Discussion for RE

BY ELDERLY TEAM

ELDERLY TEAM

Operations & Visionary - Long

Finance(Monetary aspect) -

Technical – Shi Wei

Sales (good at convincing) - Kavya

Team: Shi Wei

Problem Statement: Kavya

Market Size + Competition: Long

Problem Statement

- About 8 in 10 elderly Singaporeans prefer to stay at home.
- A gap that we identified is that helpers are sometimes unable to follow tasks provided by experts. There is also a need for emotional support for the elderly.
- Hence, we decided to develop a system that can assist caregivers in providing instructions on physiotherapy or some technical terms. Able to identify emotions and provide appropriate responses.
- Helping the elderly with common tasks.

Market Size

- Elderly and Caregivers in Singapore

Competition

- Home service robots(e.g. Elliq) an AI- driven robot that interacts actively with users and provides them with emotional support.
- However, the robot does not have a friendly interface.
- High-end therapeutic robots such as the PARO is effective in reducing patient stress and interacting with them emotionally.
- However, it is priced at around $6,000 USD which is not affordable for most.

Solution

A more interactive and Userfriendly robot that helps with daily tasks as well.

Maybe implement with fall detection too.

Ideation

- Simple robot focusing on sustainability
- A personalized assistant to assist caregivers and act as an emotional support to the elderly.
- A simple and affordable robot that can assist in common household tasks.
- A robotic system that helps people to turn ideas into real life solutions.
- A simple robot that does hair styling for people with special needs.

Problem Statement Canvas

Context: **Elderly who live alone or with caregivers at home.**	**Problem:** • **The caregivers are not proficient in following medical advice throughly or might have difficulty in following instructions for therapy.** • **The elderly require emotional support.** • **Overcome social lonliness.**	**Alternatives:** **Currently, there are home-service and high-end therauptic robots to provide the elderly with emotional support. However, these robots are expensive and cause more problems for caregivers.**
Customers: Elderly with deteriorating health conditions and helpers with little medical experience.	**Emotional Impact:**	**Alternative Shortcomings: Existing solutions? What are the drawbacks in them?**
	Quantifiable Impact: what is the impact for the customers?	

Problem statement tool

- 5W 1H
- Problem statement
- Context, Customers, existing solutions, and the drawbacks
- The birthrate in Singapore is around 1.04 births per woman according to statistics in 2022.
- 39 per cent of Singaporeans aged 62 years and older reported being lonely in a nationally representative study by CARE.
- Customers: Elderly who are feeling lonely and caregivers.
- Caregivers spend nearly seven hours a day taking care of their wards, and over four in 10 of them are at risk of depression.
- Current Solutions: Home Nursing Foundation where staff pay monthly home visits to monitor health and prescribe medications.
- Lions Befrienders' Active Ageing Centre where elderly can seek assistance from staff and converse with them.
- Aces Care HelpLife , a helpline that helps seniors with simple physical tasks received an increased number of calls targeted at mental wellbeing of the elderly.

Problem statement

Shortcomings:

Language barriers, cost-effectiveness, user-friendliness.[Paro and Elliq}

Lack of volunteers who are also elderly. They might have mobility and health issues.[Helpline & centers]

Funding for servers and licenses.[Helpline & Centers]

Emotional impact:

The solution must be more personalized.(mild illnesses vs serious ones such as dementia)

Some just require a companion to share thoughts instead of helping physically with daily tasks.(mental health vs physical health).

Quantifiable Impact:

According to the article published in CNA in 2023, There were 476 suicides reported in Singapore in 2022, the highest number in over 20 years, and those aged between 70 and 79 registered the biggest increase - 60 per cent - compared with figures in 2021.

By 2030, around one in four citizens will be aged 65 or above, and life expectancy in Singapore is bound to increase.

