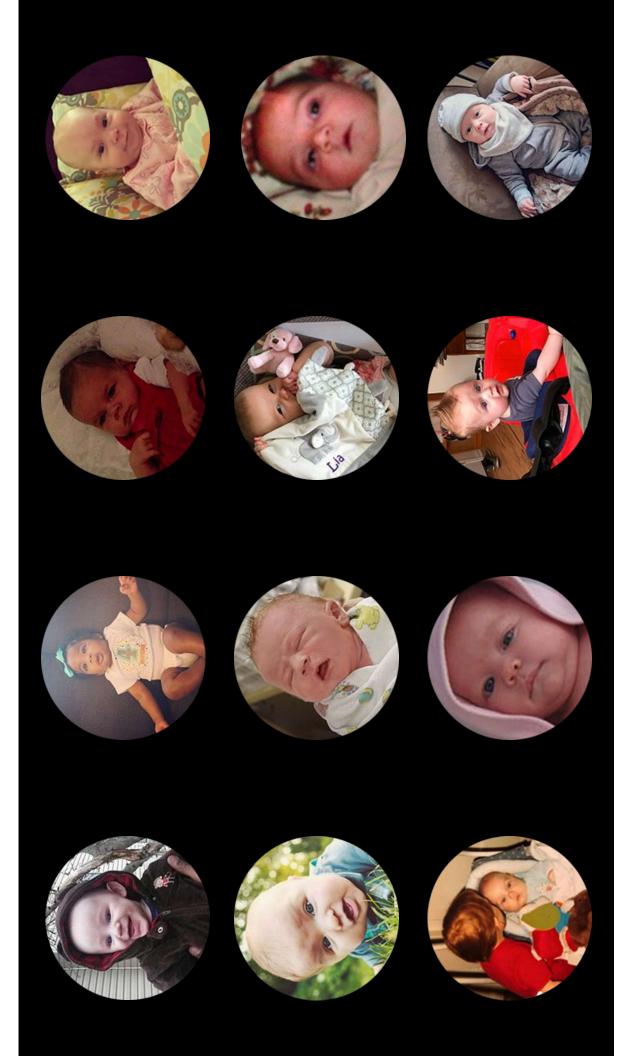




Lia James Madigan september 13, 2018 ~ 5 Months



4

SLEEP APNEA

- Around 25% of adults use an app to track their sleep
- It is estimated that 26% of adults aged 30-70 have a form of sleep apnea
- The current market size value for sleep apnea is \$3.9 billion, and is estimated to reach \$6.1 billion by 2028.

- Of the 3.8 million births each year in the US, about 9.8% (300,000) of the babies are born prematurely
- During the first month after birth sleep apnea occurs in 84 percent of infants who weigh less than 2.2 pounds. The risk decreases to 25 percent for infants who weigh less than 5.5 pounds. It is rare in full-term newborns.

Sleep Apnea & SUID

SLEEP APNEA

Infant Sleep Apnea - sleep-related breathing disorder involving reductions and pauses in breathing that occur during an infant's REM

sleep [7]

"Hypopneas": partial reductions in breathing

"Apneas": complete pauses in breathing

Primarily affect small preterm babies, due to their extended REM sleep, however all babies are at risk to develop sleep apnea [9]

Caused by by a number of conditions that affect the control centres for breathing in the brain, known as the brainstem [8]

Symptoms:

Prolonged pauses in breathing that last 20+ sec.

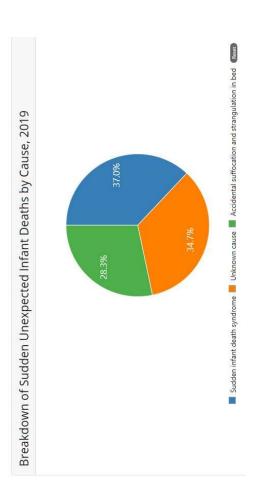
Low oxygen or a slow heartbeat

A small percentage of children who die from sudden infant death syndrome (SIDS) have apnea symptoms prior to death.[7]

Sleep Apnea & SUID

Leading Causes of Infant Mortality:

- Birth defects
- Preterm births
- Maternal Pregnancy complications
 - Sudden infant death syndrome
 - Injuries (e.g., suffocation)
- Over 21,000 infants died in 2018, according to the CDC
 - Around 3,400 deaths of these deaths were from SUIDs
 - SIDS 1,250
- Accidental suffocation 960
- Unknown 1,180
- There is no way to completely predict or prevent SIDS
- Injuries are the leading preventable cause of death, and among those suffocation is very common



Our Team



Lara Soldi App Designer



Kyle OWens
Consumer Researcher



Margaret Zhuang Product Designer



Roberto Nagel
Manufacturing Researcher



Suyesh
Prabhugaonkar
Market Analyst

Objective

anything to the infant (possibly using sensors under the mattress they are lying on), collect this information, and send it to a monitoring organization. Monitor at risk neonates, infants, and young children's diagnosis specific data gathering technology to be developed by the teams without attaching This information should be used to predict when an infant needs to be seen in an ER versus other care avenues.

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Market Information

Who cares and why?

- Parents with premature infants or infants at risk to illness or other medical conditions
- Hospitals with neonatal services and Newborn Intensive Care Units
- Concerned parents who want to know when it is necessary to take their baby to the ER

Market Information

Cost of Raising Children

- There are around 3.8 million births each year in the US
- 75% of parents buy some sort of baby monitor or tracker
- Middle-income families spend an estimated \$13,000 per child every

year







1. https://www.nytimes.com/2017/03/20/fieahtv/grandparents.populerion-censis.html

Technology Already in Use: Babysense Monitor



\$129.99

https://www.babysensemonitors.com/products/babysense-7-breathing-monitor?variant=35030185868475¤cy=USD&utn_mediu m=product_sync&utm_source=google&utm_content=sag_organic&utm_campaign=sag_organic&gdid=CjwKCAjwruSHBh4tEiwA_qCpp i1f0NkUXPIkaQdEbDZVEGH9LUMJkdlALlizDBwoO6016xN6NWMzxoCMFkQAvD_BwE



Our Product: BabySleep1

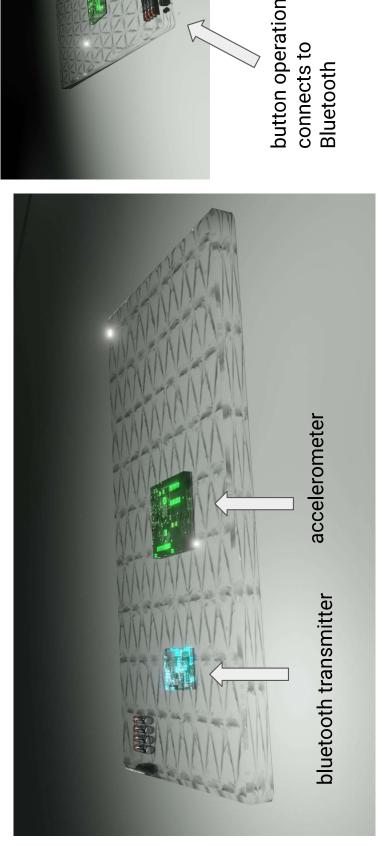


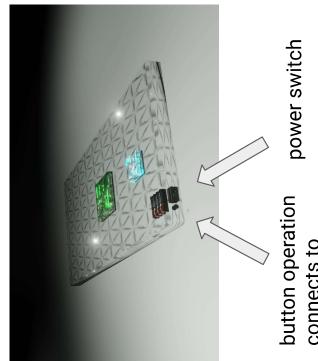
- Senses up to 6 inches in depth
- Dimensions: $40'' \times 20'' \times 2''$
- Cordless and battery powered for safety
- No harmful radiation emissions
- Connects to device via bluetooth to record patterns and send alerts



