to differentiate ourselves from our competitors. Our real-time updates feature provides regular updates whenever homeowners would like insight on their consumption and suggest how they can shift their daily life while saving on their monthly utility bills.

We decided to take out accurate data as that is an attribute that all our competing companies offer. However, digestible, easy to comprehend data along with quick real time updates are two functions that not all companies offer. Overall, this perceptual map also gives our service the best positioning on the grid.

*SmartCheck Consulting is for homeowners in the Greater Boston Area who are interested in reducing their home utility consumption. The SmartCheck Consulting service is a home utility monitoring and consulting service which gives digestible information of home utility consumption levels because it offers real time usage updates and is unlike Commonwealth Energy and A9 who do not provide real time updates.*

### Marketing Exhibit 2: Positioning Maps

(Marketing Exhibit 2: Positioning Map 1: Digestible Information vs. Real Time Update Marketing Exhibit #: Positioning Map 2: Accurate Data vs. Real Time Update Marketing Exhibit #: Positioning Map 3: Digestible Data vs. Real Time Updates).







## Awareness

### **SmartCheck Utilizes Integrated Marketing Communications to Generate Brand Awareness**

We have constructed SmartCheck’s marketing strategies off our target segment market and company objectives. Our team will execute several Integrated Marketing Communications initiatives to raise awareness in the Greater Boston Area about our upcoming environmental service (Marketing Appendix 2).

Our team plans to use a combination of outdoor events, print ads, paid media, and outdoor advertising to attract customer attention and spread news about our service. Our website will not be our main form of advertising, as it does not generate awareness. Our website will be describing what our service entails, allow customers to book appointments, and chat with our consultants if they have immediate questions.

SmartCheck’s awareness mostly comes from online advertising and paid media, specifically our guerilla marketing and outdoor marketing strategies. Our company’s awareness grows each year with these forms of promotions.

### **Online Marketing Strategies Prove to Generate High Percentage Of Awareness**

SmartCheck generates most awareness from Facebook’s online advertising where we run Facebook ads in the spring and fall seasons prior to the months in which utility bills are highest (Marketing Exhibit 3) The scope will be our target segment in the Greater Boston Area where we will feature our print ads reaching around 36,000 people per day. The ads aim to have a shocking effect on the audience, as they are warned about global warming and the changes in the world if



they do not act on it. We estimate that this will generate the biggest amount of awareness for our service as the ads are projected to be seen by a large amount of people, giving us the most exposure.

### *Marketing Exhibit 3: Online Ads*



### **SmartCheck's Nostalgic Guerilla Marketing Strategy Aims to Attract Consumers Through Childhood Memories**

For our guerilla marketing idea, we will be setting up booths with a Japanese Gashapon machine in four different Boston locations with the highest foot traffic levels - Boston Common, Harvard Square, Newton Center Piccadilly Square, and Jamaica Plains Brewery Complex (Marketing Exhibit 4). A gashapon machine is similar to that of a gumball machine. The general idea is to have oncoming people insert \$1 into our gashapon machine, which will then spin out a capsule containing our business card. This will allow people to register for our service by scanning a QR code and provides a \$10 bill and a discount coupon for our service.

The outside of the capsule will contain a sticker picturing our logo for extra branding. Our guerilla marketing demonstrates that through our service, customers will be able to save a large amount of money in their utility bills in return for a small price they pay initially. Next to

the gashapon machines, there will be SmartCheck consultants that will answer any questions potential customers have about our service. This will generate a buzz in the community, as we expect people to post about this bizarre marketing tactic on their social media. We estimate this will produce a 2.7% increase in awareness for our service.

#### *Marketing Exhibit 4: Guerilla Marketing*



### Creative Executions

#### **Our Outdoor Transit Executions Aim to Make A Lasting Impression on the Fast Paced World**

Regarding SmartCheck's paid Media, we will be utilizing billboards and the side of the MBTA trains to advertise our service, which we estimate will generate about 1.1% of our total awareness for all five years.

There will be three different locations for billboard advertisements: the Massachusetts Turnpike, Waltham Costco parking lot, and Middlesex Fells Reservation Mountain (Marketing Exhibit 5). We will be running the advertisement twice a year in the spring and fall.

The locations we chose are also deemed to be highly attractive, with many cars passing or stopping by every day. We consider Middlesex Fells Reservations Mountain, as a location that our target segment would enjoy, as they are environmentalists, so placing our billboards on the mountains is another part of our strategic advertisement. On the billboards, we feature our slogan

and a short description of what our service does by applying bright colors to catch peoples' attention quickly and generate awareness about our service.

We will be featuring our logo and slogan on MBTA trains, along with our store location and QR code to sign up for our service (Marketing Exhibit 6). Starting from the North Station, we will run the advertisements on the Green Line D route all the way to Riverside. The North Station is another attractive, high foot traffic station to present our business and slogan for people to get a good understanding of what our service does.

Since the MBTA is a popular mode of transportation in Boston, it will allow our service to gain natural attraction from the riders. Moreover, the D line stops in front of our physical store location, specifically at the Newton Centre stop. This is another reason why we want to display our advertisement on the train, in case they want to come into our store to book an appointment with SmartCheck and understand more about our business.

#### *Marketing Exhibit 5: Outdoor Advertising Billboards*



### *Marketing Exhibit 6: Outdoor Transit MBTA*



#### **Influencer Marketing Showcases How the Sustainable Lifestyle Can Be a “Flex”**

Influencer marketing will generate 1% awareness and eventually grow to 5% at the end of the five-year plan. We will start off the first two years with free influencer marketing through nano and micro sized Facebook groups. We are looking specifically at the Boston Mom’s Group and Boston Home Buyer Group as we noticed that the members in these groups fall into our segment. We hope to generate a big turnout as people would be able to directly interact with the posts and ask questions about our service.

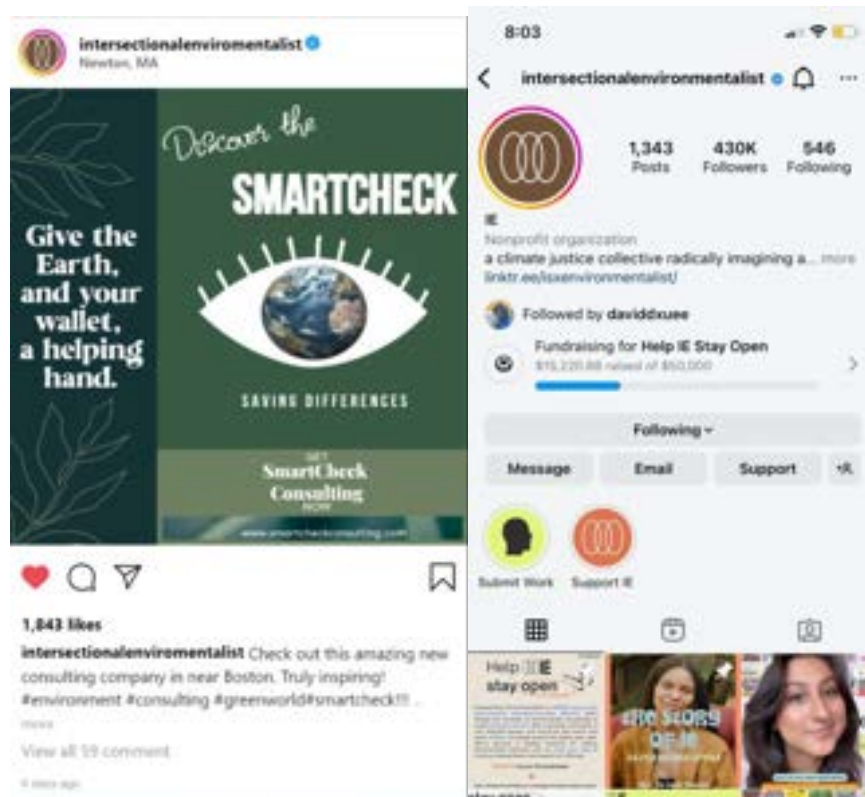
Then in years three to five, we move on to implementing Mid, then eventually Macro sized individual influencers on TikTok and Instagram along with our previous advertisements on the Facebook groups. For year three, we begin by sponsoring Boston based lifestyle influencer, Kin Yang (@kindaking on Tiktok).<sup>14</sup> We evaluated that his content would align with our brand image of sustainability as he promotes a lot of aesthetic and environmental related lifestyle videos. His target audience is mainly young adults, meaning that we could get exposure to the group of people not covered in our Facebook groups. Over the six months we are sponsoring him, we expect Kin to make five video posts related to unboxing our tablet and showcasing our service in general.

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<sup>14</sup> <https://www.tiktok.com/@kindaking>

In years four and five, we then branch out to our biggest influencer, @intersectionalenvironmentalist on Instagram, which is a nonprofit organization that focuses on making a difference in climate change.<sup>15</sup> We assessed and believed their content would align with our mission statement of smart sustainable savings, as they mostly post content that makes a positive difference in climate change. We would have them post an Instagram post to help promote our service (Marketing Exhibit 7). We have catered our post to match the overall aesthetic of their Instagram board so it would appeal to their regular audience.

### *Marketing Exhibit 7: Social Media*



### **Creative Executions Misaligned With Our Mission Statement Will Not Be Implemented**

A creative execution that we considered initially but decided not to implement is promoting our slogan on an airplane banner during the summer months. The airplane would be flying over beaches in Massachusetts like Carson Beach where there would be a fair amount of foot traffic during the summer season. It was ultimately decided that we would not go forward

<sup>15</sup> <https://www.instagram.com/intersectionalenvironmentalist/>

with this creative execution as this juxtaposes with our brand image. Our brand wants to convey a serious message about sustainability, but airplanes emit unwanted greenhouse gasses which diminishes the integrity of our brand.

Another creative execution that we will not be implementing is cartop advertising with companies such as Uber and Lyft. The cartop display advertising would show a cumulative dollar amount of how much our service saved for our customers, a small description of our service, as well as our contact information. The total amount will be regularly updated with new data. We decided to not go forward with this even though Ubers are very prominent around the Boston area, due to the fact that most Ubers still run on gasoline based cars. This goes against our brand image of sustainability once again.

### **SmartCheck Will Evaluate Our Engagement by Actively Seeking Feedback From Customers**

To calculate the effectiveness of our service levels and marketing campaigns, we will measure our consumer engagement in numerous ways. To begin, we will send out post-purchase emails to all customers after their consulting appointment so customers can rate their overall experience. Additionally, we will monitor reviews apps such as Google and Yelp to improve our brand image accordingly. Next, for influencer and social media campaigns, effectiveness will be measured with the app's dashboard insights. Through these metrics, we will be able to evaluate how well a post is doing by the engagement numbers. We will also examine our competitors' annual marketing reports and compare their turnout to our own each year.

## **Location**

### **Through Location Analysis, SmartCheck Decided To Establish Our Storefront in Newton Centre**

Our storefront is located at 1255 Centre St., Newton, MA 02459. The logic behind developing the location comes from elements collected through our target segment to display which location gathers the most attraction and allows us to be the most profitable.

Additionally, through interviews with the relevant target consumers, we gathered that 82% of the respondents would be willing to travel by car for around 30 minutes (Marketing Appendix 10). We estimated that 30 minutes of driving would cover roughly 15 miles. Thus,



based on our target segment, interviews, and factor analysis, we concluded that Newton, Massachusetts would be the ideal location for our business. Newton is a concentrated area for homeowners, and people could get there by car or by other forms of transportation such as the MBTA.

Other locations we considered through cannibalization analysis were Wellesley, MA, Woburn, MA, and Providence, RI. However, we eventually decided that we are not going to be expanding into a second location as our operations queuing model helped us determine that opening up a second location was not necessary (Marketing Appendix 9) (Operations Appendix 3).

## Pricing

### **SmartCheck Consulting Will Cost \$30 per Month to Ensure Profit While Guaranteeing Customer Savings**

The price we aim to charge for SmartCheck is \$30 per month. However, we do not have repeats as we expect to have a yearly subscription model and our retention rate remains constant each year.

A strategy we used to determine our pricing was evaluating our demand curve on Excel through price and cumulative purchase intent (Marketing Appendix 7). The demand curve yielded \$30 as the optimum price to charge per month.

Additionally, through previous interviews and surveys, most respondents also stated that \$30 a month seemed to be the best fit price for our service. In general, most interviewees stated that our service would need to save them at least 10-20% of their existing monthly utility bill for them to be willing to subscribe (Marketing Appendix 11). Most also stated that they would be most likely to utilize our service in the summer and winter months, where utility bills are higher due to the excess use of heat and air conditioning. Therefore, we concluded that a yearly subscription model would be best fit to our service and clients.

Finally, SmartCheck also looked at our competitors such as A9 and Tetra Tech to determine our pricing (Marketing Appendix 12). While our competitors do not have set pricing each month, we determined that \$30 was still a good price to charge when compared to yearly

revenue. SmartCheck will end with a revenue of \$7.9 million in year five which puts us in line with our competitors in terms of pricing (Marketing Appendix 8).

In terms of offering discounts to our customers, they will only be offered when SmartCheck implements the guerilla marketing tactic every season. We will be offering at most, a \$30 coupon, so that potential customers can try our service for a month to see how our consultation service affects their utility bill.

## Bases

### **Target Segment Size Adjusted Each Year As Purchase Intent, Retention, and Awareness Levels Change**

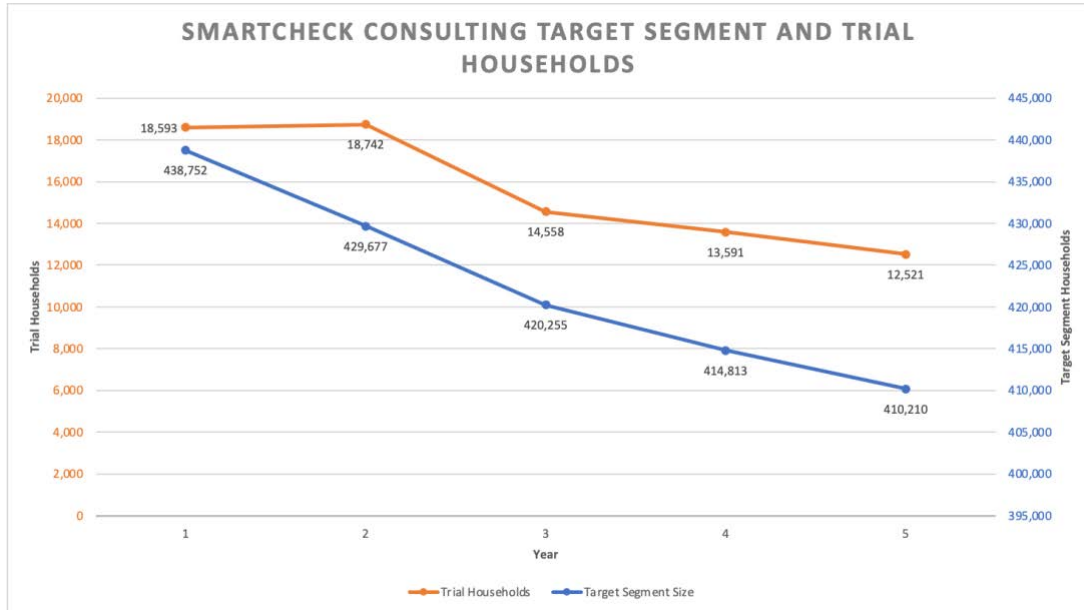
In order to make accurate predictions about our trial household for year one, we employed a model which reduces irrelevant awareness and purchase intent from our target segment size. From year two and onward, we assume the target size will grow by 2.2% every year. We exclude the prior year trial households from the segment size since those customers can no longer be captured by our company again. Another key factor we introduce in year two is competition. At the end of each year starting from year two, we will adjust our trial household for competition while still utilizing the same model used in year one.

Our awareness slowly increases from year one through five because we expect our service to grow in the market. In addition, our marketing advertising initiatives increase over the years generating more awareness for our company (Marketing Appendix 8) (Marketing Exhibit 9).

Our target segment size decreases every year due to its growth rate unable to compensate for the loss of trial households from the prior year. On the other hand, the size of the trial household will experience a slight increase in year two and plummet from year three. The drastic decrease of trial households from year three can be justified by the high percentage of loss due to competition (Marketing Exhibit 8)



*Marketing Exhibit 8: SmartCheck Target Segment & Trial Households*



*Marketing Exhibit 9: SmartCheck's Bases Model*

	Year 1	Year 2	Year 3	Year 4	Year 5
<b>Target segment</b>	438,752	429,677	420,255	414,813	410,219
<b>Purchase intent</b>	32.51%	32.51%	32.51%	32.51%	32.51%
<b>Repeats</b>	0	0	0	0	0
<b>Awareness</b>	13.03%	19.17%	21.31%	22.40%	23.45%
<b>Trial households less units lost to competition</b>	18,593	18,742	14,558	13,591	12,510
<b>Units lost to competition</b>		8,032	14,558	16,612	18,765



## **OPERATIONS SECTION**

## Introduction to Operations

### **SmarCheck's Operations Bring Sustainability and Marketing Goals to Fruition**

Our team understands the importance of caring for our planet and the desire and difficulty to save money while doing it. We created SmartCheck in hopes of creating a better alternative to some of the current energy solutions which require overhauls to a consumer's entire lifestyle or massive dents in their wallets. In the efforts to transform our business from a proposal generated by college students to a finished service, we first needed to make various important operations decisions that balanced cost efficiency with ideal quality for our consumers.

Utilizing in depth consumer interviews, we were able to compile the major concerns of our target segment and develop a list of customer needs ranked by importance. These needs formed the backbone for much of our service design. Our ultimate goal was to integrate the benefits that we recognized users would appreciate with the ones that they provided us. In the following sections, we will examine our raw material costs, facility location and layout, and the major operational decisions that established our final service.