Quantifiable Impact paper

https://pubmed.ncbi.nlm.nih.gov/31317246/

https://www.sciencedirect.com/science/article/pii/S1041610224032642#:~:text=The%20mean%20annual%20suicide%20rate%20for%20the%20elderly%20was%2052.0,women%20in%20all%20ethnic%20groups.

https://pubmed.ncbi.nlm.nih.gov/30909718/

https://pubmed.ncbi.nlm.nih.gov/39529031/

Personalized solution

Tracking the mood of the elderly. If they are sad, angry or nervous. Send warnings to close family and friends.

Monitoring heart rates and tapping onto existing wearable devices.

Ability to speak various languages and dialects?.[Embedded with AI]

Cost-efficient.

Finding the root cause of the problem. If there is a mobility issues? Why is that an issue? Ailing health due to what?. If there is a stigma with regards to mental health, what is the root cause? Societal view?.

Don’t try to go into the biological side like lineage, spouse etc.

Root causes affecting the Mental Health of Elderly.

- Mobility issues, social isolation,
- Cost, time, distance(Quantifiable impact)
- 1st level: Social isolation
- 2nd level: Lack of social network
- 3rd level: Lack of connection between current services provided and the affected individuals
- 4th level: Lack of efficient devices and methods to support and track status of the affected individuals.
- Customers feel left out, unsure on how to share their thoughts or methods to seek help. Afraid to seek help due to social stigma.
- Quantifiable impact: time, available resources?
- Alternatives: Helplines, Care centers to drop by and seek help.
- Shortcomings: Not able to keep track in long time due to shortage of volunteers who are also old and suffer from physical conditions.

Slides Format(12mins of presentation + 3mins Q and A)(15-20mins per team)

- Team profile
- Entrepreneurship mission
- Entrepreneurship Vision
- Entrepreneurship Goals
- Introduce the problem
- Problem statement
- Introduce the customer
- Context
- Emotional Impact + Quantifiable Impact
- Alternative solution currently available + What are the drawbacks or shortcomings in them
- Market Segment:

Market Segment

- - Total Available Market: Entire group your product can serve / your product can do in everyday life. (Entire world)
- Serviceable Addressable Market – Your company vs another company(only 50%) People you can serve. (Apple has 25% of share)(Apple has more safety)
- SOM: Work in progress, we have covered this amount, we will catch the rest over time. Can show projection in the future (Apple must bite more into others share?)
- Identify the spending pattern of the elderly.
- Use Bottom-up approach
- Example Oceania robotics for marine maintenance. Removing the printing of the ship hull(sand blasting) and repainting them. Depends on the usage.
- Demographic as a parameter to define TAM.
- Looking for realistic numbers for presentation.