Inside the Device

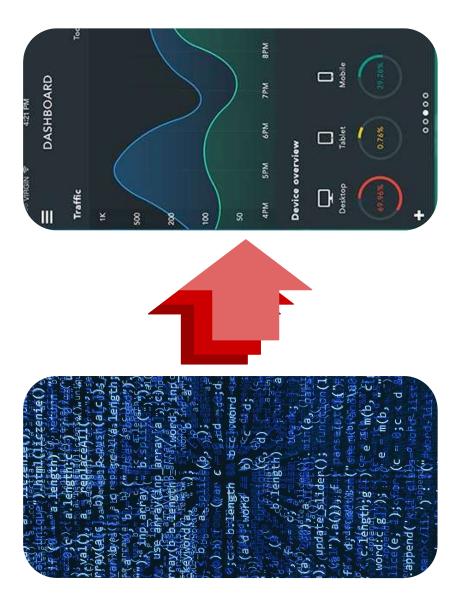






BabySleep1 App





Breathing Pattern & Micro-Movements

Respiratory Rate

Sleeping Position

Temperature

SIDS Risk

Sleep Apnea

Heart Rate

Oxygen Rate

Advanced User-Interactive AI & Machine Learning

7

SQ-SEN-200-DMK - \$38.50



Features

- Nano-power As little as 50 nA
- Coin battery operated
- Ultra-low power reference design uses less than 3 uA (configurable down to 50 nA)
 - Super bright LED output
- Compact 1.0" x 1.0" circuit board
- High sensitivity & long life Semiconductor grade electroplating

Applications

- Motion triggered wake-up
- GPS tracking, RFID, vehicle electronics
- Security, anti-tamper, anti-theft, alarms
- TV remote control tilt wake-up
- General motion, vibration, tilt and shock detection
 - Ultra-low power motion-based device wake-up
- Ultra-low power orientation-sensitive switching
- RFID tag activation
- Tamper detection
- Process monitoring and control

https://signalquest.com/product/accessories/sq-sen-200-dmk/?gclid=CjwKCAjwxo6IBhBKEiwAXSYBs40IIEWomiTRklgu7Y7TMwqPdKYk58Syv8pzDMrWU9u593Iis_5PqBoCOIMQAvD_BwE

BL652-SC-01-T/R - \$7.50/1 \$6.80/1000

Bluetooth transmitter by Laird Connectivity Inc.

https://www.digikey.com/en/products/detail/laird-connectivity-inc----wireless-&-thermal-systems/B L652-SC-01-T%2FR/6181739?utm_adgroup=R F%2FIF%20and%20RFID&utm_source=google &utm_medium=cpc&utm_campaign=Shopping_Supplier_LAIRD%20-%20WIRELESS%20%26%20THERMAL%20SYSTEMS_0776_Co-op&utm_term=&utm_content=RF%2FIF%20and%20RFID&gclid=CjwKCAjwxo6IBhBKEiwAXSYBs3ImuSGzY7BfhTgM5do0eX8U_CiEKxvI0R3xhsZDnXr8XD3W2QKmaRoCVLEQAvD_BwE



Product Manufacturers





RODUCT DESIGN

Working with Mako



150-200K

Research and

and Prototyping

25 K

Initial Design

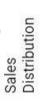
Development

Product In Market



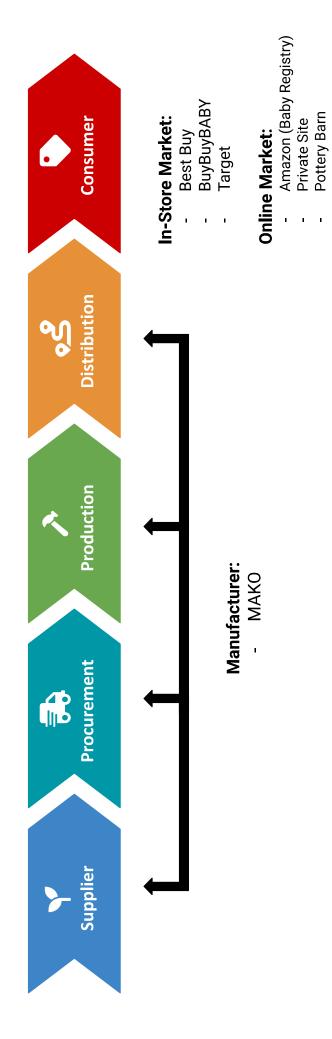
Year/Year and

- Product strategy
 - Patenting Marketing





Supply Chain



Market Plan

We plan to use a combination of Google and Facebook ads to spread the word about our product.