## Product Design Process

### **SmartCheck Utilizes Consumer Interviews for Design Insights**

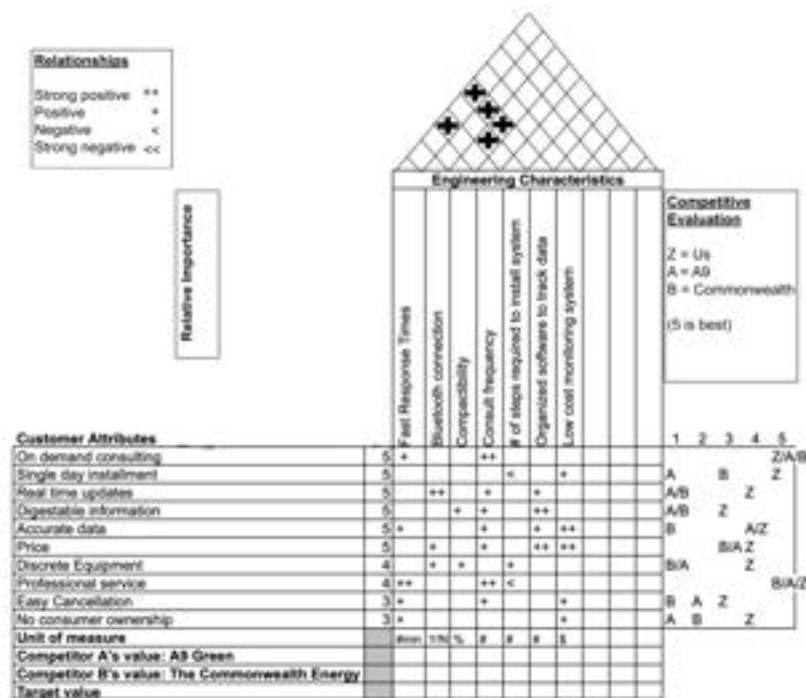
In preparation for the launch of SmartCheck, we tested our service among potential consumers that fit within our target market segment through consumer interviews. This testing was conducted in order to ensure that customer needs were fulfilled in our service blueprint, and consequently integrated into SmartCheck's marketing and operations strategies. Our house of quality displays these customer needs and compares our performance at meeting these requirements to competitors in our industry (Operations Exhibit 1).

The primary concern for our company, in terms of customer attributes, is ensuring that our service provides expeditious utility usage reports. This will be one of our primary selling points and key differentiating factors (Operations Exhibit 1). In order to meet this customer requirement, we provide customers with an in-home tablet which provides real time updates due to its wireless connection to our state-of-the-art Homey® smart home system and meters.

Another feature that contributes to speedy updates is our readily available consulting team. Throughout our interviews, we discovered that most interviewees preferred to receive reports or have consultations via email updates (Marketing Appendix 10). SmartCheck ensures

that customer concerns surrounding real time updates are always addressed. The tablet display system provides immediate access to information, while consultants provide quick and efficient analysis to help improve customer usage.

### *Operations Exhibit 1: House Of Quality*



### **Providing Information That is Easily Digestible Allows Consumers to Absorb the Important Information and Make Appropriate Changes to Usage**

The ability for customers to understand their consumption data is of great importance (Operations Exhibit 1). According to initial consumer surveys, there is an overwhelming sentiment that homeowners would need the system to be user friendly and readable for them to purchase our service. As displayed in our positioning maps, SmartCheck is at the vanguard of our industry in regard to digestible information, due to the user-friendly design of our tablet display system, information is provided in a manner that anyone can read (Marketing Exhibit 2).

## **The Remaining Attributes in Our House of Quality Were Constructed From Our Conjoint Analysis**

Following our conjoint analysis, we determined that many of the other customer attributes had to do with the in-store aspects of our service. On demand consulting was one of the most important aspects of the in-store experience. As shown in our house of quality, on demand service is an area that SmartCheck strives to excel in (Operations Exhibit 1). Similar to our real time updates, during store hours there are consultants readily available to greet our customers. All elements of our service blueprint allow for a seamless customer experience throughout the store and into the installation process. (Cross Functional Risk Assessment and Management Exhibit 1)

## **Raw Materials and Supply Chain**

### **SmartCheck Aims to Improve Our Supply Chain Through Strong Supplier Relations**

The meter system that will be installed in our customer's homes consists of three primary components: the Homey® smart home system and meter package, the raspberry pi computing system, and the tablet display system. The Homey® smart home system and meter package is a utility monitoring package provided to installers and retailers.

The package consists of a small round smart hub which is the central operating point of the Homey® system, wired KNX systems which will connect to customer circuit breakers and the Qubino water meter systems (Operations appendix 10)<sup>16</sup>. This system is priced together by Homey®. Although these meters will be in our inventory, they are not raw materials. They will be reused by our business should the customer decide to cancel their subscription, and therefore, are not on our bill of materials.

The raspberry pi computing system is constructed utilizing four components; the raspberry pi 4 model B with 4 GB of storage, the raspberry pi 4 power adapter and protective case, and a 64GB micro-SD card for information transfer and storage (Operations Exhibit 2) <sup>17,18</sup>.

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<sup>16</sup> "Homey for Installers." Homey. Accessed December 5, 2022. <https://homey.app/en-us/wiki/homey-for-installers/>.

<sup>17</sup> "Iotech (Shenzhen) Co., Ltd. - SD Card, Micro SD Card." Alibaba.com. Accessed December 5, 2022. <https://aceiotech.en.alibaba.com/>.

<sup>18</sup> "Iotech (Shenzhen) Co., Ltd.." Alibaba.com. Accessed December 5, 2022. <https://aceiotech.en.alibaba.com/minisiteentrance.html?from=detail&productId=62426962091>.

<sup>19,20</sup>. This system is relatively inexpensive, and although it is not connected to the display system, it will remain in the customer's home after the system is fully installed. The raspberry pi setup is utilized by our installation team to install important addons to the tablet display system and to create the dashboard that the customers will be using (Operations Appendix 4).

Finally, the tablet setup consists of four parts: the tablet display, qi charger and receiver, and 12 magnets<sup>21,22,23,24</sup>. The tablet which will be placed on the customer's wall in a position of their choosing. The qi wireless charger and qi receiver will be attached to the tablet to provide constant power. To secure the tablet to the wall, six magnets will be attached to the wall and six to the tablet using a non-damaging adhesive. This allows the tablet to remain firmly locked on the wall while also allowing the customer to remove it and replace it as they choose (Operations Exhibit 2).

Our raw materials will be outsourced from overseas suppliers through the platform Alibaba. We performed in-depth research regarding supplier lead times, reputations, and available quantity discounts to determine what type of magnets, charger, receiver, tablet, SD card, and computing system we needed (Operations Exhibit 2). We did this because there are several different types of these materials that were not viable for our service. We also wanted to

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<sup>19</sup> "Original Charger Fast Charging Type-C PD 18W 20W Cable Charger for Iphone." Original Charger Fast Charging Type-c Pd 18w 20w Cable Charger For Iphone - Buy Date Cable For Iphone,Charger For Iphone,Charger For Apple Product on Alibaba.com. Accessed December 5, 2022. [https://www.alibaba.com/product-detail/Original-Charger-Fast-Charging-Type-c\\_1600337360252.html](https://www.alibaba.com/product-detail/Original-Charger-Fast-Charging-Type-c_1600337360252.html).

<sup>20</sup> "Original Raspberry Pi Model PI4 4B 1gb 2GB 4GB 8gb Raspberry Pi 4 Model." Original Raspberry Pi Model PI4 4b 1gb 2gb 4gb 8gb Raspberry Pi 4 Model - Buy Raspberry Pi 4 Model,Pi 4 Model,Module Raspberry Pi Product on Alibaba.com. Accessed December 5, 2022. [https://www.alibaba.com/product-detail/Original-Raspberry-Pi-Model-Pi4-4b\\_1600568012612.html](https://www.alibaba.com/product-detail/Original-Raspberry-Pi-Model-Pi4-4b_1600568012612.html).

<sup>21</sup> "ISO Certificated Magnetic N28 N30 N35 N48 N50 N52 Eh Rare Earth Round Circle Ndfef Imanes De Neodimio Disc Neodymium Magnet." Iso Certificated Magnetic N28 N30 N35 N48 N50 N52 Eh Rare Earth Round Circle Ndfef Imanes De Neodimio Disc Neodymium Magnet - Buy Magnet For Sale,Magnetic Magnet,Iso Certificated Magnetic N28 N30 N35 N48 N50 N52 Eh Rare Earth Round Circle Ndfef Imanes De Neodimio Disc Neodymium Magnet Product on Alibaba.com. Accessed December 5, 2022. [https://www.alibaba.com/product-detail/ISO-Certificated-Magnetic-N28-N30-N35\\_1600691077746.html?spm=a2700.shop\\_index.84.3.165c71c7ABUBvX](https://www.alibaba.com/product-detail/ISO-Certificated-Magnetic-N28-N30-N35_1600691077746.html?spm=a2700.shop_index.84.3.165c71c7ABUBvX).

<sup>22</sup> "Original Charger Fast Charging Type-C PD 18W 20W Cable Charger for Iphone." Original Charger Fast Charging Type-c Pd 18w 20w Cable Charger For Iphone - Buy Date Cable For Iphone,Charger For Iphone,Charger For Apple Product on Alibaba.com. Accessed December 5, 2022. [https://www.alibaba.com/product-detail/Original-Charger-Fast-Charging-Type-c\\_1600337360252.html](https://www.alibaba.com/product-detail/Original-Charger-Fast-Charging-Type-c_1600337360252.html).

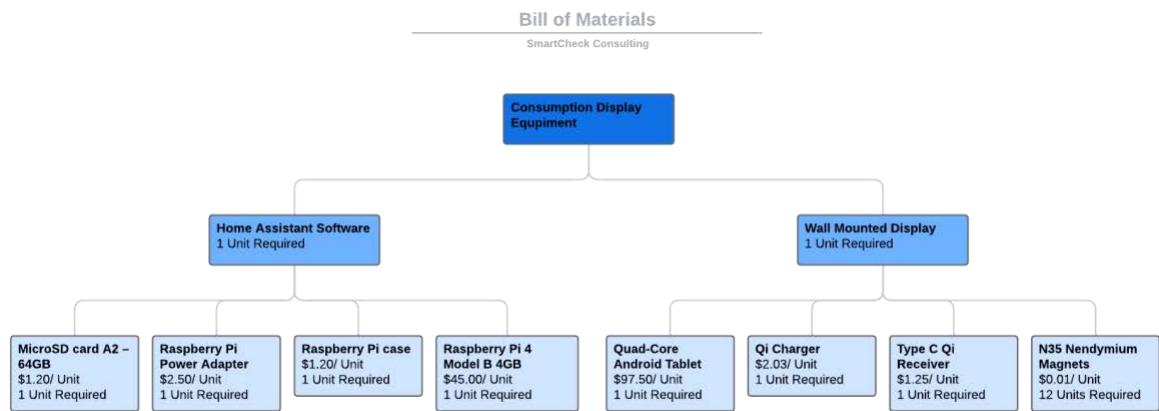
<sup>23</sup> "OEM ODM High-Performance Business Tab 10 Tablet 4GB + 64/128gb Ouad Core 8 Inch Window Tablet PC." Accessed December 5, 2022. [https://www.alibaba.com/product-detail/Oem-Odm-High-Performance-Business-Tab\\_11000001662465.html?spm=a2700.7735675.0.0.762f3fbeOy9zIL&s=p](https://www.alibaba.com/product-detail/Oem-Odm-High-Performance-Business-Tab_11000001662465.html?spm=a2700.7735675.0.0.762f3fbeOy9zIL&s=p).

<sup>24</sup> "Iotech (Shenzhen) Co., Ltd.." Alibaba.com. Accessed December 5, 2022. <https://aceiotech.en.alibaba.com/minisiteentrance.html?from=detail&productId=62426962091>.



ensure that we had the most cost-efficient option that included suppliers with verified trade assurances to be confident in our supplier relationships.

*Operations Exhibit 2: Bill of Materials*



**SmartCheck Navigated Design Challenges Through Trade Offs With Quality Analyses**

Throughout the design process we have made several decisions based on tradeoffs. First, is whether we wanted to mount the tablet to the customer’s wall. We opted to use magnets for the tablet wall attachment to eliminate permanent damage to house walls. This also allows the users to take tablet off their wall to handle it. The second trade off we encountered regarded what level of quality the tablets should be. It is important to ensure that the tablets are of high enough quality to withstand damages while also being cost efficient. In the end, we decided to pay for higher quality Quad-Core Android Tablets to reduce the likelihood of replacing damaged tablets in the home.

**Factor Analysis**

**Smartcheck’s Storefront is Strategically Located to Maximize Reach**

Our marketing research helped us to find four possible locations for our retail space: Newton MA, Wellesley MA, Woburn MA, and Providence RI (Marketing Appendix 9). These locations were selected based on the number of target customers in the area, as well as the location’s ability to meet our customers’ needs. We then used the factor rating method to determine the specific location (Operations Exhibit 3). The factors for this method were chosen

based on responses from our marketing survey (Marketing Appendix 9). Newton had the highest weighted average of all four locations, and we concluded 1255 Centre Street, Newton, MA is the optimal storefront location.

*Operations Exhibit 3: Factor Analysis*

Factors	Weights	Newton MA Score	Wellesley MA Score	Woburn MA Score	Providence RI Score	$W_{\text{Newton}}$	$W_{\text{Wellesley}}$	$W_{\text{Woburn}}$	$W_{\text{Providence}}$
Parking	0.25	4	3	5	3	1	0.75	1.25	0.75
Number of homeowners	0.3	5	5	3	2	1.5	1.5	0.9	0.6
High income	0.25	4	5	3	1	1	1.25	0.75	0.25
Interest in sustainability	0.1	5	5	3	3	0.5	0.5	0.3	0.3
Rent price for business	0.05	4	4	2	2	0.2	0.2	0.1	0.1
Population	0.05	4	2	3	5	0.2	0.1	0.15	0.25
Weighted Average						4.4	4.3	3.45	2.25

## Facility Layout

### SmartCheck's Storefront Layout Aims to Display Our Business Values

Our facility at 1255 Centre Street, Newton MA has a 2,700 square foot exterior costing \$13,500 per month in rent. In addition, we will be renting a 3,784 square foot storage warehouse costing \$8,672 per month<sup>25</sup>. We designed the storefront's interior to best facilitate our process flow. When customers enter, they will immediately be immersed in our green environment. We will have plants and other natural display elements that bring our sustainable goals to life. Our

<sup>25</sup> "1255 Centre St, Newton, MA 02459 - Retail for Lease." LoopNet, November 21, 2022. <https://www.loopnet.com/Listing/1255-Centre-St-Newton-MA/25768283/>.



customers will have a very short footpath through the store, so we have decided to place our displays behind the consulting bar for easy visibility. Overall, we aim to create a comfortable and inviting space for our customers so that we can shape a positive consulting experience.

*Operations Exhibit 4: Facility Layout*



**Process Flow**

**SmartCheck Strategically Planned Our Store Process Flow to Maximize Efficiency for Customers**

We want to implement a system which provides customers with a positive experience while simultaneously allowing us to meet demand. Customers begin the process by scheduling

their in-store consultation appointment either online or by phone. Customers enter our storefront at street level. The customer will then take a seat at the consulting bar, fill out their information on an iPad, and wait for their appointment to begin. When a consultant becomes available, they will review the customer's information and begin the appointment by explaining how SmartCheck works. The customer will then schedule a home visit from one of our installation technicians.

After scheduling an installation, an installation expert will arrive at the customers house on the scheduled date. Upon arrival, installation technicians will request customer approval to begin the process before conducting a home inspection. This inspection will track all in-home systems utilizing electricity, water, or gas. When the inspection is complete, installation experts confirm the customer would like to finalize the installment, and the installation is performed. This process is described in detail in the SmartCheck installation guide (Operations Appendix 4)

<sup>26</sup>.

We understand instances of canceled subscriptions or damage to in-home equipment will arise. In the account of damaged equipment, customers must schedule an appointment in which an installation expert can perform replacements. Following the replacement, damaged equipment will be refurbished or disposed of. This process applies to customers who unsubscribe from the service as well.

## **Labor Requirements**

### **SmartCheck Offers Flexible Work Schedules and Employee Benefits**

We will operate our business 297 days out of the year for eight hours each day. We will give our employees Sundays, United States holidays, and an additional six personal days off. This working schedule is utilized to avoid burnout from our employees and to foster a safe working environment that values employee beliefs and health.

### **SmartCheck Utilizes Queuing Theory and Our Appointment-Based Model To Staff Efficiently**

Our queuing model allowed us to determine a staffing plan for our direct labor workers. Our consultants will report to our Vice President of Operations. The number of servers needed

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<sup>26</sup> Mens, Rudy, Shawn H, Jur, Rudy Mens, Derric, Eric Prescott, and Vlad. "How to Create a Smart Home Dashboard with a Tablet." LazyAdmin, August 25, 2022. <https://lazyadmin.nl/home-network/smart-home-tablet/>.

each year in the model is the number of consultants we need available in store. In year one, we discovered that five minutes is the optimal wait time. In year two, we will modify our staffing to include an additional consultant to meet our demand. In years two through five, we maintain five consultants. Our appointment-based system ensures that there is no peak demand, therefore, it is highly unlikely that we will generate a queue. (Operations Exhibit 6) (Operations Exhibit 7) (Operations Appendix 2)

Our installation experts will also report to our Vice President of Operations. These employees will work by appointment and will travel individually to customers' homes. Installation visit times will vary, but we expect that each of our installation experts will schedule three to four appointments per day. This allows us to meet our demand with only two installation experts in each of our first five years. (Operations Exhibit 6) (Operations Exhibit 7)

SmartCheck will employ three part time indirect labor workers. We will have a part time bookkeeper to handle our payroll and other expenses. Our bookkeeper will report to the Chief Executive Officer in year one and the Chief Financial Officer in years two through five. We will only have one bookkeeper in years one through five. We will outsource Human Resources and Legal Counsel due to the small size of our company. These outsourced employees may report to any administrator depending on the nature of their involvement. We will employ Human Resources in years one through five. We will employ a Legal Counsel in years two through five as it is not cost effective to do so in year one. (Operations Exhibit 6) (Operations Exhibit 7)

Our direct labor expense and part time indirect labor expenses tables show the costs associated with our direct labor. Direct labor employees and part time indirect labor employees will be paid on an hourly basis, while administrative indirect labor employees will have yearly salaries. Wages grow at a rate of 3% each year and benefits of 30% are applied to the labor expense in the staff member's second year of employment (Operations Exhibit 5).