Competition

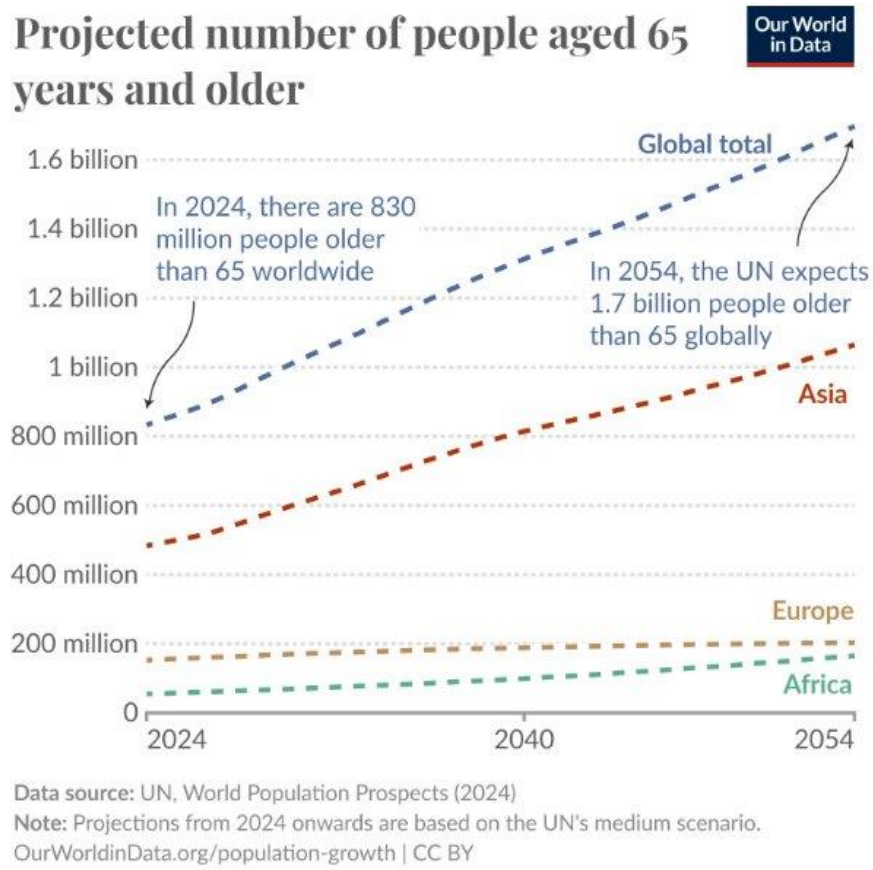
- Who?(Customers)
- What?(The problem)
- How?(Product category)
- Talking to clients, Leverage LinkedIn, Keyword research, Be a consumer yourself(have some empathy and understand them better)
- Competitive analysis:
- -Spot your unique value, Learn from their success and mistakes, Tap into customer sentiments and benchmark your progress.
- Use SWOT analysis, Mapping(Features(smoothness of the chocolate, density and crunchiness vs price), Feature Score card.
- First present competitors then present analysis of either the product or the service.

Competition

- PEST Framework, Demand-supply
- Important to understand the market better.
- TAM: 1,657,736.38 USD Billion in 2024
- SOM: About 142,000 elders in Singapore in 2024, if it is S$500 for each robot after subsidy, it should be estimated to be around S$71 million
- SAM:

TAM

- In 2024, there are about 830 million people aged 65 and above.
- It is estimated that in 2054, there would be about 1.7 billion elderly.
- An average value of a personal care robot is sold at S$2500.
- The Gobal Market for the elderly is estimated to be 2.075 trillion in 2024.
- In 2054, it is estimated to be S$4.25 trillion.



SAM

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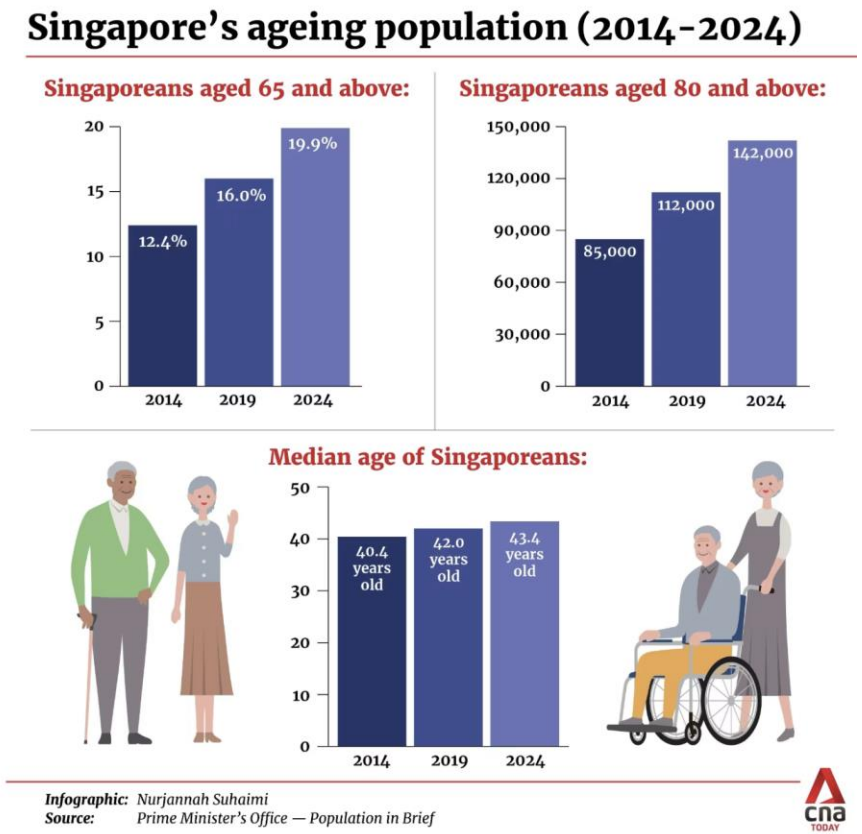