- Easily identify expecting parents and target them with words that distinguish our product such as "hack proof" and using action verbs to place ourselves in the parents shoes such as "provide you and your baby the rest you both deserve"
 - Many expecting parents post on social media about their status, and Facebook can easily identify this, and allows ad placers to pick new parents as their target demographic

Additionally, our team can reach out to parents with a larger following on social media and sponsor them to try our product in exchange for posting about it on their social media and endorsing the product

Market Plan

What makes our product special?

- Reliable
- Phone access to the monitor
- Safe and comfortable for the baby

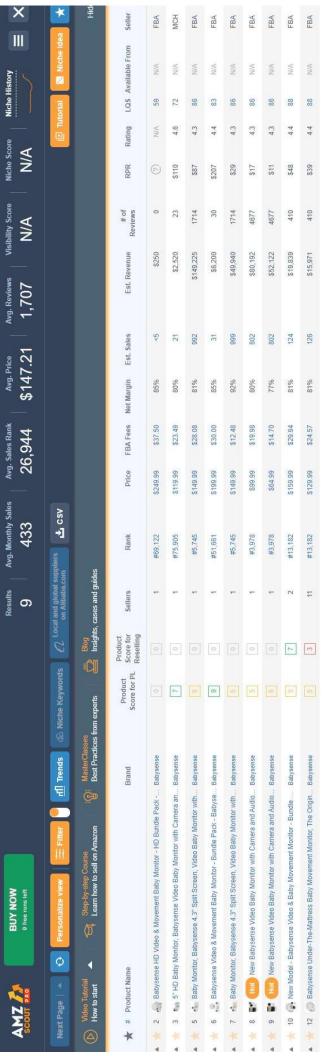
Secondary Benefits

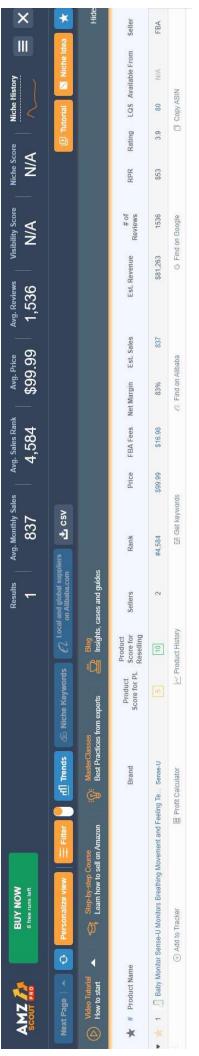
- Quick response time
- Notifies the parents directly
 - Hack Proof

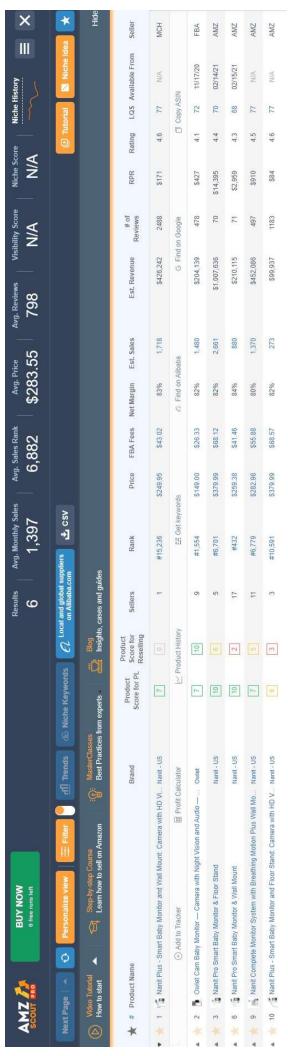
https://www.ibabylabs.com/what-to-expect-from-modern-baby-monitors/

Revenue Forecast

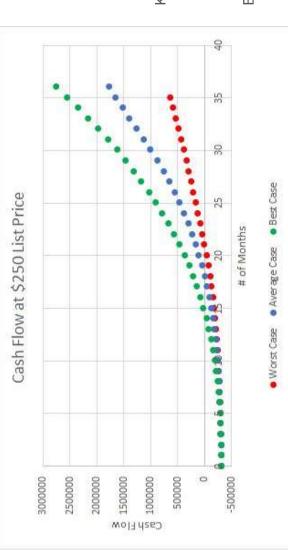
Before starting our revenue forecast, we first looking into the sales of competing products