*Operations Exhibit 5: Labor Expenses (per employee)*

**Direct labor expenses (per employee)**

	Hourly Expense including Benefits	Total Yearly Expense
<b>Year 1</b>	\$ 49.66	\$ 118,000.00
<b>Year 2</b>	\$ 66.50	\$ 158,002.00
<b>Year 3</b>	\$ 68.49	\$ 162,742.06

<b>Year 4</b>	\$ 70.55	\$ 167,624.32
<b>Year 5</b>	\$ 72.67	\$ 172,653.05

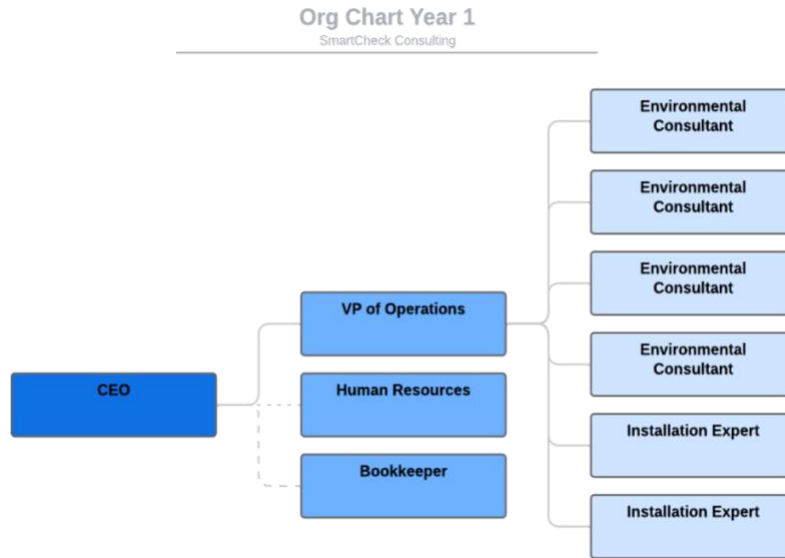
**Part time indirect labor expenses (per employee)**

	<b>Hourly Expense including Benefits</b>	<b>Total Yearly Expense</b>
<b>Year 1</b>	\$ 56.50	\$ 18,800.00
<b>Year 2</b>	\$ 425.65	\$ 42,673.20
<b>Year 3</b>	\$ 546.57	\$ 49,360.90
<b>Year 4</b>	\$ 562.97	\$ 50,841.72
<b>Year 5</b>	\$ 579.86	\$ 52,366.97

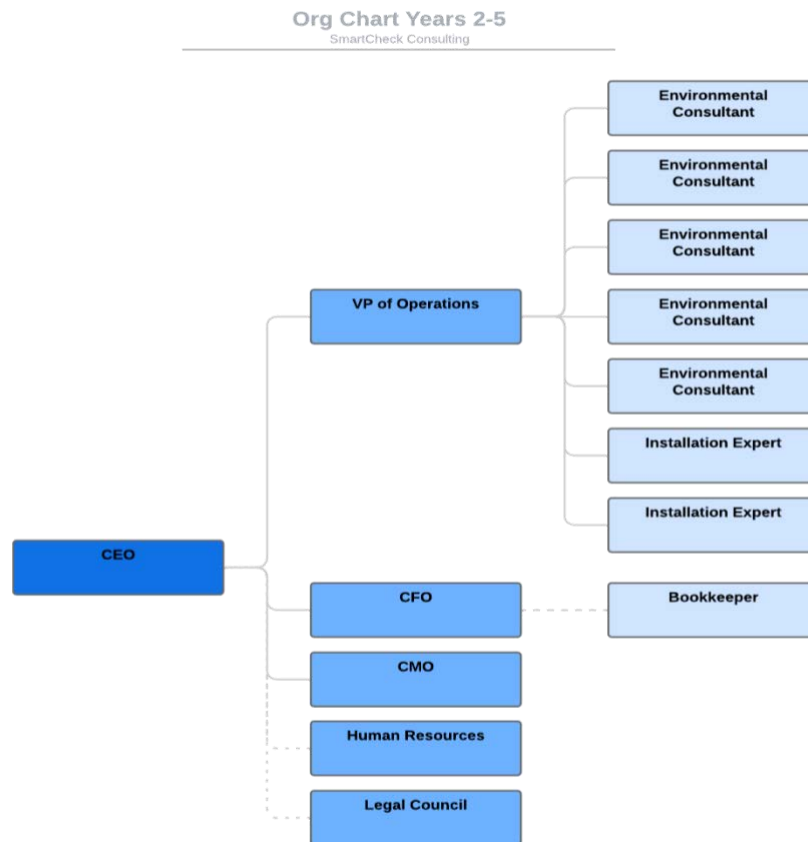
**Administrative Salary Expenses Make Up Remaining Indirect Labor Costs**

SmartCheck will pay administrative salaries in all five years. In year one, our only administrators will be the Vice President of Operations and the Chief Executive Officer and in year two this will develop to include a Chief Marketing Officer and a Chief Financial Officer. This structure will remain the same through year five. Similarly, to all other employees, administrative employees will have a growth in salary of 3% each year and will receive benefits of 30% in their second year of employment. (Operations Exhibit 6) (Operations Exhibit 7) (Operations Exhibit 8)

*Operations Exhibit 6: Organization Structure Year 1*



*Operations Exhibit 7: Organization Structure Year 2-5*



*Operations Exhibit 8: Administrative Overhead and Salaries*

	Year 1 Cost	Year 2 Cost	Year 3 Cost	Year 4 Cost	Year 5 Cost
<b>Chief Executive Officer</b>	\$ 400,000.00	\$ 535,600.00	\$ 551,668.00	\$ 568,218.04	\$ 585,264.58
<b>Vice President of Operations</b>	\$ 78,000.00	\$ 104,442.00	\$ 107,575.26	\$ 110,802.52	\$ 114,126.59
<b>Chief Financial Officer</b>	-	\$ 188,000.00	\$ 251,732.00	\$ 259,283.96	\$ 267,062.48
<b>Chief Marketing Officer</b>	-	\$ 119,000.00	\$ 159,341.00	\$ 164,121.23	\$ 169,044.87
<b>Total Yearly Cost</b>	<b>\$ 478,000.00</b>	<b>\$ 947,042.00</b>	<b>\$ 1,070,316.26</b>	<b>\$ 1,102,425.75</b>	<b>\$ 1,135,498.52</b>

**Resource Acquisition**

**Capital Expenditures and Staffing Evolves With Increasing Number of Customers**

As SmartCheck grows from years one through five, we increase the number of consultants to ensure we are accounting for the retained customers. By year two, we increase the hired consultants to five to keep up with demand, while the two installation experts remain the same. This extra hired consultant ensures a positive customer experience and aids with sending customers their emailed personalized consulting reports. We determined this by finding the arrival rate of customers, which portrays the capacity utilization. We also calculated the system capacity to help evaluate consultants needed with our appointment-based system (Operations Exhibit 6) (Operations Exhibit 7) (Operations Appendix 2).

To determine our capital expenditure schedule, we calculated the new customers each year, and took note of the customers retained to ensure we are investing in utility meters according to the demand, as we only must purchase meters for the new customers. The retained customers do not require additional meters once the meters are installed in their homes (Operations Exhibit 9).

We will also acquire breakroom and office supplies as startup capital expenditures, as well as vehicles. We will not need to purchase these additional items again after the startup time (Operations Appendix 8).

*Operations Exhibit 9: Homey® Meter Acquisition Schedule*

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
# of meters	19,647	15,450	0	0	0	883

## Logistics Management

### **Total Logistics Costs Decrease From Year to Year**

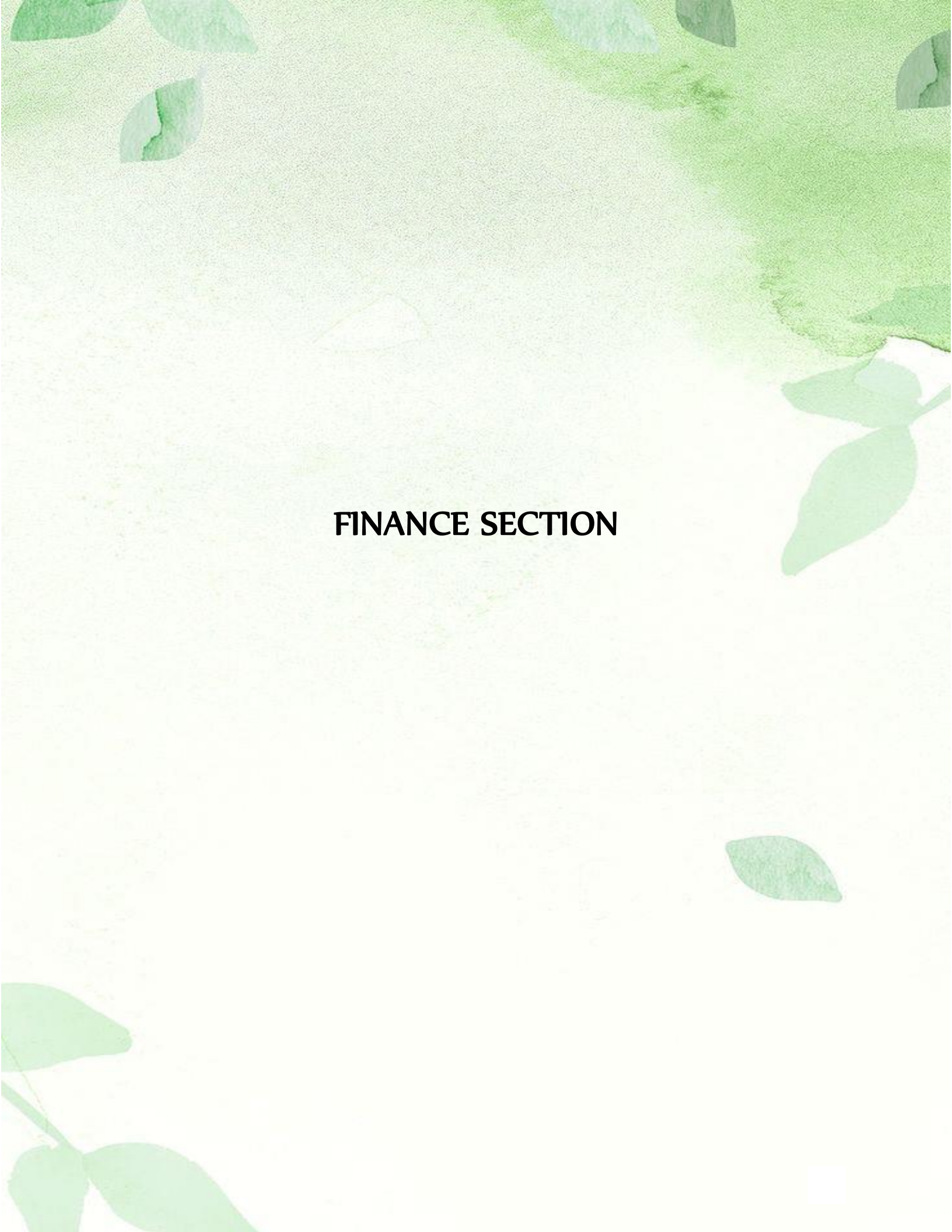
SmartCheck will incur inbound logistics costs for the shipping of direct materials and Homey® meters as well as freight insurance costs. These logistics costs will be incurred with each shipment of new inventories. The shipping costs for the materials remain constant all five years, but the freight insurance costs decrease each year.

We will incur outbound logistics costs related to our installation vehicles. This cost will be made up of vehicle maintenance and charging costs. Charging costs will fluctuate each year, but the vehicle maintenance cost will increase over the five years. We estimate that our total logistics cost in year one will be \$120,601 and by year five it will decrease to \$81,146. This large decrease can be explained by the freight insurance cost that decreases by nearly 60% from year one to year five (Operations Appendix 9).<sup>27</sup>

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<sup>27</sup> Lopienski, Kristina. “What Is Shipping Insurance, How Much Does It Cost, and Is It Worth It?” ShipBob, April 9, 2019. <https://www.shipbob.com/blog/shipping-insurance/>.



The background is a soft watercolor illustration. It features a central, faint yellow flower with delicate petals. Surrounding this are several green leaves of various shapes and sizes, some with visible veins. The colors are muted and blended, creating a gentle, naturalistic feel. The overall composition is centered and balanced.

## **FINANCE SECTION**

## High Initial Investment For High Returns

SmartCheck is seeking a \$3.1 million investment from angel investors at startup time, and an additional \$1.3 million in year one. Investors will experience over full payback of all investments by year three, as we will breakeven by year one and produce positive cash flows by year two. Our net present value comes to \$6.5 million, with an IRR of 45%, presenting SmartCheck as a company with high returns that exceed the cost of capital. (Finance Appendix 3) (Finance Appendix 4)

## SmartCheck's Comprehensive Startup Cost Requirements

Before we are open to serving customers, we estimate it will take us two months to prepare our company for business. We will train our direct labor, physically prepare our store, and organize all finance, operations, and marketing elements. We will also purchase all depreciable information system, office, and breakroom items, as well as the depreciable Homey® utility meters needed for the first year. These capital expenditures are included in our fixed assets, but not inventory, and account for 83.8% of all our startup costs. (Finance Exhibit 1) (Finance Appendix 1)

Another 11.5% of the startup costs are our startup inventory, which includes all bill of material items, shipping costs for materials, and direct labor salaries for the 2 months of training. We will also spend money on facilitating operating expenses, which are our utilities. In order to market our business, the first two months, we will spend part of our startup costs in preparation for our first guerilla marketing campaign throughout the Boston area in January. Lastly, we will account for additional expenses like rent, maintenance supplies, insurance, additional salaries, and information system expenses. Our startup purchases add up to \$3,239,687. (Finance Appendix 1)

### *Finance Exhibit 1: Startup Purchases*

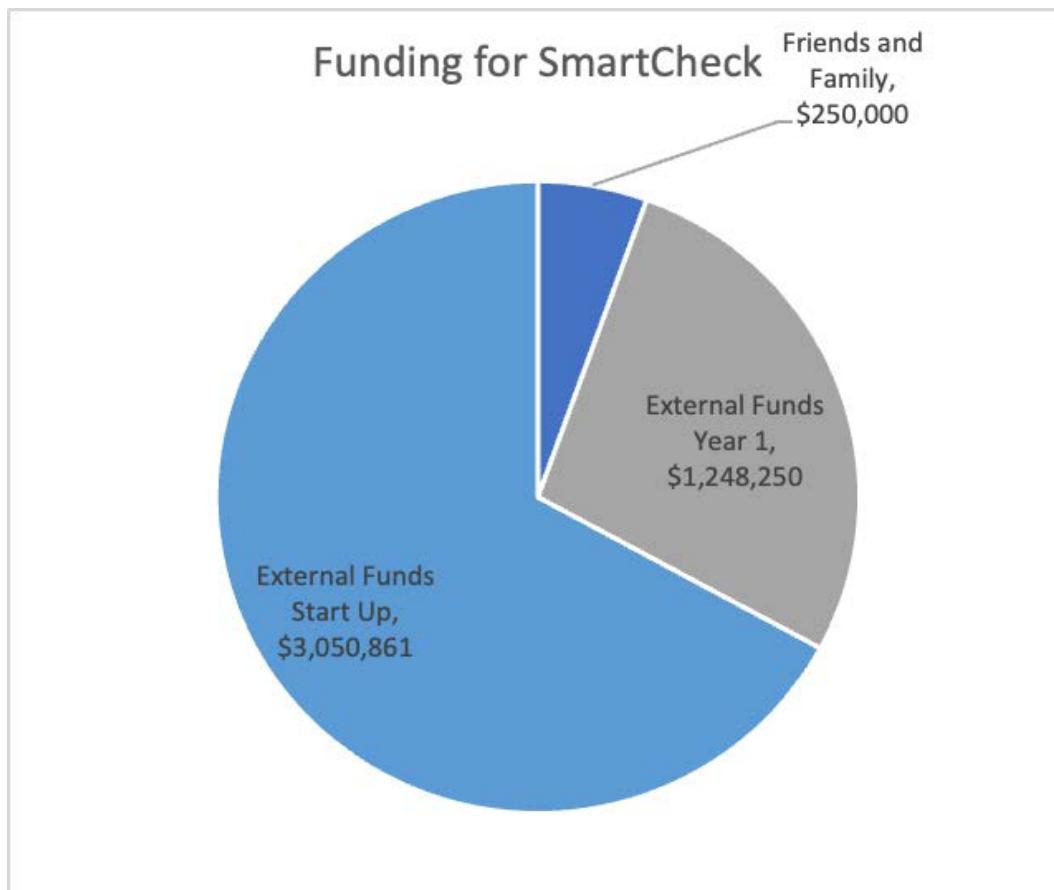
Startup Purchases	Costs	Percentage of total
<b>Fixed Assets</b>	\$2,709,059	83.6%
<b>Startup inventory</b>	\$368,071	11.4%
<b>Facilities operating expenses</b>	\$945	0.03%

<b>Pre-marketing expenses</b>	\$8,689	0.27%
<b>All other</b>	\$152,923	4.7%
<b>Total</b>	\$3,239,687	100%

### **SmartCheck Will Need External Funding at Startup Time and in Year One**

To launch our service in the Boston area, we are requesting \$3,300,861 from friends, family, and external funding at startup time. To achieve this value, we are asking our friends and family for \$250,000, therefore, we are looking for external funding from angel investors for a value of \$3,050,861 (Finance Exhibit 2). We will need additional external funding in year one of \$1,248,250. Following year one, we will need no additional funds from shareholders. This means over the entire project life we will need \$4,549,111 total, but \$4,299,111 from external funding. (Finance Appendix 3) (Finance Appendix 4)

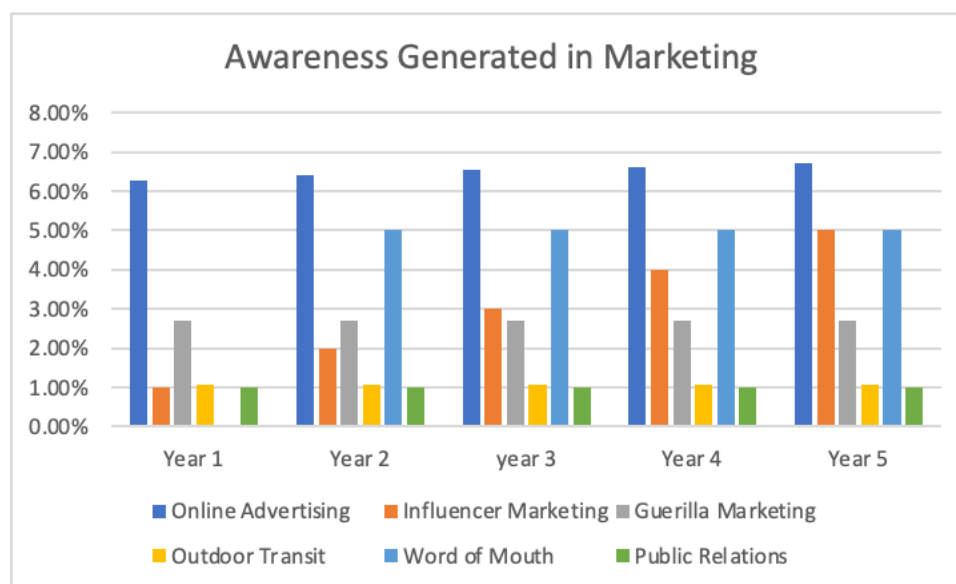
*Finance Exhibit 2: External Funding Needed*



## SmartCheck's Awareness Levels Remain Our Main Driver for Revenue and Profit

The key drivers of our revenue and profit growth are our high awareness percentages generated from our efficient marketing tactics (Finance Appendix 2). SmartCheck's online advertising generates the most awareness out of the marketing strategies. Influencers and the guerrilla marketing plan also contribute highly to awareness (Finance Exhibit 3). We can keep our variable costs low relative to our depreciable assets, which allows our profits to grow (Finance Appendix 3).