https://www.channelnewsasia.com/today/big-read/super-aged-2026-singapore-ready-4656756

SOM

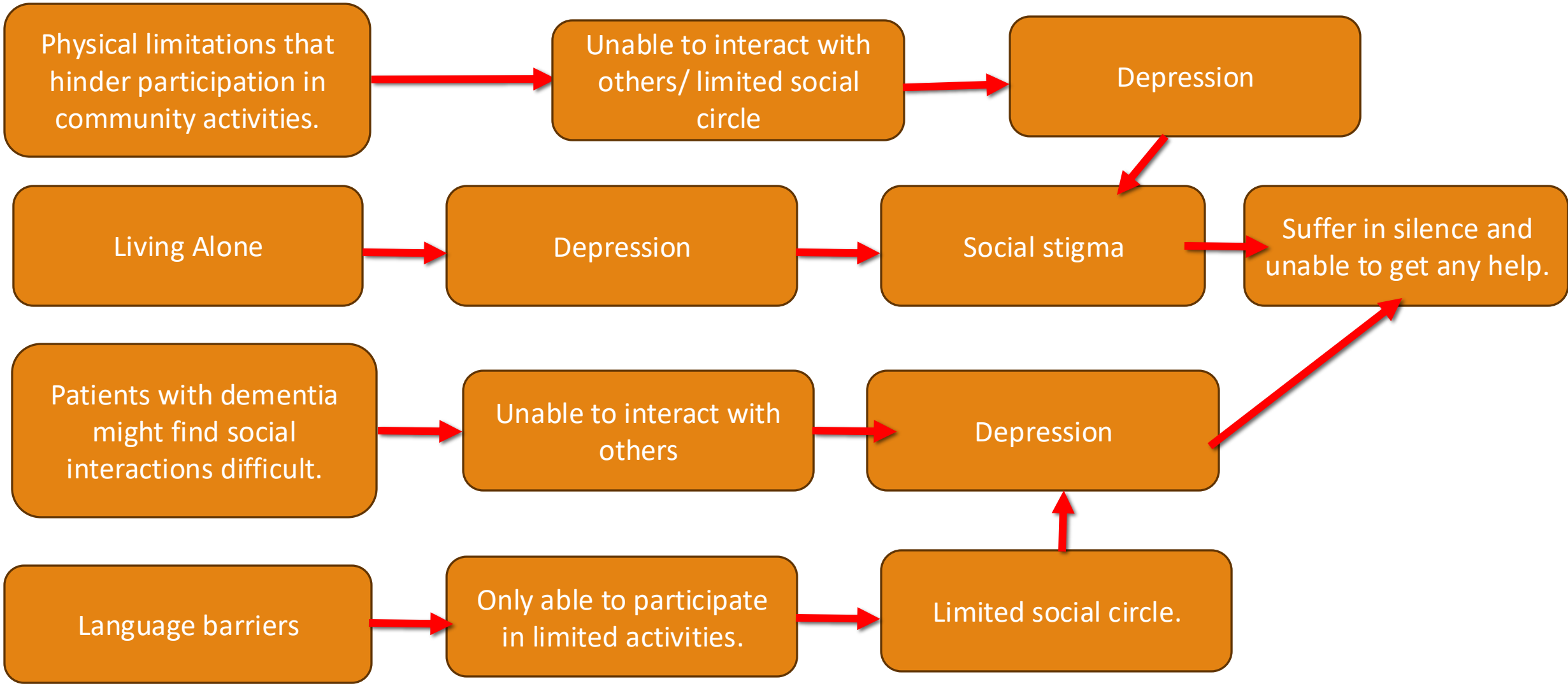
- Nuwa Robotics, a Taiwanese startup colloborated with Silver activites to create Kebbi, a senior-friendly social robot.
- It priced to be around S$590, a more affordable option.
- Lovot, a social robot thatnot only keeps you company but also allows your loved ones to keep track of your activites.
- Paro, a therapeutic robot that responds according to the actions of the user.
- Companion Pet robots that are designed realistically to imitate animals such as dogs, cats etc.