Cash Flow



Assumptions for the above graphs:

- \$250 listing price \$50 production cost
- All items sold online through Amazon or personal website
 - Initial deficit of \$300,000
- Does not take inventory and time to sell into account
 - 8% of all our profit is put back into advertising

Key Observations:

- Worst case has us break even around month 22
- Average case breaks even around month 18
 - Best case Breaks even around month 14

By the end of year 3:

- Worst case has an average of 26k per month
- Average case has an average of 60k per month
- Best case has an average of 85k per month

Citations

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5615271/

https://onlinelibrary.wiley.com/doi/full/10.1111/resp.13838

https://www.cdc.gov/nchs/fastats/births.htm

https://www.usda.gov/media/blog/2017/01/13/cost-raising-child

https://www.cnbc.com/2015/03/20/next-frontier-for-internet-of-things-babies.html#.~:text=Out%20of%20the%20four%20million,or%20tracker%2C%20according%20to%20Sproutling. https://www.watchfuldad.com/baby-monitor-cost/#:~:text=The%20cost%20for%20a%20baby,audio%2Donly%20or%20video%20monitor

https://www.sleepfoundation.org/how-sleep-works/sleep-facts-statistics

https://www.statista.com/statistics/699439/us-adults-that-use-apps-to-track-sleep-by-age/

https://news.childrensmercy.org/sleep-apnea-in-babies/

https://signalquest.com/product/accessories/sq-sen-200-dmk/?gclid=CjwKCAjwxo6IBhBKEiwAXSYBs40IIEWomiTRklgu7Y7TMwqPdKYk58Syv8pzDMrWU9u593lis_5PqBoCOIMQAvD_BwE

https://www.digikey.com/en/products/detail/laird-connectivity-inc---wireless-&-thermal-systems/BL652-SC-01-T%2FR/6181739?utm_adgroup=RF%2FIF%20and%20RFID&utm_source=google&utm_medium=cpc& utm_campaign=Shopping_Supplier_LAIRD%20-%20WIRELESS%20%26%20THERMAL%20SYSTEMS_0776_Co-op&utm_term=&utm_content=RF%2FIF%20and%20RFID&gclid=CjwkCAjwxo6IBhBKEiwAXSY Bs3ImuSGzY7BfhTgM5do0eX8U_CiEKxvI0R3xhsZDnXr8XD3W2QKmaRoCVLEQAvD_BwE

https://www.ibabylabs.com/what-to-expect-from-modern-baby-monitors/

Citations

- [1] https://www.marchofdimes.org/mission/prematurity-campaign.aspx
- [2] https://www.marchofdimes.org/nicu_summary_final/
- [3] https://www.statista.com/statistics/195908/number-of-births-in-the-united-states-since-1990/
- [4] https://sleepeducation.org/sleep-disorders/infant-sleep-apnea/
- [5] https://www.grandviewresearch.com/industry-analysis/sleep-apnea-devices-market
- [6] https://www.prnewswire.com/news-releases/the-worldwide-industry-for-sleep-apnea-devices-is-expected-to-grow-at-a-cagr-of-7-2-between-2020-to-2025--301173588.html
- [7] Morse, A. M., & Saito, J. (Eds.). (2020, November 6). Infant Sleep Apnea. Sleep Education. https://sleepeducation.org/sleep-disorders/infant-sleep-apnea/
- [8] NHS. (n.d.). Central Sleep Apnoea Syndrome (CSA). NHS Choices. https://www.gosh.nhs.uk/conditions-and-treatments/conditions-we-treat/central-sleep-apnoea-syndrome-csa/.
- [9] Katz, Eliot S et al. "Obstructive sleep apnea in infants." American journal of respiratory and critical care medicine vol. 185,8 (2012): 805-16. doi:10.1164/rccm.201108-1455CI
- https://www.chop.edu/conditions-diseases/sudden-infant-death-syndrome-sids
- https://www.cdc.gov/sids/data.htm
- https://www.cdc.gov/reproductivehealth/maternalinfanthealth/infantmortality.htm
- https://www.arrow.com/en/categories/sensors/accelerometers
- https://www.hisense.co.il/products/babysense/