*Finance Exhibit 3: Awareness Generated in Marketing*



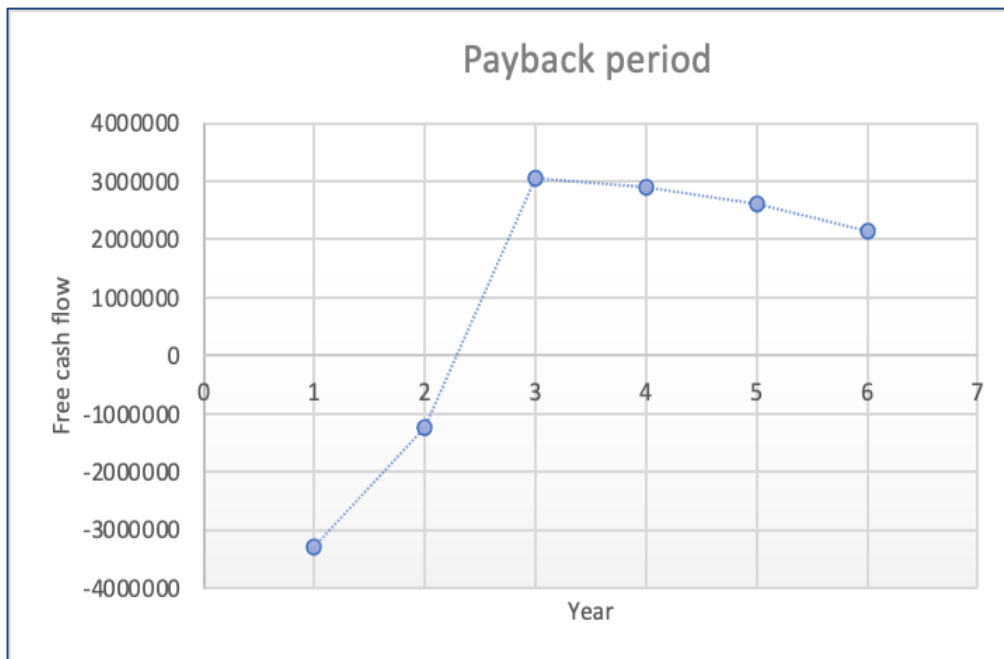
## SmartCheck Projected To Breakeven Year One and Begin Investor Payback in Year Two

Our cash flows are positive in year two, allowing us to begin paying our dividends, allowing SmartCheck to completely pay back family and friends funds from startup costs by year two, and pay back external funds by the start of year three. (Finance Exhibit 4) (Finance Appendix 3)

We are able to EBIT breakeven every year, as our actual sales exceed the number of sales required to EBIT breakeven. Since our subscription model allows for customer retention, the value of customers retained is not reflected in the quantity of EBIT breakeven, but it is reflected in the sales of EBIT breakeven. The costs that the retained customers produce are not substantial in comparison to the new customers. Therefore, we do not believe the retained customers will produce substantial costs for the variable costs after their first year as a consumer. We have

reflected the breakdown of EBIT breakeven before retention, after retention, and the new customers that are generated for years one through five. (Finance Exhibit 5)

*Finance Exhibit 4: Payback Period*



*Finance Exhibit 5: EBIT Breakeven Analysis*

EBIT breakeven	Year 1	Year 2	Year 3	Year 4	Year 5
EBIT breakeven quantity (new customers)	11,191	16,371	20,515	21,947	23,570
EBIT breakeven sales (new customers)	\$4,028,921	\$5,893,521	\$7,385,261	\$7,900,815	\$8,485,190
EBIT breakeven (adjusted for retention)	\$4,028,921	\$3,216,183	\$3,615,447	\$4,296,565	\$5,086,328
Sales	\$6,693,347	\$9,424,460	\$9,010,626	\$8,497,155	\$7,906,250
EBIT Margin of Safety	39.81%	65.87%	59.88%	49.44%	35.67%

## Using Eight Comparable Companies, The Determined Required Rate of Return is 10.89%<sup>28,29,30,31,32,33,34,35</sup>

Due to the uniqueness of our service, we were unable to find public firms that perform environmental consulting for utilities solely. Therefore, we sought out public firms in the utilities industry that perform utility related services, as well as consulting firms. We narrowed our comparable companies down to eight firms, which when averaged, presented a beta of 0.55. The beta matches our expectations since utility companies tend to have lower volatility, therefore a lower beta. (Finance Appendix 5)

The averaged highest risk premium is 6.1%, while the lowest risk premium is 4%<sup>36,37,38,39,40,41,42,43</sup>. The 10-year treasury bond long term average is 4.26%<sup>44</sup>. We chose to use 5.9% as a lowest risk premium to calculate the minimum required rate of return. We did this

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<sup>28</sup> “Eversource Energy (ES) Stock Price, News, Quote & History.” Yahoo! Finance. Yahoo!, December 5, 2022. <https://finance.yahoo.com/quote/ES?p=ES>.

<sup>29</sup> “National Grid Plc (NGG) Stock Price, News, Quote & History.” Yahoo! Finance. Yahoo!, December 5, 2022. <https://finance.yahoo.com/quote/NGG/>.

<sup>30</sup> “ICF International, Inc. (ICFI) Stock Price, News, Quote & History.” Yahoo! Finance. Yahoo!, December 5, 2022. <https://finance.yahoo.com/quote/ICFI/>.

<sup>31</sup> “Ecolab Inc. (ECL) Stock Price, News, Quote & History.” Yahoo! Finance. Yahoo!, December 5, 2022. <https://finance.yahoo.com/quote/ECL/>.

<sup>32</sup> “Edison International (EIX) Stock Price, News, Quote & History.” Yahoo! Finance. Yahoo!, December 5, 2022. <https://finance.yahoo.com/quote/EIX/>.

<sup>33</sup> “The Southern Company (SO) Stock Price, News, Quote & History.” Yahoo! Finance. Yahoo!, December 5, 2022. <https://finance.yahoo.com/quote/SO/>.

<sup>34</sup> “Dominion Energy, Inc. (D) Stock Price, News, Quote & History.” Yahoo! Finance. Yahoo!, December 5, 2022. <https://finance.yahoo.com/quote/D/>.

<sup>35</sup> “American Electric Power Company, Inc. (AEP) Stock Price, News, Quote & History.” Yahoo! Finance. Yahoo!, December 5, 2022. <https://finance.yahoo.com/quote/AEP/>.

<sup>36</sup> “WACC for Eversource Energy.” Finbox. Accessed December 5, 2022. <https://finbox.com/NYSE:ES/models/wacc>.

<sup>37</sup> “WACC for National Grid.” Finbox. Accessed December 5, 2022. <https://finbox.com/NYSE:NGG/models/wacc>.

<sup>38</sup> “WACC for ICF International, Inc.” Finbox. Accessed December 5, 2022. <https://finbox.com/NASDAQGS:ICFI/models/wacc>.

<sup>39</sup> “WACC for Ecolab Inc.” Finbox. Accessed December 5, 2022. <https://finbox.com/NYSE:ECL/models/wacc>.

<sup>40</sup> “WACC for Edison International.” Finbox. Accessed December 5, 2022. <https://finbox.com/NYSE:EIX/models/wacc>.

<sup>41</sup> “WACC for The Southern Company.” Finbox. Accessed December 5, 2022. <https://finbox.com/NYSE:SO/models/wacc>.

<sup>42</sup> “WACC for Dominion Energy, Inc.” Finbox. Accessed December 5, 2022. <https://finbox.com/NYSE:D/models/wacc>.

<sup>43</sup> “WACC for American Electric Power Company, Inc.” Finbox. Accessed December 5, 2022. <https://finbox.com/NASDAQGS:AEP/models/wacc>.

<sup>44</sup> “10 Year Treasury Rate.” YCharts. Accessed December 5, 2022. [https://ycharts.com/indicators/10\\_year\\_treasury\\_rate](https://ycharts.com/indicators/10_year_treasury_rate).

because SmartCheck's lowest risk premium should not be below the 10-year treasury bond, and 5.9% is the highest risk premium for Eversource Energy and American Electric Power Company, Inc.<sup>24,31</sup>. Due to our small size relative to our comparables, SmartCheck has higher risk, therefore it is appropriate to have a lowest risk that is high. Lastly, the averaged EV/EBITDA multiples for SmartCheck is 14.9. SmartCheck's actual calculated EV/EBITDA is 0.8 since we have zero debt. Based on this financial data from other firms, the minimum required return for projected cash flows is 10.89%. (Finance Appendix 5)

### **SmartCheck is a Healthy Investment Option Demonstrated by Our High NPV and IRR**

Using the cash flows from years one through five and a discount rate of 10.89%, SmartCheck's NPV is \$6,475,520. When determining the IRR, we use the cash flows from years one through five to discover it is 45%. SmartCheck is a healthily growing company that is projected to produce high cash flows in years two through five, producing a high NPV and IRR. Investors may anticipate dividends past their initial investments starting in years three, and continuing into year four and five, making SmartCheck a great investment. (Finance Appendix 1) (Finance Appendix 3) (Finance Appendix 4)

### **SmartCheck Anticipates Our Terminal Value Using the Declining Perpetuity Exit Strategy**

SmartCheck's terminal value is calculated using a declining perpetuity exit strategy because our cash flow is positive in year five. We are using a declining perpetuity growth rate of 20% after year five since SmartCheck experienced a growth rate decline of 18.5% from year four to year five. We decline at a relatively high speed due to competition entering in year two, we experience slow growth in our target segment, and the model of our business is subscription based leading to a low switching cost to competitors. (Finance Appendix 4)

The terminal value is calculated by finding the cash flow in year six. To find this, we use the declining rate of -20% plus 100%, to be 0.8, multiplied by the year five cash flow of \$2,135,024. The cash flow in year six, \$1,708,019, is then divided by the discount rate minus the declining growth rate. Our terminal value is calculated to be \$5,529,360. (Finance Appendix 4)



## SmartCheck is a Competitive Investment in Comparison to Other Similar Companies

45,46,47,48,49,50,51,52

There are not many companies that provide SmartCheck services and that publicly share their financial data. Therefore, our ratios slightly differ from our competitors in the energy consumption and consulting areas due to the differences in size and services provided. The comparable companies we decided to research were Eversource Energy, National Grid plc, American Electric Power Company, Inc., and ICF International, Inc. Eversource, National Grid, and American Electric Power Company are utility companies, while ICF is an environmental consulting service. (Finance Exhibit 6)

Firstly, SmartCheck's EV/EBITDA multiple is significantly lower than its comparable companies. This is due to our company having a low enterprise value because SmartCheck has zero debt, while the EBITDA remains high. Meanwhile, other public companies have incurred a substantial amount of debt. (Finance Exhibit 6)

SmartCheck's cost of goods sold, gross margin, and net income percentages remain similar to all comparable companies at 40%, 60%, and 20%, respectively. Though, when reviewing the change in the cost of goods sold percentage over time, it declines each year. SmartCheck can decrease their inventory over time due to customer retention, driving the cost of goods sold percentage downwards, and the cash flows and gross margin percentage upwards. We can stop purchasing meters in year two, which also allows us to drive our net income percentages and cash flows upwards. (Finance Appendix 2) (Finance Appendix 4) (Finance Exhibit 6)

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<sup>45</sup> "Eversource Energy (ES) Stock Price, News, Quote & History." Yahoo! Finance. Yahoo!, December 5, 2022. <https://finance.yahoo.com/quote/ES?p=ES>.

<sup>46</sup> "National Grid Plc (NGG) Stock Price, News, Quote & History." Yahoo! Finance. Yahoo!, December 5, 2022. <https://finance.yahoo.com/quote/NGG/>.

<sup>47</sup> "ICF International, Inc. (ICFI) Stock Price, News, Quote & History." Yahoo! Finance. Yahoo!, December 5, 2022. <https://finance.yahoo.com/quote/ICFI/>.

<sup>48</sup> "Ecolab Inc. (ECL) Stock Price, News, Quote & History." Yahoo! Finance. Yahoo!, December 5, 2022. <https://finance.yahoo.com/quote/ECL/>.

<sup>49</sup> "Edison International (EIX) Stock Price, News, Quote & History." Yahoo! Finance. Yahoo!, December 5, 2022. <https://finance.yahoo.com/quote/EIX/>.

<sup>50</sup> "The Southern Company (SO) Stock Price, News, Quote & History." Yahoo! Finance. Yahoo!, December 5, 2022. <https://finance.yahoo.com/quote/SO/>.

<sup>51</sup> "Dominion Energy, Inc. (D) Stock Price, News, Quote & History." Yahoo! Finance. Yahoo!, December 5, 2022. <https://finance.yahoo.com/quote/D/>.

<sup>52</sup> "American Electric Power Company, Inc. (AEP) Stock Price, News, Quote & History." Yahoo! Finance. Yahoo!, December 5, 2022. <https://finance.yahoo.com/quote/AEP/>.

All comparable companies, except ICF, had negative net working capital, therefore net working capital days is not an appropriate ratio to use in this case. ICF had a lower net working capital, creating for a lower net working capital days than SmartCheck. This is likely due to our higher amount of current assets because we install inventory in people's homes, in comparison to ICF, which as an environmental consulting firm, has lower current assets in nature. (Finance Exhibit 6)

SmartCheck has lower accounts receivable and payable than all comparables. This is due to SmartCheck being a service and collecting its sales in five days. Since SmartCheck is a subscription service, we assume all our sales will be on credit. For our accounts payable days, we believe it would be 15 days because our only accounts payable would be outbound transportation on credit because all other costs are planned and ordered ahead, so are not paid on credit. (Finance Exhibit 6)

The return on equity (ROE) and return on assets (ROA) are significantly higher than all comparables because of our high total income relative to our assets and equity (Finance Exhibit 6). Meanwhile, our comparable companies include stocks in their equity and assets, which leads to their lower ROE and ROA. We then receive high revenues, which drives our bottom line to increase the shareholder's equity. Meanwhile, other comparables do not have as many yearly investments. (Finance Appendix 2) (Finance Appendix 3) (Finance Exhibit 6)

*Finance Exhibit 6: Comparable Companies*

Comparable companies	EV/EBITDA multiple	COGS %	Gross Margin %	Net Income %	NWC days	Accounts Receivable days	Accounts Payable days	ROE	ROA
SmartCheck Consulting	0.8	40%	60%	20%	27.29	5	15	68%	68%
Eversource	14.4	60%	40.46%	11.8%	n/a	8	119	8.4%	2.5%
National Grid	13.8	33%	67%	13%	n/a	58	211	12%	2.5%
American Electric Power Company	13.2	39%	61%	15%	n/a	16	202	11%	2.8%
ICF International, Inc.	16.9	63%	37%	4.6%	17.05	56	39	9.5%	4%



# **CROSS FUNCTIONAL RISK ASSESSMENT AND MANAGEMENT**

## Cross Functional Risk Assessment and Management Evaluation

The environmental services industry is one that often requires advanced technology, established branding, and deep financial backing. In considering all these factors when planning for the future and wellbeing of SmartCheck, we have considered and accounted for numerous risks that could come up along our business life cycle.

To begin the SmartCheck development, we first conducted a conjoint analysis to gauge what aspects of our service are most desirable. Following our service planning, testing, and financial forecasting, we conducted a series of tests to analyze the project's quantitative and qualitative riskiness. After identifying the most probable and impactful quantitative risks to our NPV, we ran simulations on each to better understand all potential outcomes to our NPV. The information provided by these risk analyses have allowed us to better implement precautions and plans to ensure that SmartCheck is a robust and risk averse company.

### Conjoint Analysis: Identifying Unique Features and Customers' Needs

When first plotting the design and features of SmartCheck, our team set out to perform a conjoint analysis of what features are most important to our target consumers. We received forty usable survey responses which indicated how much our target consumers are willing to pay for this service and what aspects of the service are preferable. The survey was designed by offering three pricing options and three different service features with each having two options. Respondents were presented with seven different service profiles, each with different combinations of features. They were asked to rank their preference from 1 to 7 of each profile. From these results we were able to calculate which components and price were most desirable.