Competition Analysis

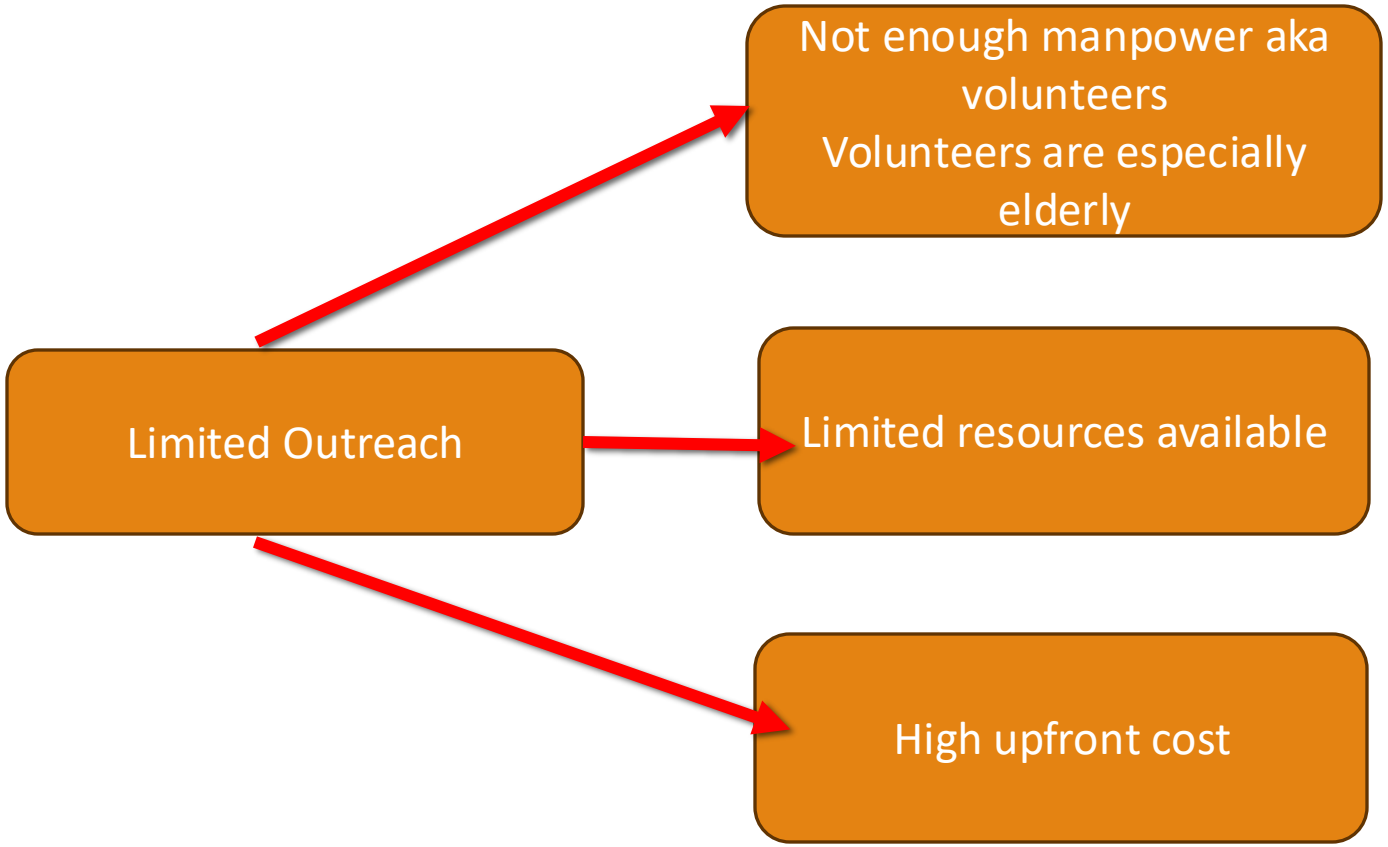
Kebbi

Strengths	**Weakness**
• Able to interact livelier and has a wide range of functions.	
Opportunities	**Threats**

Root Causes for Social Isolation



Root Causes for Social Isolation



Solution

- 1)A robotic pet that is interactive.
- It can follow the user around, able to detect emotions through touch and voice.
- Able to collect data on the different moods of the elderly and respond accordingly.
- 2) A Robot companion with an interface that can interact with the elderly.
- -Make use of voice commands to allow robot to move around the house.
- Provide companionship.

Root cause: Providing companionship

Product

- Benefits
- Differentiators
- Strategy
- -Low cost: Provide the platform for low cost then gain the attention. Improvise according to feedback, quality and features.
- -Niche: Define the niche statement. Eg, Go pro only for travelers. Improved the standards(make it more rugged).
- -Platform: A robot base. They put their payload then sell it.
- -Enterprise sales: Governments or corporates.

Pretotype

Physical sketching?

Visualize how is it going to be.

Need to include in the review 1

Would the people be interested in it?

Will people use it as expected?

Will people continue to use it?

Will people pay for it?

Prototyping:

-Can we build it?, will it work as expected?, How cheaply can we build it?, How fast can we make it?.

Preto typing Types

Animation as a pretotype?

Keyshot(no student access available)

Product 1(Robotic Pet)

Product Strategy: **Niche(Cater only to the elderly)**

Product features: Able to detect emotions through touch sensors and through voice commands.

Give suggestions on activities to do.

Acts just like a real pet. Make sounds when it is alone for too long.

Gains attention by wagging tail or blinking eyes.