*Cross Functional Risk Assessment and Management Exhibit 1: Summary of Conjoint Analysis Partworts*

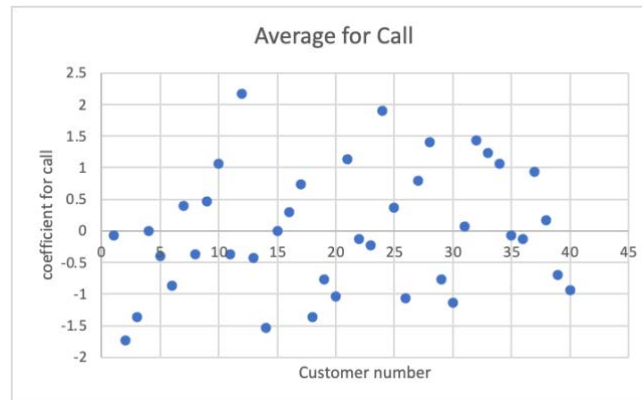
Partworts	Mean	Standard Deviation	Min	Max
Intercepts	3.91	2.04	0.1	7.2
\$45	-0.33	1.3	-3.25	2.75
\$54	-1	2.19	-4.9	4.6

<b>Yearly Subscription</b>	0.33	1.26	-2.37	3.17
<b>Email Notification</b>	0.69	1.22	-2.57	3.43
<b>Schedule by Phone</b>	0.004	0.97	-1.73	2.17

Results from our survey showed that our lowest price offered in the survey was the most popular (Cross Functional Risk Assessment and Management Exhibit 1). This was a monthly price of \$35 which is included in the intercept. These results aligned well with our house of quality where we ranked price as being a customer attribute with the highest importance (Operations Exhibit 1). Knowing that the lowest price was most preferred, our team does not have any reservations about charging our revenue maximizing price of \$30 a month.

While price was clearly the most important aspect in our survey, we were still able to gain some more insight on consumer preferences regarding different service features. We asked respondents if they would like to receive their monthly report and recommendations via email, or in person with a consultant. Emailed reports were slightly more preferable. Finally, we asked respondents if they would prefer to schedule their consultation appointment over the phone or through our website. It may appear that there was relative indifference with responses as the corresponding partworth is 0.004, however, this is due to a large variation in responses as demonstrated in (Cross Functional Risk Assessment and Management Exhibit 2).

*Cross Functional Risk Assessment and Management Exhibit 2: Scatter Plot of “Call” Coefficient for Respondents*



This scatter plot details how respondents’ partworths regarding a phone call scheduling style varied in sign and weight greatly which led to an average partworth close to zero. Following these results, our team ultimately decided to offer appointment scheduling both online and via phone as this will not be a major hindrance.

**SmartCheck Qualitative Risk Analysis: Navigating a Complex Supply Chain**

In the ever-changing world of today, the SmartCheck team understands that there is always going to be several risks involved in a project. Many of the risks may be hard to predict and are unquantifiable. We understand geopolitics and intercontinental logistics can play a major role in supply chain management. With nearly all our raw material suppliers being in China, we feel that potential tariffs and supply chain issues are risks of high probability and impact (Cross Functional Risk Assessment and Management Exhibit 3).

*Cross Functional Risk Assessment and Management Exhibit 3: Qualitative Risk Matrix*

<b>High Impact</b>	Decrease in home utility cost Decreased interest in sustainability Inadequate employee training Negative PR	Failure to raise startup capital Supply chain logistical issues Tariffs
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<b>Low Impact</b>	Decrease in household income Inadequate parking Poor storefront infrastructure Unreliable service vehicles	Discount rate increase Inflation effects on pricing Installment postponements due to weather Equipment breakage
	<b>Low Probability</b>	<b>High Probability</b>

### Quantitative Risk Analysis: Quantifiable Risk Impacts Remain Low

Quantitative risk in business is prevalent in nearly all aspects of forecasting. We understand that even a slight change in one forecasted variable can lead to a tremendous change in our NPV. To assess the potential impact of each of these risks, we first created a preliminary quantitative risk matrix in which we estimated what quantitative changes could greatly impact our NPV (Cross Functional Risk Assessment and Management Appendix 1). We then conducted a sensitivity analysis on 15 quantitative variables which we felt could potentially have a substantial impact on our NPV. Listed below are the risks which produce an elasticity (impact) greater than 0.5% (Cross Functional Risk Assessment and Management Exhibit 4).

#### *Cross Functional Risk Assessment and Management Exhibit 4: Quantitative Risk Sensitivity Analysis*

	<b>Year 1 (Base Value)</b>	<b>Breakeven Value</b>	<b>Change in NPV with 1% increase</b>	<b>Elasticity</b>
<b>Awareness</b>	13%	8%	\$167,571	2.59%
<b>Retention</b>	40%	20%	\$156,380	2.41%
<b>Competition %</b>	30%	45%	\$(124,608)	-1.92%
<b>Segments Size</b>	438,754	198,034	\$118,028	1.82%
<b>Tablet Price</b>	\$98	\$185	\$(72,123)	-1.11%
<b>Administrative Salary</b>	\$496,800	\$1,299,025	\$(40,101)	-0.62%
<b>Energy Meter</b>	\$130	\$353	\$(37,756)	-0.58%



The marketing related risks with the highest elasticities are awareness, retention, and the percentage of trial households lost to competition. Purchase intent was not included in this chart because it has the same total effect as awareness to our NPV. We elected to run simulations on awareness and retention rate as their elasticities are the only ones which could have a substantial impact on our NPV (Cross Functional Risk Assessment and Management Exhibit 4).

For our operations risk analysis we chose to simulate the fluctuation in the tablet price as that variable had the highest elasticity related to operations. As stated in the operations section of the report, the tablet will be installed in each customer's home to display their utility consumption data. While the percentage change in the price of the tablet would have the greatest percentage change to NPV regarding operations, it is still unlikely that it will be substantial with an elasticity of 1.1%. The tablet price, however, is considered high risk, high impact compared to our other quantitative risks. With the information from our sensitivity analysis now available, we formulated a new, more accurate quantitative risk matrix (Cross Functional Risk Assessment and Management Exhibit 5).

*Cross Functional Risk Assessment and Management Exhibit 5: Final Quantitative Risk Matrix*

<b>High Impact</b>	Direct labor costs Indirect labor cost Administrative salaries Segment size decrease	Retention rate decrease Awareness rate decrease Purchase intent rate decrease Tablet price increase
<b>Low Impact</b>	Commercial property Increased insurance costs Increased website expense Increased POS expense	Marketing expenses increase Rent prices increase Inbound logistics costs increase
	<b>Low Probability</b>	<b>High Probability</b>

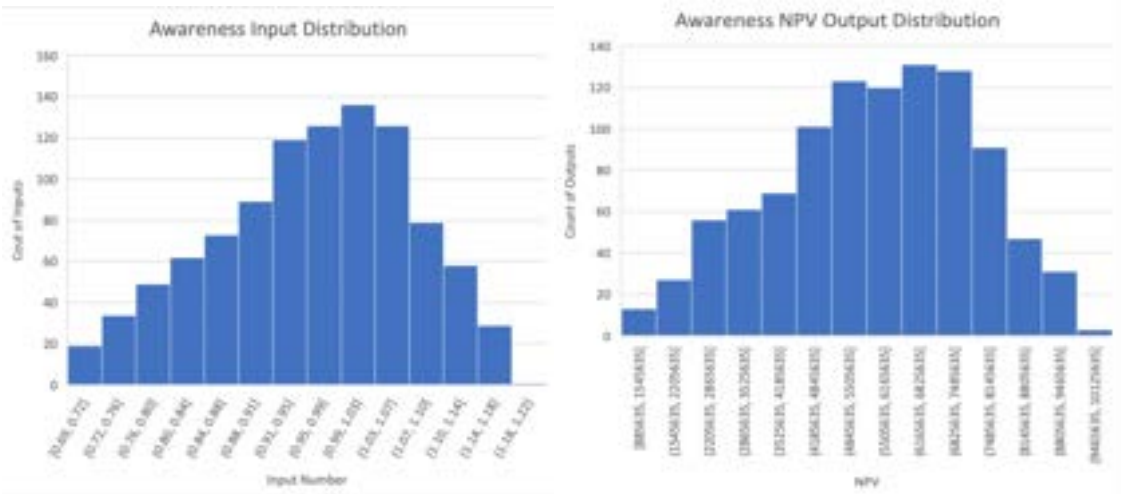
### **Simulation Analysis One (Marketing): NPV Remains Positive Despite Awareness Fluctuation**

After performing a sensitivity analysis on the fifteen quantitative variables which we deemed to have the most risk associated with them, we performed simulations on the three riskiest variables. This showed us how a percentage change in that variable affects our NPV. The first variable selected, due to its high impact, was our awareness within our target segment. Being that we are in the Boston metropolitan area, we believe that the population will never vary

greatly, and it will never go below or above a certain point. Factoring in this belief, we elected to use a triangular distribution to run our simulation.

The first step in creating our triangular distribution was to find the minimum, maximum, and most likely parameters of awareness. We assume that our current marketing campaign, using six different vehicles, is our base value (Marketing Appendix 2). We then calculate that it could take a maximum of nine or a minimum of five vehicles to gain our estimated awareness of 13% in year one (Cross Functional Risk Assessment and Management Appendix 2). These parameters show that if we do, in fact, need nine vehicles to reach our current awareness, then using six vehicles will lead to an awareness that is 66% of our current estimate. We ran 1,000 iterations using these parameters, and we were able to estimate all possible NPV outcomes within this range of awareness spending (Cross Functional Risk Assessment and Management Exhibit 6).

*Cross Functional Risk Assessment and Management Exhibit 6: Awareness Simulation Input and NPV Distribution*



Awareness Simulation Summary	
Average	\$5,651,580
Median	\$5,767,210
Standard Deviation	\$1,879,643
5th Percentile	\$2,390,896
95th Percentile	\$8,544,319

<b>%NPV &lt; 0</b>	<b>0%</b>
--------------------	-----------

The above charts indicate that NPV would never go below zero with our estimated minimum and maximum inputs. We believe that these inputs are realistic as we estimate it is far more likely we need to increase the scope of our marketing campaign rather than decrease it.

**Simulation Analysis Two (Marketing): Customer Retention as a Key to Success**

One major aspect to any successful service is the ability to retain past customers. We estimate that around 40% of our customers in each year will be retained for the next. This is a somewhat low assumption; however, it is realistic to believe this rate could fluctuate a fair amount in reality. To create our minimum and maximum parameters, we set the minimum to our breakeven retention rate which is 50% of the base, or a 20% retention rate. We then extended this assumption to the maximum parameter and made that value 150% of the base. To determine how these fluctuations in the rate of retained customers would affect our NPV, we ran a simulation using triangular distribution with 1,000 iterations (Cross Functional Risk Assessment and Management Exhibit 7).

*Cross Functional Risk Assessment and Management Exhibit 7: Retention Rate Simulation Input and NPV Distribution*



Retention Rate Simulation Summary	
Average	\$6,763,709
Median	\$6,413,931
Standard Deviation	\$3,312,379
5th Percentile	\$1,828,204
95th Percentile	\$12,881,933
%NPV < 0	0%

According to this simulation, our NPV will never go below zero as our minimum retention rate is our breakeven value. With that in mind, the fifth percentile NPV is still nearly \$2,000,000 because a retention rate even slightly above the breakeven value will lead to a significantly positive NPV.

### **Simulation Analysis Three (Operations): Increase in Raw Materials Price is Manageable**

The fluctuation in pricing for raw materials is something that should always be considered when forecasting business spending and profitability. As previously mentioned, we found that a change in the price of the home tablet display systems has the highest NPV impact. To find our minimum, maximum, and most likely parameters we found price ranges of different tablets and created an average for each parameter<sup>53,54</sup> (Cross Functional Risk Assessment and Management Appendix 3). We then ran the 1,000 iterations simulation using triangular distribution on the tablet price change impact (Cross Functional Risk Assessment and Management Exhibit 8).

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<sup>53</sup> “Galaxy Tab A7 10.4 (2020) Prices, Still a Good Buy.” n.d. Swappa. Accessed December 5, 2022. <https://swappa.com/guide/samsung-galaxy-tab-a7-104-2020/prices>.

<sup>54</sup> “iPad Mini 5th Gen Prices, Still a Good Buy.” n.d. Swappa. Accessed December 5, 2022. <https://swappa.com/guide/apple-ipad-mini-5/prices>.

*Cross Functional Risk Assessment and Management Exhibit 8: Tablet Price Simulation Input and NPV Distribution*



Awareness Simulation Summary	
Average	\$6,427,418
Median	\$6,451,070
Standard Deviation	\$542,661
5th Percentile	\$5,512,358
95th Percentile	\$7,323,459
%NPV < 0	0%

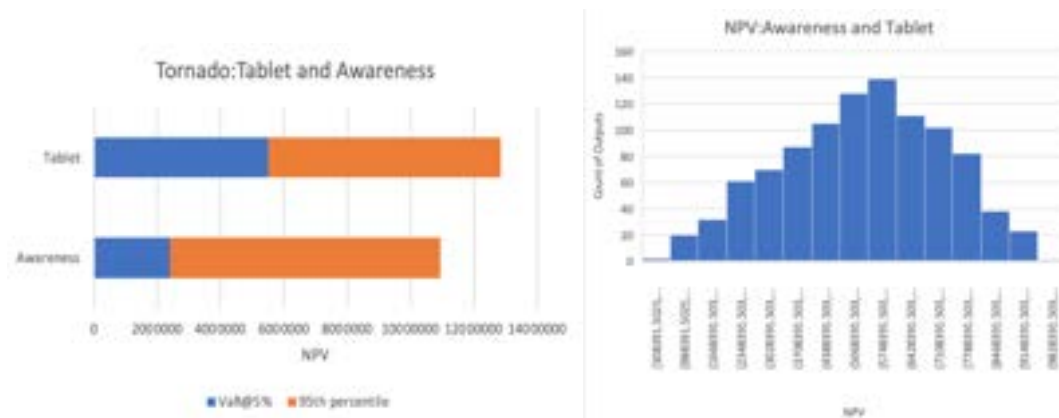
The above data further demonstrates that while the change in tablet price is the most impactful operations quantitative risk, its overall impact is still extremely small. Although the change in tablet price from our current supplier does not have a strong NPV impact, there is still significant risk associated with potentially being forced to move to a more expensive supplier. Our plan to mitigate this risk will be discussed later in this section.

#### Simulation Analysis Four: NPV Remains Strong When Awareness and Tablet Price Fluctuate

While the risk of tablet price change to our NPV is negligible, we wanted to see how that risk would change when combined with changes in our awareness rate. Combining these risks, however, still did not give any potential of having a negative NPV (Cross Functional Risk

Assessment and Management Exhibit 9). Again, this is due to the relatively low price of the tablet from our Chinese supplier. If that supplier were to change, the price for this material would increase.

*Cross Functional Risk Assessment and Management Exhibit 9: Awareness Rate and Tablet Price Change NPV Distribution*

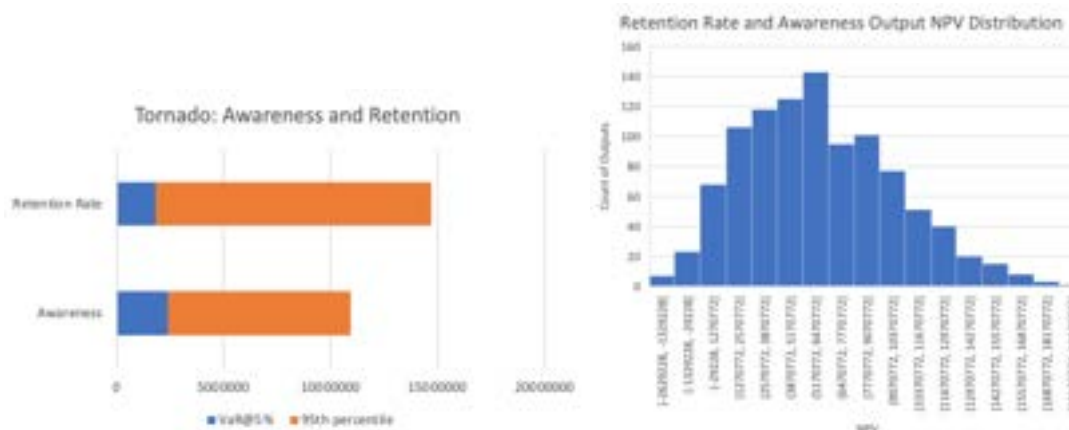


Awareness and Tablet Price Simulation Summary	
Average	\$5,625,594
Median	\$5,725,349
Standard Deviation	\$1,952,275
5th Percentile	\$2,302,881
95th Percentile	\$8,662,934
%NPV < 0	0%

**Simulation Analysis Five: Awareness and Retention Change Together Creates Added Risk**

To find a more realistic risk probability, we simulated the two highest impact quantitative risk variables, awareness, and retention rate, to see their combined impact on NPV. Out of 1,000 iterations, we found that 3% of the time our awareness and retention rate could be low enough to cause our NPV to be negative (Cross Functional Risk Assessment and Management Exhibit 10).

*Cross Functional Risk Assessment and Management Exhibit 10: Awareness and Retention Rate  
NPV Distribution*



Awareness and Retention Rate Simulation Summary	
Average	\$5,999,703
Median	\$5,701,957
Standard Deviation	\$3,819,413
5th Percentile	\$599,382
95th Percentile	\$12,842,204
%NPV < 0	3%

The above charts and tables further demonstrate our findings regarding risk of negative NPV due to a change in both awareness and retention rate. While this simulation showed changes in these metrics would lead to a negative NPV only 3% of time, we believe it is prudent to formulate a risk mitigation strategy.

### Locating Alternate Suppliers to Mitigate Supply Chain Risk

With nearly all our suppliers being located in China, we understand that a number of supply chain and logistical issues are likely to arise throughout our business cycle. Addressing supply chain issues swiftly and effectively can be the difference in the survival of a business. We have formulated a list of alternate suppliers in the event of severe supply chain disruptions



(Cross Functional Risk Assessment and Management Appendix 4). These alternate suppliers are all located in the United States which will alleviate complications in the supply chain.

Ordering our raw materials from U.S. suppliers, however, could lead to a somewhat significant increase in costs depending on the item being ordered. We must ensure that we are able to move back to an overseas, more cost-effective supplier as soon as possible. If this is not an option, we will work to build strong working relationships with local suppliers to reduce costs.

All our raw materials are being shipped by sea. We realize that the shipping process also comes with significant risk of damaged, destroyed, or lost merchandise. To help soften our financial losses from these risks, we have purchased comprehensive freight insurance (Operations Appendix 9). This does result in higher inbound logistics costs, however, the cost of losing a shipment of goods without insurance would be devastating.

### **Scaling Back SmartCheck's Size and Reach if Required Investment is Not Met**

We realize that our required startup investment outlined in our finance startup section is substantiation. Therefore, the risk of failing to meet this goal is elevated. To help ensure that SmartCheck is still able to go to market in the event of not reaching our startup capital goals, we will scale down our initial target segment size and related costs. This will allow us to grow at a more conservative rate and reduce the burden of high startup investment.

### **Maintaining Strong Retention Through Customer Feedback**

SmartCheck's ability to retain current customers year over year is crucial to the overall health and success of our business. To help mitigate the risk of our customer retention rate falling significantly we will be implementing a customer feedback system in which we are able to gauge customers' wants and needs as well as what they may like or dislike about our service. This is shown in our marketing creative executions. This will not only help us continue to tailor our service to customer requirements but demonstrate to our customers that we care about their individual opinion's. Overall, we hope that it will help ensure a strong retention rate and bottom line.

## Conclusion

### **SmartCheck Provides a Socially Responsible Investment With High Returns**

SmartCheck is designed to help homeowners in the Greater Boston Area make a positive impact on their wallet and personal finances. We have taken into consideration potential customers' opinions and concerns to finalize our unique consulting service.

After thorough market research and data analysis, we believe that our consumers will truly understand how our service differs from others through the value we provide them. Based on interviews and research, we have carefully formulated marketing strategies that will contribute to SmartCheck's continued success. As we advertise through multiple marketing channels, we believe we will concurrently raise awareness for our service while continuously delivering value to our customers.

At the heart of our business is the service's operations management team. While keeping customer wants and demands in mind, we have crafted our service to meet consumers' needs at an efficient rate. Similarly, we have designed our material lead times to match our customers' schedules which will ensure we are providing the best possible service.

Our financial statements also showcase to potential investors that our business will generate strong returns. With our NPV of \$6,475,520 and IRR of 45%, we have proven that investing in SmartCheck will yield high returns. To ensure that SmartCheck can withstand risk and preserve a stable NPV, we have composed a list of qualitative and quantitative risks that could harm our service. Through research and identification of these risks we can take the necessary steps in mitigating them.

SmartCheck is uniquely positioned to provide a positive environmental impact while reducing each customer's monthly spending. We will reshape how homeowners view their utility consumption and spending by providing real time consumption data along with cost reducing consultations. SmartCheck is extremely driven to make a positive impact in our community, and we are eager to add unique insights and experience through external investors.

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*Marketing Appendix 1: Segmentation Grid to Reach our Target Market*

Segment Name	Ecosystem Enthusiasts	Kinda Carers	Not Environmentally Conscious folks	Rent-a-home
Demographics	Homeowners in Middlesex, Norfolk, Suffolk, and Essex County, MA with income above \$35,000 per year.	Homeowners in the Middlesex, Norfolk, Suffolk, Essex County in MA that make above \$35,000 that are interested in sustainability but might not have the time.	Owner Occupied homes in Middlesex, Norfolk, Suffolk, and Essex County, MA with income above \$35,000 per year.	Non-Homeowners in the Middlesex, Norfolk, Suffolk, and Essex County in MA with income above \$35,000.
Psychographics	Wants access to consumption data and is interested in improving their environmental footprint. Actively recycles and reuses products through second-hand purchases. Is interested in sustainability overall.	Aims to be sustainable but might not necessarily travel to retrieve sustainable services.	Don't recycle, reuse, or reduce. Not environmentally conscious and do not care for sustainability at all.	May be environmentally conscious through their beliefs and practices.
Segment Size	418,752	138,553	126,735	468,639
Other Services Used	They most likely recycle or keep a compost bin. Likely to avoid any actions that would harm the environment.	N/A	N/A	N/A
Service attributes and Benefits	Informative, Cost saving, Easy to use.	Useful, Informative	Somewhat informative	Does not apply to their property.
Price	\$40-\$50/month	\$25-\$40/month	\$10-\$25/month	\$0
Information Sources	Magazines/ newspaper,TV, government info flows	Magazines/ newspaper,TV, government info flows	Magazines/ newspaper,TV, government info flows	Magazines/ newspaper,TV, government info flows
Media Options	Social media, TV(news), youtube, instagram	Social media, Tv (news), youtube, instagram	Social media, Tv (news), youtube, instagram	Social media, Tv (news), youtube, instagram

## Marketing Appendix 2: Year 1 IMC Schedule

SEGMENT SIZE: 438,752															
Year 1 IMC Schedule	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	COST	CPM	AWARENESS
PULL															
Paid Media															
Online Advertising													\$ 18,750.00		6.27%
Influencer Marketing (Total)													\$ -		1.00%
Massachusetts Home Buyer, Seller & Real Estate Forum (Nano):													\$ -		
Boston Moms Home Group (Micro):													\$ -		
Guerilla Marketing Idea (Total)													\$ 13,477.00		2.70%
Boston Commons													\$ 3,369.25		
Newton Center Piccadilly square													\$ 3,369.25		
Harvard Square													\$ 3,369.25		
Jamaica Plain Brewery Complex													\$ 3,369.25		
Outdoor/Transit (Total)													\$ 10,700.00		1.07%
Mass Turnpike Billboard													\$ 2,900.00		
Advertisement starting from North Station													\$ 2,000.00		
Waltham Costco Billboard													\$ 2,900.00		
Middlesex Fells Reservation Billboard													\$ 2,900.00		
Owned Media															
Website													\$ 10,000.00		0.00%
Earned Media															
Word Of Mouth															0.00%
Public Relations													\$ 5,000.00		1.00%
Blog: Treehuggers, Ecowatch, SmallFootprint Family, Family Focus Blog, Green Talk, EnviroGadget , Life The Green Way, Groovy Green Livin															
Carryover															1.00%
Total Pull													\$ 57,927.00		13.03%
PUSH															
No Push															
Total IMC Schedule													\$ 57,927.00		13.03%

### Marketing Appendix 3: Year 2 IMC Schedule

SEGMENT SIZE: 429,677															
Year 2 IMC Schedule	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	COST	CPM	AWARENESS
<b>PULL</b>															
<b>Paid Media</b>															
Online Advertising													\$ 18,750.00		6.40%
Influencer Marketing (Total)													\$ -		2.00%
Massachusetts Home Buyer, Seller & Real Estate Forum (Nano):													\$ -		
Boston Moms Home Group (Micro):													\$ -		
Guerrilla Marketing Idea (Total)													\$ 13,477.00		2.70%
Boston Commons													\$ 3,369.25		
Newton Center Piccadilly square													\$ 3,369.25		
Harvard Square													\$ 3,369.25		
Jamaica Plain Brewery Complex													\$ 3,369.25		
Outdoor/Transit (Total)													\$ 10,700.00		1.07%
Mass Turnpike Billboard													\$ 2,900.00		
T Advertisement Starting from North Station													\$ 2,000.00		
Waltham Costco Billboard													\$ 2,900.00		
Middlesex Fells Reservation Billboard													\$ 2,900.00		
<b>Owned Media</b>															
Website													\$1,500.00		0.00%
<b>Earned Media</b>															
Word Of Mouth															5.00%
Public Relations													\$5,000		1.00%
Blog: Treehuggers, Ecolwatch, Smallfootprint Family, Family Focus Blog, Green Talk, EnviroGadget, Life The Green Way, Groovy Green Living															
Carryover															1.00%
<b>Total Pull</b>													\$ 49,427.00		19.17%
<b>PUSH</b>															
No Push															
<b>Total IMC Schedule</b>													\$ 49,427.00		19.17%

### Marketing Appendix 4: Year 3 IMC Schedule

SEGMENT SIZE: 412,723														
Year 3 IMC Schedule	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	COST	CPM
<b>PULL</b>														
<b>Paid Media</b>														
Online Advertising													\$ 18,750.00	6.55%
Influencer Marketing (Total)													\$ 5,000.00	3.00%
Massachusetts Home Buyer, Seller & Real Estate Forum (Nano):													\$ -	
Boston Moms Home Group (Micro):													\$ -	
@Kindaking on TikTok (Mid):													\$ 5,000.00	
Guerilla Marketing Idea (Total)													\$ 13,477.00	2.70%
Boston Commons													\$ 3,369.25	
Newton Center Piccadilly square													\$ 3,369.25	
Harvard Square													\$ 3,369.25	
Jamaica Plain Brewery Complex													\$ 3,369.25	
Outdoor/Transit (Total)													\$ 10,700.00	1.07%
Mass Turnpike Billboard													\$ 2,900.00	
T Advertisement Starting from North Station													\$ 2,000.00	
Waltham Costco Billboard													\$ 2,900.00	
Middlesex Falls Reservation Billboard													\$ 2,900.00	
<b>Owned Media</b>														
Website													\$ 1,500.00	0.00%
<b>Earned Media</b>														
Word Of Mouth														5.00%
Public Relations													\$ 5,000.00	1.00%
Blog: Treehuggers, Ecowatch, Smallfootprint Family, Family Focus Blog, Green Talk, EnviroGadget, Life The Green Way, Groovy Green Livin														2.00%
Carryover														
<b>Total Pull</b>													\$ 54,427.00	21.31%
<b>PUSH</b>														
No Push														
<b>Total IMC Schedule</b>													\$ 54,427.00	21.31%



## Marketing Appendix 5: Year 4 IMC Schedule

SEGMENT SIZE: 406,799																
Year 4 IMC Schedule	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	COST	CPM	AWARENESS	
<b>PULL</b>																
<b>Paid Media</b>																
Online Advertising													\$ 18,750.00		6.63%	
Influencer Marketing (Total)													\$ 40,000.00		4.00%	
Massachusetts Home Buyer, Seller & Real Estate Forum (Nano):													\$ 10,000.00			
Boston Moms Home Group (Micro):													\$ 10,000.00			
@Kindaking on TikTok (Mid):													\$ 10,000.00			
@IntersectionaleEnvironmentalist on Instagram (Macro):													\$ 10,000.00			
Guerilla Marketing Idea (Total)													\$ 13,477.00		2.79%	
Boston Commons													\$ 3,369.25			
Newton Center Piccadilly square													\$ 3,369.25			
Harvard Square													\$ 3,369.25			
Jamaica Plain Brewery Complex													\$ 3,369.25			
Outdoor/Transit (Total)													\$ 10,700.00		1.07%	
Moss Turnpike Billboard													\$ 2,900.00			
T Advertisement Starting From North Station													\$ 2,000.00			
Waltham Costco Billboard													\$ 2,900.00			
Middlesex Fells Reservation Billboard													\$ 2,900.00			
<b>Owned Media</b>																
Website													\$ 1,500.00		0.00%	
<b>Earned Media</b>																
Word Of Mouth															5.00%	
Public Relations													\$ 5,000.00		1.00%	
Carryover															2.00%	
Total Pull													\$ 89,427.00		22.40%	
<b>PUSH</b>																
No Push																
Total IMC Schedule													\$ 89,427.00		22.40%	

Marketing Appendix 6: Year 5 IMC Schedule

SEGMENT SIZE: 402,217															
Year 5 IMC Schedule	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	COST	CPM	AWARENESS
PULL															
Paid Media															
Online Advertising													\$ 18,750.00		6.71%
Influencer Marketing (Total)													\$ 50,000.00		5.00%
Massachusetts Home Buyer, Seller & Real Estate Forum (Nano):													\$ 12,500.00		
Boston Moms Home Group (Micro):													\$ 12,500.00		
@Kindaking on TikTok (Mid):													\$ 12,500.00		
@Intersectionalenvironmentalist on Instagram (Macro):													\$ 12,500.00		
Guerilla Marketing Idea (Total)													\$ 13,477.00		2.70%
Boston Commons													\$ 3,369.25		
Newton Center Piccadilly square													\$ 3,369.25		
Harvard Square													\$ 3,369.25		
Jamaica Plain Brewery Complex													\$ 3,369.25		
Outdoor/Transit (Total)													\$ 10,700.00		1.07%
Mass Turnpike Billboard													\$ 2,900.00		
T Advertisement Starting from North Station													\$ 2,000.00		
Waltham Costco Billboard													\$ 2,900.00		
Middlesex Fells Reservation Billboard													\$ 2,900.00		
Owned Media															
Website													\$ 1,500.00		0.00%
Earned Media															
Word Of Mouth															5.00%
Public Relations													\$ 5,000.00		1.00%
Carryover															2.00%
Total Pull													\$ 99,427.00		23.47%
PUSH															
No Push															
Total IMC Schedule													\$ 99,427.00		23.47%

*Marketing Appendix 7: Demand Curve Based on Cumulative Purchase Intent and Price*



*Marketing Appendix 8 : SmartCheck's Sales Forecasted Demand*

Years	Year 1	Year 2	Year 3	Year 4	Year 5
Target Market Size	438,752	429,677	420,255	414,813	410,219
ADJUSTED purchase intention (for each revenue stream)	32.51%	32.51%	32.51%	32.51%	32.51%
Awareness	13.03%	19.17%	21.31%	22.40%	23.47%
<b>Trial</b>					
Trial households	18593	18742	14558	13591	12510
Retail selling price for each revenue stream	360	360	360	360	360
<b>Trial revenue</b>	\$ 6,693,346.87	\$ 6,747,121.66	\$ 5,240,841.49	\$ 4,892,904.87	\$ 4,503,589.53
<b>Retention of customers across years</b>					
Cumulative retention		40%	40%	40%	40%
Retention for year 1 customers		7,437	2,975	1,190	476
Retention for year 2 HHLDs or individuals			7,497	2,999	1,199
Retention for year 3 HHLDs or individuals				5,823	2,329
Retention for year 4 HHLDs or individuals					5,437
Retention for year 5 HHLDs or individuals					
Total retained customers		7,437	10,472	10,012	9,441
Retail selling price for EACH revenue stream ***	360	360	360	360	360
# Occasions	1	1	1	1	1
<b>Revenue from retained customers</b>		\$ 2,677,338.75	\$ 3,769,784.16	\$ 3,604,250.26	\$ 3,398,862.05
<b>Repeats - NO REPEATS (year long subscription)</b>					
*Competition adjustment (Included in Trial Households)		30%	50%	55%	60%
Revenue LOST to competition		\$2,891,624	\$ 5,240,841	\$ 5,980,217	\$ 6,755,384
<b>Total revenue AFTER competition adjustment</b>	\$ 6,693,346.87	\$ 9,424,460.40	\$ 9,010,625.65	\$ 8,497,155.13	\$ 7,902,451.58
<b>Year 5 - IMC Costs =</b>					\$ 99,427

### Marketing Appendix 9: Location Analysis





### *Marketing Appendix 10: Marketing Survey*

1. Are you a homeowner
  - a. Yes
  - b. No

#### **Description:**

We are a team of Boston University students working on a new service project for a class. Please answer the questions as carefully and as honestly as possible. We will keep your responses confidential. SmartCheck is an energy and water consumption consultation service. Our service aims to reduce monthly costs and environmental impact for homeowners. To do so, the customer comes to our store-front so we can gather data regarding their lifestyle, current usage, and environmental/saving goals. In an at home visit our installation team will scope out the house and record data on appliances, square footage, and both the electrical and physical structure. One to two weeks following the installation would be a follow up consultation to discuss what conservation efforts can be made based off of the short term data we collected.



1. Now that you have reviewed our product concept, how interested would you be in this product if it became available?
  - a. 5 (very interested)
  - b. 4 (interested)
  - c. 3 (neutral)
  - d. 2 (not very interested)
  - e. 1 (not interested at all)
2. Assuming you purchase this service, how many times would you utilize the consultants of this service?
  - a. Once a year or less
  - b. 2-4 times a year
  - c. 5-8 times a year
  - d. 9-12 times a year
  - e. 13+ times a year
3. How do you expect to travel to our service?
  - a. Car
  - b. MBTA
  - c. Walk
4. On what day and time would you be most likely to visit our service location?



	Before 8:00 am	8:01am - 12:00 pm	12:01pm - 4:00 pm	4:01pm - 8:00pm	After 8:01pm	N/A
Weekday	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Saturday	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sunday	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. Please indicate your level of agreement with each following statement?

	Strongly Agree	Somewhat Agree	Neither Agree or Disagree	Somewhat Disagree	Strongly Disagree
The company participating in sustainability clinics through educational visits to underprivileged community centers/schools would increase my likelihood of purchasing the service	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The company using environmentally friendly service vehicles would increase my likelihood of purchasing the service	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. How much time are you willing to travel to our storefront?

- Less than 10 minutes
- 11-20 minutes
- 21-30 minutes
- 31- 40 minutes
- Over 40 minutes

7. Please fill out the following table with your level of agreement with each statement.

	Strongly disagree	Somewhat disagree	Neutral	Somewhat agree	Strongly agree
I actively separate tin cans and bottles from my other trash items when I recycle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I bring a reusable bag when I go grocery shopping to reduce the use of plastic bags	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I unplug appliances from the outlet when idle to reduce energy consumption	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I turn off the lights when I leave a room to reduce energy consumption	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I use a reusable water bottle or straws to reduce my use of plastic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. Do you use any services or products to monitor your home activity ? (Ring, Nest. ect.)