Product 2(Robot buddy Companion)

Product Strategy: Differentiation(Able to closely follow the person and can act as a 'buddy').

Product features: Moves around the house by avoiding any obstacles.

Daily mental health check in. ("Asks them how are they feeling today?")

Family monitor remotely. Like can send alerts to family members if any abnormal activity is shown through an app?.

Provides reminders on to take medication or have their meals.

Product 3 (A Pet Companion)

1. A wheeled Robotic pet with an interface.
2. An interactive interface where we emotions are shown through the screen.
3. Can perform video calling with family and friends.
4. Can entertain the elderly with some simple games.
5. Provide suggestions on activates to do when feeling down.
6. Do a daily mental check in('how are you feeling today").
7. Provide reminders to take medication and meals on time.
8. Send alerts to family members via app if any emergency or abnormal behavior detected.
9. Touch sensors + voice communication to detect emotions of elderly.
10. Can follow them around the house when commanded.
11. Make sounds if the robot is alone for too long.
12. Uses blinking eyes or tail wagging to gain attention from elderly.

Pretotype(Robotic Pet companion)

- Strategy:
- Nursing home, Elderly, what type of features and how feasible,
- Companies that distribute or lend these robots for elderly.
- Supply chain companies that make robotic dogs.
- Engage as real contact points as possible.
- Survey or interview.
- Finer details on the features. Prepare a specification table.
- Usage scenarios(Storyboarding, small animations.) build up on those.
- Technical architecture. Block diagram(different sensors, communication modules) Input, output, wifi, Bluetooth etc.
- Site analysis. What if it is in a home?