- a. Yes
- b. No

9. How important is your environmental change to you?

- a. 5 (very important)
- b. 4 (slightly important)
- c. 3 (neutral)
- d. 2 (not very important)
- e. 1 (not important at all)

10. Where do you get your information on sustainability and environmental news?

- a. Television
- b. Newspaper
- c. Online news article
- d. Social media
- e. Email promotions
- f. Magazines

11. At what price would you expect this service to be priced monthly?

- a. \$25-\$35
- b. \$36-\$45
- c. \$46-\$55
- d. \$56-\$65
- e. \$66-\$75

12. At the price you just indicated, what is the likelihood that you will buy/use this service?

- a. Definitely Buy
- b. Probably Buy
- c. Neutral
- d. Probably Not Buy
- e. Definitely Not Buy

13. What is your gender?

- a. Male
- b. Female
- c. Non-Bianary
- d. Other
- e. Prefer not to answer

14. What is your age?

- a. Under 24 years

- b. 24 to 34 years
- c. 35 to 44 years
- d. 45 to 54 years
- e. 55 to 64 years
- f. 75+ years

15. What is your household annual income?

- a. Less than \$35,000
- b. \$35,000 - \$59,999
- c. \$60,000 - \$84,999
- d. \$85,000 - \$99,999
- e. \$100,000 or more

16. How many children do you have?

- a. None
- b. 1-2
- c. 3-4
- d. 5+

17. What is your marital status?

- a. Single
- b. Married
- c. With a partner
- d. Prefer not to answer

18. Do you live in Massachusetts?

- a. No
- b. Yes

19. What city do you live in? (write N/A if outside MA)

20. What is your ZIP code? (write N/A if outside MA)

### *Marketing Appendix 11: Interviewee Information*

Name	State	Email
Carla Russo	VT	primaporta@hotmail.com
Erika Jade	UT	<a href="mailto:Junglgc0@sewanee.edu">Junglgc0@sewanee.edu</a>
Michelle Berberian	PA	michelledowns5@gmail.com
Rick Gasparini	NY	r_gasparini@hotmail.com
Robert Martin	MN	rfgmartin@gmail.com
Mindy Hogan	MA	mindy.hogan@yahoo.com
Amanda Pociano	MA	amandap6325@gmail.com
Camile Baghdady	MA	cbaghdady@yahoo.com
Miriam Hraiz	MA	Miriam.hraiz@gmail.com
Sofia Girioni	MA	sofiagirioni@gmail.com
Jason Chan	MA	1228933562jason@gmail.com
Esther Xiang	GA	<a href="mailto:xiang130@gmail.com">xiang130@gmail.com</a>
Shawn Self	FL	shawn@shawnself.com
Blake Tang	D.C.	2227289731@qq.com
Oliver Spencer	CT	obs2000@wildcats.unh.edu
Shari Mahan	CT	smahan@optonline.net
Maria Ponciano	CT	mponciano007@gmail.com
Nancy Luk	CA	xue.nancy@gmail.com
Emily Valian	CA	<a href="mailto:emilyval@cox.net">emilyval@cox.net</a>
Kristi Grant	CA	kristigrant@cox.net

## Marketing Appendix 12: Competitor's Revenue Information

	Yearly Revenue (2021)	Revenue / Employee	Revenue / Sq Ft
Smart Check	8.0 Million	15M/17=\$882K	15M/2700=\$5,555
Commonwealth Energy	\$5.9 Million	5.9M/25=\$236K	5.9M/9000=\$656
Tetra Tech	\$22 Million	22M/100=\$220K	22M/3040=\$7,237
A9 Green	\$455K	455K/8=\$56,875	445K/4200=\$106
ReVision Energy	\$56 Million	56M/280=\$200K	56M/6400=\$8,750
AEI Consultants	\$4.41 Million	4.41M/20=\$220,500	4.41M/1400=\$3,150

## Operations Appendix 1: Service Blueprint

### Customer Actions

- Visits Web site	- Visits store to receive formal consultation at appointment time - While waiting, they can enjoy our company juice bar	- Discusses features and benefits with consultants through at home visit	- Makes purchase	- Awaits the installation	- Schedule monthly email or phone call
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### Line of activities

#### Contact Persons

- Greeted by one of our consultants - Consultant confirms customer appointment time	- Detailed explanation of how this service will work/data retrieval - Consultants are ready to answer more in depth questions that customers may have - A home visit for installation is scheduled with our installation experts	- Installation expert inspects the customer's home by looking at all appliances and areas which may use the most amount of energy/resources - Installation expert gives breakdown potential estimates on how much energy and money can be saved	- Customer is given quote on service price and payment plan by consultants - Customer decides whether or not to purchase - If they purchase, payment plan is chosen and down payment is made	- Installation of LED monitors on appliances by installation experts	- Consultants report out progress on energy consumption and costs for the month - Consultants provide guidance with how to reduce energy and costs
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### Line of visibility

#### Backstage Contacts

- Answers customer calls and emails from website - Set up appointments	- Equipment installation team scheduled with delivery date
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### Line of internal interaction

#### Support

- Reservation System - CRM	- Reservation System - CRM	- Payment Process	- Homey Installation and coding package	- Reservation system - CRM
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### Operations Appendix 2: Queuing Model

	Year 1	Year 2*	Year 3*	Year 4*	Year 5*
<b>Trial household</b>	18,593	26,179	25030	23603	21962
$\mu$ (service rate per hour)	3	3	3	3	3
$\lambda$ (arrival rate per hour)	7.83	11.02	10.53	9.93	9.24
<b>Service Utilization (<math>\lambda/\mu</math>)</b>	2.61	3.67	3.51	3.31	3.08
<b>Lq=</b>	0.66	1.055	0.882	0.615	0.427
<b>Wq (minutes)</b>	5.05	5.74	5.02	3.72	2.77
<b>Servers</b>	4	5	5	5	5

### Operations Appendix 3: Factor Analysis

Factors	Weights	Newton MA Score	Wellesley MA Score	Woburn MA Score	Providence RI Score	W <sub>Newton</sub>	W <sub>Wellesley</sub>	W <sub>Woburn</sub>	W <sub>Providence</sub>
<b>Parking</b>	0.25	4	3	5	3	1	0.75	1.25	0.75
<b>Number of homeowners</b>	0.3	5	5	3	2	1.5	1.5	0.9	0.6
<b>High income</b>	0.25	4	5	3	1	1	1.25	0.75	0.25
<b>Interest in sustainability</b>	0.1	5	5	3	3	0.5	0.5	0.3	0.3
<b>Rent price for business</b>	0.05	4	4	2	2	0.2	0.2	0.1	0.1
<b>Population</b>	0.05	4	2	3	5	0.2	0.1	0.15	0.25
<b>Weighted Average</b>						4.4	4.3	3.45	2.25

### Operations Appendix 4: SmartCheck Installation Guide

#### Step 1

- Enable USB Debugging on tablet
  - On the tablet, go to Settings > Device > Options > About and tap 7 times on the Serial number until you unlock Developer Options
  - Press back and open Developer Options

- Turn Developer Options on
- Scroll down and enable USB debugging

### Step 2

Installer will connect tablet to his smart book

- Tablet will receive a notification asking to allow USB debugging and to trust computer

### Step 3

- On tablet, in toolbox, installer may now change color scheme on tablet
- Installer should also
  - Modify System Setting – to disable OTA and Automatic updates.
  - Privacy Controls – Toggle off all options and click Randomize ID
  - Custom Keyboard – You can change if you like
- This will leave the tablet cleared with only google play store and toolbox.

### Step 4

- Next, the installer is going to install the Fully Kiosk Browser. This app not only allows you to open a browser full screen on your Android device but also gives you a lot of controls when it comes to sleep modes, lock screen, scheduled wake-up, etc.
  - Installer will download APK file provided by our company
  - Go to the second page (the small radio button in the lower right corner)
  - Click Sideload Apps
  - Browse to open the APK file
  - Click Sideload to install the app
- Now the tablet is ready to be installed on the customer's wall.
- First, a small qi charger will be mounted on the customers wall using glue. This will ensure the tablet receives continued charge.
- To mount the tablet against the wall twelve small N35 neodymium magnets are used. Six Magnets will be glued to the back of the tablet and six on the wall will hold the tablet perfectly.
- A small qi receiver is also attached to the tablets center to provide a connection to the charger.
- Next installers will install a smart home assistant controlled by the Homey Smart Home AI®, which is connected to meters analyzing waterpower and gas consumption.

#### Step 1: Install Home Assistant OS on the SD Card

- To do this installer will insert SD card and use a pre-installed program, Belena Etcher to download the home assistant
- On this program open ether and click flash from URL
- Installer enters previously provided GitHub URL
- Select the target SD card and click flash to begin the process.
- Once complete, the installer adds home Wi-Fi connection.

#### Step 2: Starting raspberry pi

- Insert SD card into raspberry PI
- Installer connects network cable and power cable to start raspberry PI

#### Step 3: Install home assistant addons

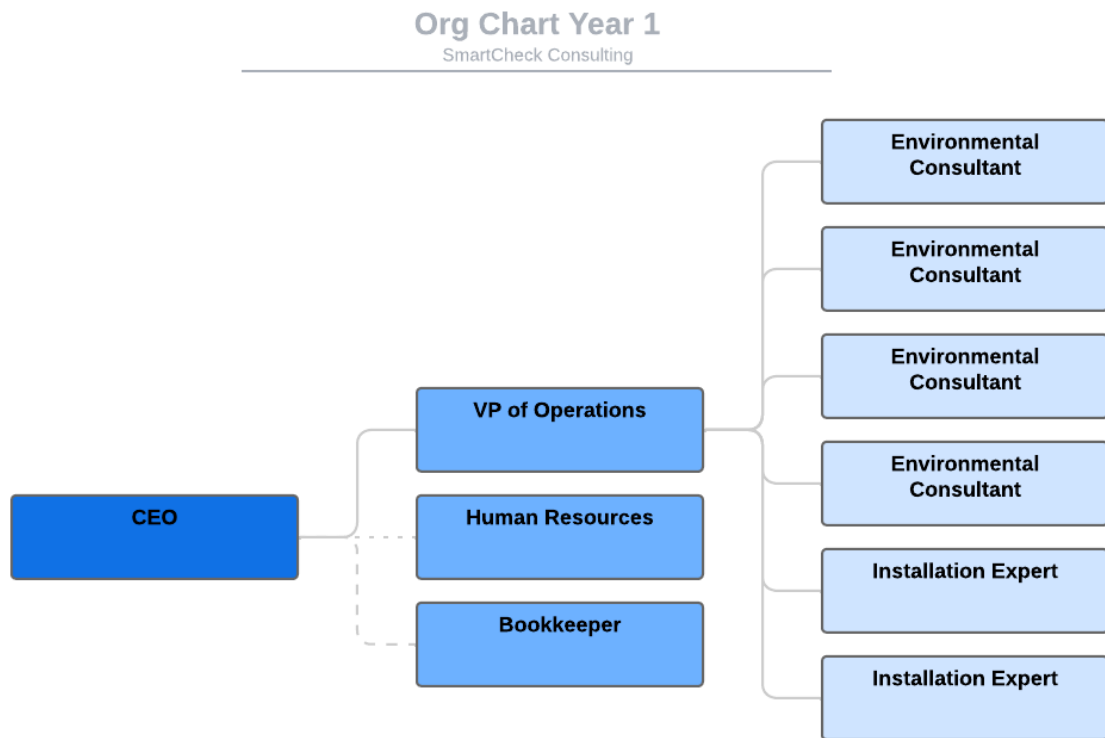
- First, installers will need to enable Advanced mode, this way they can install more add-ons:
  - Click on profile name (last option in the sidebar)
  - Scroll down and enable Advanced Mode
  - Open Supervisor in Home Assistant
  - Click on the Add-on store tab
  - Install the following add-ons:
    - File Editor
    - Mosquito broker
    - Terminal & SSH

#### Step 4: Install HACS (Home assistant community store)

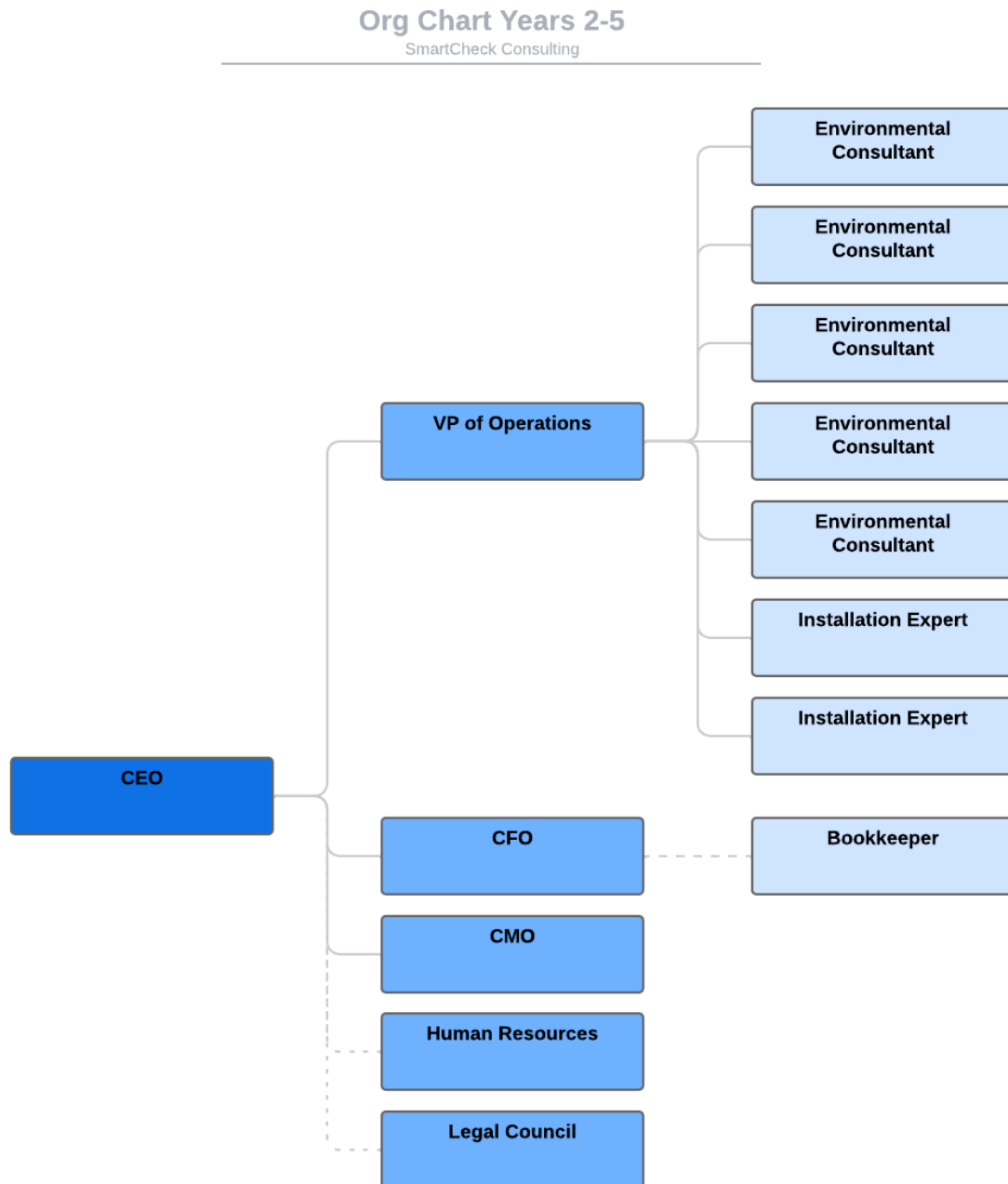
- Open terminal from sidebar with “Terminal & SSH”
- Installer enters previously given command
  - Now that tablet has a home assistant and processing controls installer may connect it to the Homey smart home device.
  - The installer will then connect the KNX meter equipment, provided in the meter installation package from Homey, into customers circuit breaker and wirelessly connect that to the Homey.
  - Installation is now complete. Installer should walk the customer through simple tablet instructions. Customers can now witness their consumption of utilities in real time!



*Operation Appendix 5: Organizational Structure Year 1*



Operation Appendix 6: Organizational Structure Year 2-5



## Operations Appendix 7: Inventory suppliers

Name	Description	Quantity Needed	Supplier Name	Supplier Contacted?
Quad-Core Android Tablet	Thin HD tablets measuring 8 inch. Acts as display system, for energy measurement equipment. Tablet is an LCD screen placed on a wall in the consumers house that depicts the imagery that our service provides for consumers.	1	Shenzhen Pretech Industrial Co., Ltd.	Yes
Wireless type C charger	The Type C Qi charger allows for consistent charge for the tablet display, while simultaneously preventing the bulky appearance associated with a traditional charging system. This system comes with a wireless charging connection, a connector for the Amazon Fire HD 10, and an interior outlet connection.	1	Shenzhen Keyuantai Industrial Co., Ltd.	Yes
Wireless type C Receiver	Connects to the type C charger to allow wireless connection for charging between the tablet and type C charger	1	<a href="#">Shenzhen Desire Technology Co., Ltd.</a>	Yes
Magnets	N35 neodymium magnets are small magnets with adhesive on one side, as well as optional supplier customization. At \$.01 they are the cheapest option in terms of wall connectors. One side will be attached to the tablet and the other glued to wall with adhesive.	12	<a href="#">Shenzhen Aim Magnet Co., Ltd.</a>	Yes
Micro SD card	Contains memory for display system	1	lotech (Shenzhen) Co., Ltd.	Yes
Power Adaptor	Similar to charger but internal to wall, it provides power to motherboard ensuring that the systems capacity remains stable.	1	<a href="#">Shenzhen Ewin Power Technology Co., Ltd.</a>	Yes
Raspberry Pi case	Protects raspberry pi system. Comes with additional fan to prevent over heating, additional panel for easy access to system for maintenance and repairs, and non slip rubber feet to ensure stability in setup	1	Shenzhen Oim Electronic Co. Ltd.	Yes
Raspberry Pi 4 Model B	Acts as motherboard for display system. Without it there would be no connection to the homey smart home system and no available dashboard for consuming. Essentially a coding tool for our installers which then remains as an all purpose system	1	Zhenzhi Intelligent Beijing Technology Co. Ltd	Yes
Homey Installation package	Combination of Homey Smart home assistant and energy, water and gas meters from KNX. These units will be in inventory in store but accounted for as capital expenditure	1	Anthom NL B.V.	Yes