Stakeholders to reach out to

- SilverActivities (A company that develops products and applications for elderly to use) (Also offers a live demo for Kebbi in Homecare facilities)
- https://silveractivities.com/kebbi-social-robot
- Contact: hello@silveractivities.com
- SoundEye
- https://sound-eye.com/

-Lasso: Sound recognition sensors(abnormal sounds) send warning alerts

-Gogo: Can we communicate with the staff?

- Contact: info@sound-eye.com
- MI Robotic Telepresence robot? Robots implemented in hospitals and care homes.
- https://mirobotic.sg/personal-robot-temi/

Stakeholders

- Robotic companies that are focused on developing products for the elderly(Would be great if related to mental health)
- Interview: Silver activities.
- Survey: Sound eye or MI robotic
- Eldercare homes:
- Caregivers and maybe elderly? (Interview)
- St Luke's eldercare

-Home-based services and residential based services.

Focusing on Psycho-social Care & Cognitive Care.

Feedback

Users: Elderly, through elderly care reach out to the elderly.

Decision makers: Doctors, Can the product really help?

Domain experts: Robotics companies(Robotic experts), Healthcare domain(Professors that work on products related to the elderly).

Regulatory officers: MOH people to receive feedback about product and the safety aspects.

Validating product(users, domain experts, supply chain personnel) and the market(decision makers, regulatory officers, resellers).

Suppliers for the components.(sources – cost required, local and overseas).

Bystanders: Family members, friends etc.

Data collection Methods

- Email
  - Eldercare Homes(Elderly, professionals, care givers) (Kavya)
  - Robotic Companies & Professors (Long)
  - MOH personnel & Supply chain personnel (Shi Wei)
- Surveys
- Interviews

Review 2

- Do survey and interviews
- Present an updated version of the product
- Present a realistic animation if you are planning for one.
- Market Validation: Need to validate each and every stakeholder.
- Users, Decision makers, domain experts, regulatory officers, supply chain personnel, resellers and bystanders.
- At least get three stakeholders' information
- -Validation Methodology(Simple methodology and what methodology have you used)
- Validation Canvas based on the output. Can add more columns and mention what pivot have you done.
- Validate the problem, Validate the market, Validate the Value proposition(How does your product differ), Validate the product(right product? Right set of features? Any regulator and safety constraints?)
- Validate the customers(Are they the right group?, Can you build repeatable sales?).

Discussion of improved Features

Act as a facilitator to enhance social interaction(E.g. Invite a Neighbour for tea or prompt the elderly to make a call to their son as it's been a while).

Making it more localized(Adding Singlish prompts are prompts with different languages).

Adding a fur-like body-structure to the robot to make it look more realistic.

Personalized memory-based conversations: Let the robot recall simple facts like the family member's name, favorite food, or preferred routine. (To make it more personalized).

Improving the pretotype:

A Storyboard?

Recap(Shi Wei)

Market Validation(Long)

Validation methods(Long)

Validation Canvas(Long)

Product Function and features(Kavya)

Pretotype(Kavya)

Video(Shi Wei)

Video(How long should the video be)

1)Fix a storyboard and then shoot the video. Elderly alone at home, feeling uneasy and sad. If they have a robot, they can converse with it, ask it accompany them.

2)3D modelling of the robot.(Shi wei)

3)Can use the dog toy to show it providing comfort.

4)Flow:

5) -Elderly feeling lonely

6) -Some text saying this is about to change

7) -Show the 3D model of the robot(Overall)

8) -Zoom into each parts to show functions

9) -End it off with maybe the pretotype providing comfort to the elderly.(Act out)

Interview Questions

Section 1: The Elderly Market and the mental health issue that they face

Section 2: The current solution in Singapore + The Social Robots used to tackle this problem

Section 3: Our Product(The Robotic pet companion)

Feedback for Review 2

Updated product

Worst case scenario: use online data but inform beforehand about the fact that we have contacted care centers and then we did not get any reply so we are going to keep trying.