## Operation Appendix 8: Capital Expenditure acquisitions schedule

Item	Useful life (Years)	Number Total (By Year 5)	Unit Cost	Order cost	Shipping Cost	Total Cost	Annual Depreciation Per Unit	Acquisition Schedule (in units)					
								Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Vehicle													
2013 Tesla Model Y	30	2	\$ 49,990.00	\$ 40.00	\$ -	\$ 140,060.00	\$ 7,003.00	2	0	0	0	0	0
Office													
<a href="#">Storage Shelves</a>	30	1	\$ 34.99	\$ 40.00	\$ -	\$ 74.99	\$ 2.50	1	0	0	0	0	0
<a href="#">Work Desk</a>	10	5	\$ 249.99	\$ 40.00	\$ -	\$ 1,449.95	\$ 145.00	5	0	0	0	0	0
<a href="#">Swivel Chair</a>	10	20	\$ 63.99	\$ 40.00	\$ -	\$ 2,079.80	\$ 207.98	20	0	0	0	0	0
<a href="#">File cabinet</a>	20	2	\$ 209.99	\$ 40.00	\$ -	\$ 499.98	\$ 25.00	2	0	0	0	0	0
<a href="#">Bar Stool</a>	10	8	\$ 30.00	\$ 40.00	\$ -	\$ 360.00	\$ 36.00	8	0	0	0	0	0
Breakroom													
<a href="#">Chair</a>	10	4	\$ 29.54	\$ 40.00	\$ -	\$ 278.15	\$ 2.96	4	0	0	0	0	0
<a href="#">Microphone</a>	10	1	\$ 99.98	\$ 40.00	\$ -	\$ 99.98	\$ 10.00	1	0	0	0	0	0
<a href="#">Sublimator</a>	10	1	\$ 409.99	\$ 40.00	\$ -	\$ 449.99	\$ 45.00	1	0	0	0	0	0
<a href="#">Table</a>	10	2	\$ 125.88	\$ 40.00	\$ -	\$ 331.74	\$ 33.19	2	0	0	0	0	0
Melter													
<a href="#">Homes</a>	18	16,333	\$ 129.99	\$ -	\$ 2,028.00	\$ 2,133,256.23	\$ 18.57	19,647	13,490	0	0	0	883

Operations Appendix 9: Logistics Expenses Table

**Logistics Expenses Years 1-5**

Year 1		Year 2	
Inbound Logistics	Cost	Inbound Logistics	Cost
Homey	\$ 2,025	Homey	\$ 2,025
shipping cost (inbound) (Direct Materials)	\$ 36,000	shipping cost (inbound) (Direct Materials)	\$ 36,000
Freight Insurance	\$ 48,367	Freight Insurance	\$ 40,729
Total Inbound Logistics Cost	\$ 86,392	Total Inbound Logistics Cost	\$ 78,754
Outbound Logistics		Outbound Logistics	
Vehicle charging costs	\$ 33,775	Charging Costs	\$ 48,637
Vehicle maintenance	\$ 434	Vehicle maintenance	\$ 480
Total Outbound Logistics Cost	\$ 34,209	Total Outbound Logistics Cost	\$ 49,117
Total Logistics Cost	\$ 120,601	Total Logistics Cost	\$ 127,870
Year 3		Year 4	
Inbound Logistics	Cost	Inbound Logistics	Cost
Homey	\$ 2,025	Homey	\$ 2,025
shipping cost (inbound) (Direct Materials)	\$ 36,000	shipping cost (inbound) (Direct Materials)	\$ 36,000
Freight Insurance	\$ 21,852	Freight Insurance	\$ 20,394
Total Inbound Logistics Cost	\$ 59,877	Total Inbound Logistics Cost	\$ 58,419
Outbound Logistics		Outbound Logistics	
Charging Costs	\$ 26,095	Charging Costs	\$ 24,354
Vehicle maintenance	\$ 552	Vehicle maintenance	\$ 668
Total Outbound Logistics Cost	\$ 26,647	Total Outbound Logistics Cost	\$ 25,022
Total Logistics Cost	\$ 86,524	Total Logistics Cost	\$ 83,441
Year 5			
Inbound Logistics	Cost		
Homey	\$ 2,025.00		
shipping cost (inbound) (Direct Materials)	\$ 36,000.00		
Freight Insurance	\$ 19,929.15		
Total Inbound Logistics Cost	\$ 57,954.15		
Outbound Logistics			
Charging Costs	\$ 22,427.39		
Vehicle maintenance	\$ 764.00		
Total Outbound Logistics Cost	\$ 23,191.39		
Total Logistics Cost	\$ 81,145.55		

*Operations Appendix 10: Homey® Installation Package*





## Finance Appendix 1: Assumptions

Assumptions (In US Dollars)	Start-up	Year 1	Year 2	Year 3	Year 4	Year 5	
Initial Startup Costs (Startup Column Only)							Link To
<b>INITIAL INVESTMENT IN FIXED ASSETS</b>							
Long Term Balance Sheet Items (Can be depreciated - includes IS equip & Factory/office buildout costs)	\$ 2,709,059						OM
<b>INITIAL INVESTMENT IN NET WORKING CAPITAL</b>							
Cash (Additional Cash required ABOVE start up costs.)	5%						FE
Start-Up Inventory (Put Years 1-5 in Table Below)	\$ 368,071						OM
<b>INITIAL OPERATING EXPENSES (INCOME STATEMENT, TAX DEDUCTIBLE)</b>							
Facilities Operating Expenses	\$ 945						OM
Pre-Marketing Expenses (Marketing expenses before Year 1) See Sales Projection Tutorial	\$ 8,689						MK
All Other (Miscellaneous non depreciated expenses, additional salaries, Rent etc.)	\$ 152,923						MK, OM
Subtotal Start Up Operating Expenses	\$ 162,557						
Operating Information (Year 1 - 5)							
<b>Customers Served</b>							
At Retail Location 1		18,593	18,742	14,558	13,591	12,521	MK
On-line		-	-	-	-	-	MK
Total Customers Served		18,593	18,742	14,558	13,591	12,521	
<b>MANUFACTURER SELLING PRICE</b>							
Weighted Average Sale Price Location 1		\$ 360	\$ 360	\$ 360	\$ 360	\$ 360	MK
Average Sale Price Online		\$ -	\$ -	\$ -	\$ -	\$ -	MK
<b>COST OF Sales</b>							
Variable Cost per unit (Total Direct Cost = Direct Labor + Direct Materials)		\$ 178	\$ 175	\$ 192	\$ 196	\$ 201	OM
Total Variable Costs		\$ 178	\$ 175	\$ 192	\$ 196	\$ 201	
Fixed Costs to provide the service		\$ -	\$ -	\$ -	\$ -	\$ -	OM
Total Cost of Sales		\$ 178	\$ 175	\$ 192	\$ 196	\$ 201	
<b>SELLING &amp; GENERAL ADMINISTRATIVE EXPENSES</b>							
Fixed Administrative Costs		\$ -	\$ -	\$ -	\$ -	\$ -	OM
Marketing Expenses (Push and Pull)		\$ 57,927	\$ 49,427	\$ 54,427	\$ 89,427	\$ 99,427	MK
IS EXPENSES		\$ 19,180	\$ 24,121	\$ 24,121	\$ 24,121	\$ 24,121	OM
Total SG&A Expenses		\$ 77,107	\$ 73,548	\$ 78,548	\$ 113,548	\$ 123,548	
Balance Sheet Information (Year 1-5)							
Accounts Receivable (Days AR Outstanding) - Credit Card Sales	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	\$ 5	FE
Accounts Payable (Days Payable Outstanding)	15	15	15	15	15	15	FE
Inventory		836,364	836,117	827,824	828,255	873,745	OM
Additional Investment in Fixed Assets, more capacity or replacement		-	-	-	-	-	OM
OTHER ASSUMPTIONS							
Discount Rate	10.89%	10.89%	10.89%	10.89%	10.89%	10.89%	FE
Tax Rate	27% Given Assumption (21% Federal, 6% State), no further research required						
Cash as a Percentage of Sales	5% Given Assumption, up to a max of \$300K, no further research required						

## Finance Appendix 2: Income Statement

Income Statement						
(In US Dollars)	Start-up	Year 1	Year 2	Year 3	Year 4	Year 5
TOTAL REVENUES	\$ -	\$ 6,693,347	\$ 9,424,460	\$ 9,010,626	\$ 8,497,155	\$ 7,906,250
Variable Costs	\$ -	\$ 4,331,128	\$ 4,092,783	\$ 3,499,757	\$ 3,331,002	\$ 3,143,951
TOTAL COST OF SALES	\$ -	\$ 4,331,128	\$ 4,092,783	\$ 3,499,757	\$ 3,331,002	\$ 3,143,951
GROSS PROFIT	\$ -	\$ 2,362,219	\$ 5,331,677	\$ 5,510,868	\$ 5,166,153	\$ 4,762,299
One time startup costs						
Training costs	\$ 59,333					
Administrative Overhead (salaries)	\$ 82,800	\$ 496,800	\$ 989,715	\$ 1,119,677	\$ 1,153,267	\$ 1,187,865
General operating expenses not already part of Cost of Sales	\$ 58,121	\$ 582,290	\$ 582,290	\$ 582,290	\$ 582,290	\$ 582,290
Marketing expense	\$ 8,689	\$ 57,927	\$ 49,427	\$ 54,427	\$ 89,427	\$ 99,427
IS Expenses	\$ 12,947	\$ 19,180	\$ 24,121	\$ 24,121	\$ 24,121	\$ 24,121
Depreciation on original PP&E	\$ -	\$ 386,078	\$ 386,078	\$ 386,078	\$ 386,078	\$ 386,078
Depreciation on new PP&E (purchased after start-up)	\$ -	\$ -	\$ 286,900	\$ 286,900	\$ 286,900	\$ 286,900
Earnings Before Tax	\$ (221,890)	\$ 1,015,944	\$ 3,013,148	\$ 3,057,377	\$ 2,644,071	\$ 2,195,619
Taxes	\$ -	\$ 275,385	\$ 813,550	\$ 825,492	\$ 713,899	\$ 592,817
NET INCOME	\$ (221,890)	\$ 744,559	\$ 2,199,598	\$ 2,231,885	\$ 1,930,172	\$ 1,602,802
<b>Statement of Retained Earnings</b>						
Retained earning(start of the period)	\$ -	\$ (221,890)	\$ 522,669	\$ (322,048)	\$ (983,428)	\$ (1,674,311)
Net Income	\$ (221,890)	\$ 744,559	\$ 2,199,598	\$ 2,231,885	\$ 1,930,172	\$ 1,602,802
minus cash returned to investors (dividends)	\$ -	\$ -	\$ 3,044,315	\$ 2,893,265	\$ 2,621,054	\$ 2,135,024
Retained earning(end of period)	\$ (221,890)	\$ 522,669	\$ (322,048)	\$ (983,428)	\$ (1,674,311)	\$ (2,206,533)
<b>Income Statement Financial Ratios</b>						
COGS % Sales	0	62%	43%	39%	39%	40%
Gross Margin % Sales	0	38%	57%	61%	61%	60%
Net Income % Sales	0	11%	23%	25%	23%	20%
SG&A % Sales (including depreciation)	0	17%	17%	19%	21%	24%
Marketing Expenses % Sales	0	0.9%	0.5%	0.6%	1.1%	1.3%



### Finance Appendix 3: Balance Sheet

Balance Sheet						
(In US Dollars)	Time 0	Year 1	Year 2	Year 3	Year 4	Year 5
<b>Current Assets</b>						
Cash reserves	\$ -	\$ 300,000	\$ 300,000	\$ 300,000	\$ 300,000	\$ 300,000
Accounts Receivable	\$ -	\$ 91,690	\$ 129,102	\$ 123,433	\$ 116,399	\$ 108,305
Inventory	\$ 368,071	\$ 359,763	\$ 151,223	\$ 167,565	\$ 153,868	\$ 183,924
Current Assets	\$ 368,071	\$ 751,453	\$ 580,325	\$ 590,999	\$ 570,267	\$ 592,229
<b>Fixed Assets</b>						
Gross Fixed Assets	\$ 2,710,899	\$ 4,708,044	\$ 4,708,044	\$ 4,708,044	\$ 4,710,803	\$ 4,829,521
Accumulated Depreciation	\$ -	\$ 386,078	\$ 1,059,055	\$ 1,732,032	\$ 2,405,009	\$ 3,077,986
Net Fixed Assets	\$ 2,710,899	\$ 4,321,966	\$ 3,648,989	\$ 2,976,012	\$ 2,305,794	\$ 1,751,535
<b>TOTAL ASSETS</b>	\$ 3,078,970	\$ 5,073,419	\$ 4,229,314	\$ 3,567,010	\$ 2,876,061	\$ 2,343,764
<b>Current Liabilities</b>						
Accounts Payable	\$ -	\$ 1,639	\$ 2,252	\$ 1,328	\$ 1,261	\$ 1,186
Current Liabilities	\$ -	\$ 1,639	\$ 2,252	\$ 1,328	\$ 1,261	\$ 1,186
<b>Equity</b>						
Paid in Capital (Cumulative)	\$ 3,300,861	\$ 4,549,111	\$ 4,549,111	\$ 4,549,111	\$ 4,549,111	\$ 4,549,111
Retained Earnings (cumulative)	\$ (221,890)	\$ 522,669	\$ (322,048)	\$ (983,428)	\$ (1,674,311)	\$ (2,206,533)
Total Equity	\$ 3,078,970	\$ 5,071,780	\$ 4,227,063	\$ 3,565,682	\$ 2,874,800	\$ 2,342,578
<b>TOTAL LIABILITIES AND EQUITY</b>	\$ 3,078,970	\$ 5,073,419	\$ 4,229,314	\$ 3,567,010	\$ 2,876,061	\$ 2,343,764
Check Total Assets - Total Liabilities & Equity	\$ -	\$ -	\$ 0.00	\$ -	\$ -	\$ -
Net Working Capital Balance (Current Assets - Current Liabilities)	\$ 368,071	\$ 749,814	\$ 578,074	\$ 589,671	\$ 569,006	\$ 591,043
<b>Balance Sheet Financial Ratios</b>						
Accounts Receivable Days	0	5	5	5	5	5
Accounts Payable Days	0	15	15	15	15	15
Inventory Days COGS	0.0	31.8	13.5	17.5	16.9	21.4
NWC days	0	40.89	22.39	23.89	24.44	27.29
ROE	0	0.15	0.52	0.63	0.67	0.68
ROA	0	0.15	0.52	0.63	0.67	0.68

#### Finance Appendix 4: Statement of Cash Flows

Statement of Cash Flow							
(In US Dollars)		Start-up	Year 1	Year 2	Year 3	Year 4	Year 5
Initial Investment in Fixed Assets		\$ 2,710,899	\$ 4,708,044	\$ 4,708,044	\$ 4,708,044	\$ 4,710,803	\$ 4,829,521
Net Income		\$ (221,890)	\$ 744,559	\$ 2,199,598	\$ 2,231,885	\$ 1,930,172	\$ 1,602,802
+ Depreciation		\$ -	\$ 386,078	\$ 672,977	\$ 672,977	\$ 672,977	\$ 672,977
- Change in Net Working Capital		\$ 368,071	\$ 381,743	\$ (171,740)	\$ 11,597	\$ (20,665)	\$ 22,037
- Change in Fixed Assets		\$ 2,710,899	\$ 1,997,144	\$ -	\$ -	\$ 2,760	\$ 118,718
Net Free Cash Flow		\$ (3,300,861)	\$ (1,248,250)	\$ 3,044,315	\$ 2,893,265	\$ 2,621,054	\$ 2,135,024
Terminal Value of Business							\$ 5,529,360
Total Cash Flow		\$ (3,300,861)	\$ (1,248,250)	\$ 3,044,315	\$ 2,893,265	\$ 2,621,054	\$ 7,664,384
Net Present Value: Including TV		\$ 6,475,520					
Internal Rate of Return: Including TV		45.26%					
EWBITDA	0.8						

*Finance Appendix 5: CAPM: Comparable Companies, Discount Rate, Actual Risk Premium Level*

Comparable s	Eversource	National Grid	ICF	EcoLa b	Edison International	The Southern Company	Dominion Energy	American Electric Power Company	Average
<b>Beta</b>	0.48	0.23	0.55	1.03	0.74	0.51	0.48	0.4	0.55
<b>Risk Premium Lowest</b>	3%	3.90%	3.70 %	4.10%	3.50%	3.40%	3.30%	3.40%	4%
<b>Risk Premium Highest</b>	5.90%	7.90%	5.10 %	5.10%	7.60%	5.60%	5.70%	5.90%	6.10%
<b>EV/EBITD A</b>	14.4	13.8	16.9	20.1	11.9	14.5	14.3	13.2	14.9

Calculations	Discount Rate	Growth
<b>SmartCheck</b>	10.89%	-20%

Actual Risk Premium Lowest Used
5.90%

*Cross Functional Risk Assessment and Management Appendix 1: Original Quantitative Matrix*

	High Probability	Low Probability
High Impact	Segment Size	Direct Labor year 1
	Homey price change	Administrative Salaries Change
	Tablet price change	Awareness
	Purchase Intent	Indirect Labor year 1
Low Impact	Marketing Expense	% Revenue lost to competition
	Storage Rent price change	Commercial Property Insurance price change
	Office Rent price change	Commercial Vehicle Insurance price change
		Website Expenses change

*Cross Functional Risk Assessment and Management Appendix 2: Simulation 1 Parameter Calculations*

Best Case Scenario	Most Likely	Worst Case Scenario
1.2	1	0.67

*Cross Functional Risk Assessment and Management Appendix 3: Simulation 3 Parameter Calculations*

Comparable Products	Ipad Mini	Galaxy Tablet A	Average
Max Price	\$306	\$147	
Base Price	\$288	\$118	
Min Price	\$263	\$87	
Max Parameter	1.063	1.25	1.2

<b>Base Value</b>	1	1	1
<b>Min Parameter</b>	0.913	0.737	.83

*Cross Functional Risk Assessment and Management Appendix 4: Alternate Supplier List*

<b>Alternative Product Type</b>	<b>Company</b>	<b>Location</b>	<b>Price per Unit</b>
Wireless type c charger	Satechi	San Diego, CA	\$15
17" touch screen monitor	Elo Touch	Knoxville, TN	\$150
Wireless type c receiver	CustomUSB	San Francisco, CA	\$14
Magnets	CSM Magnets	Garland, TX	\$0.18
Micro SD card	Everything but Stromboli	Lancaster, PA	\$3.45
Raspberry Pi 4 model B	Pi Shop	New Castle, DE	\$55
Power adapter	Newegg	Memphis, TN	\$11.07
Raspberry Pi 4 case	Pi Shop	New Castle, DE	\$5

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