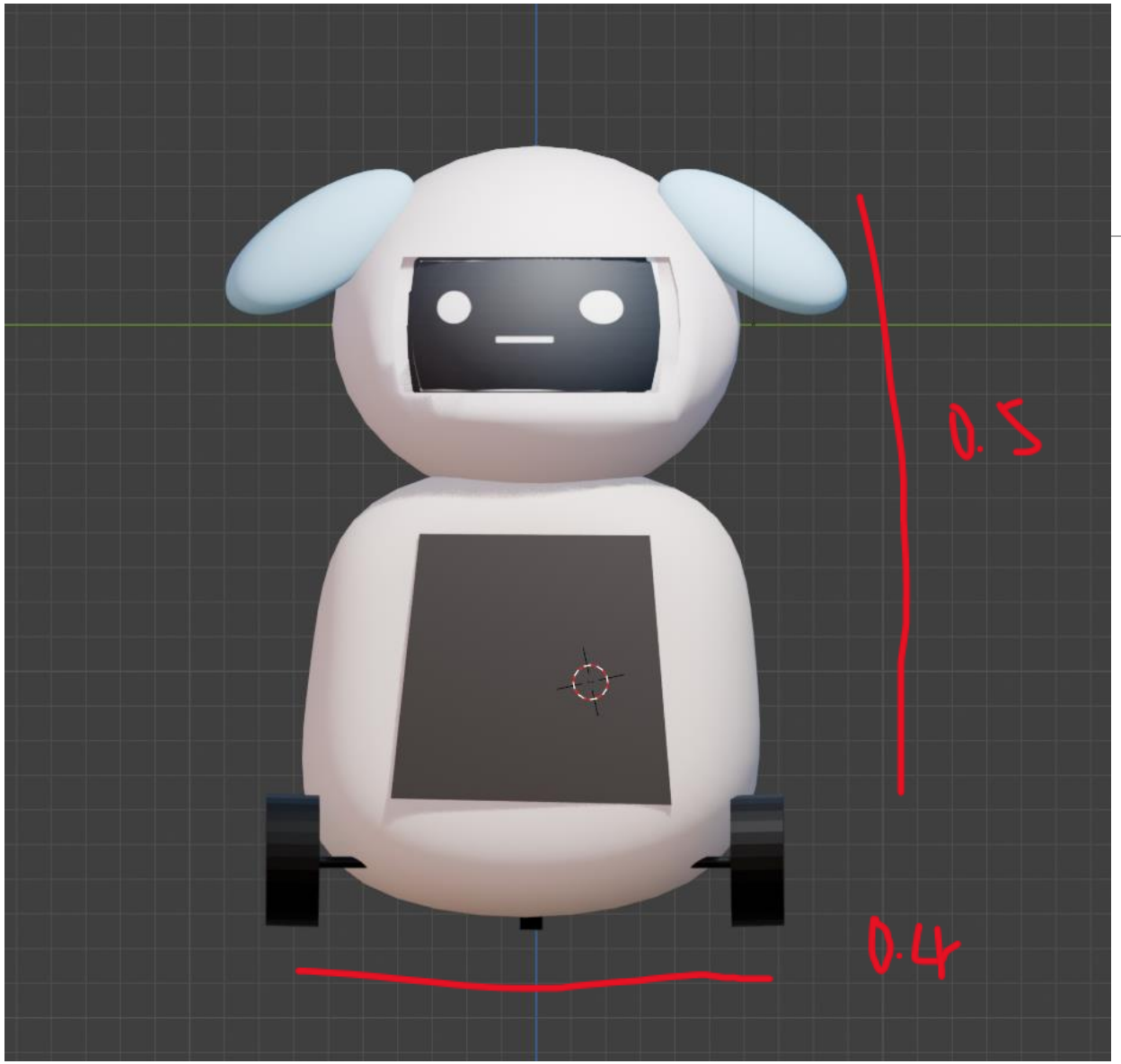
Changi General Hospital has connections with SUTD.

Interview a domain-expert on the product and market. (Dr Jay)

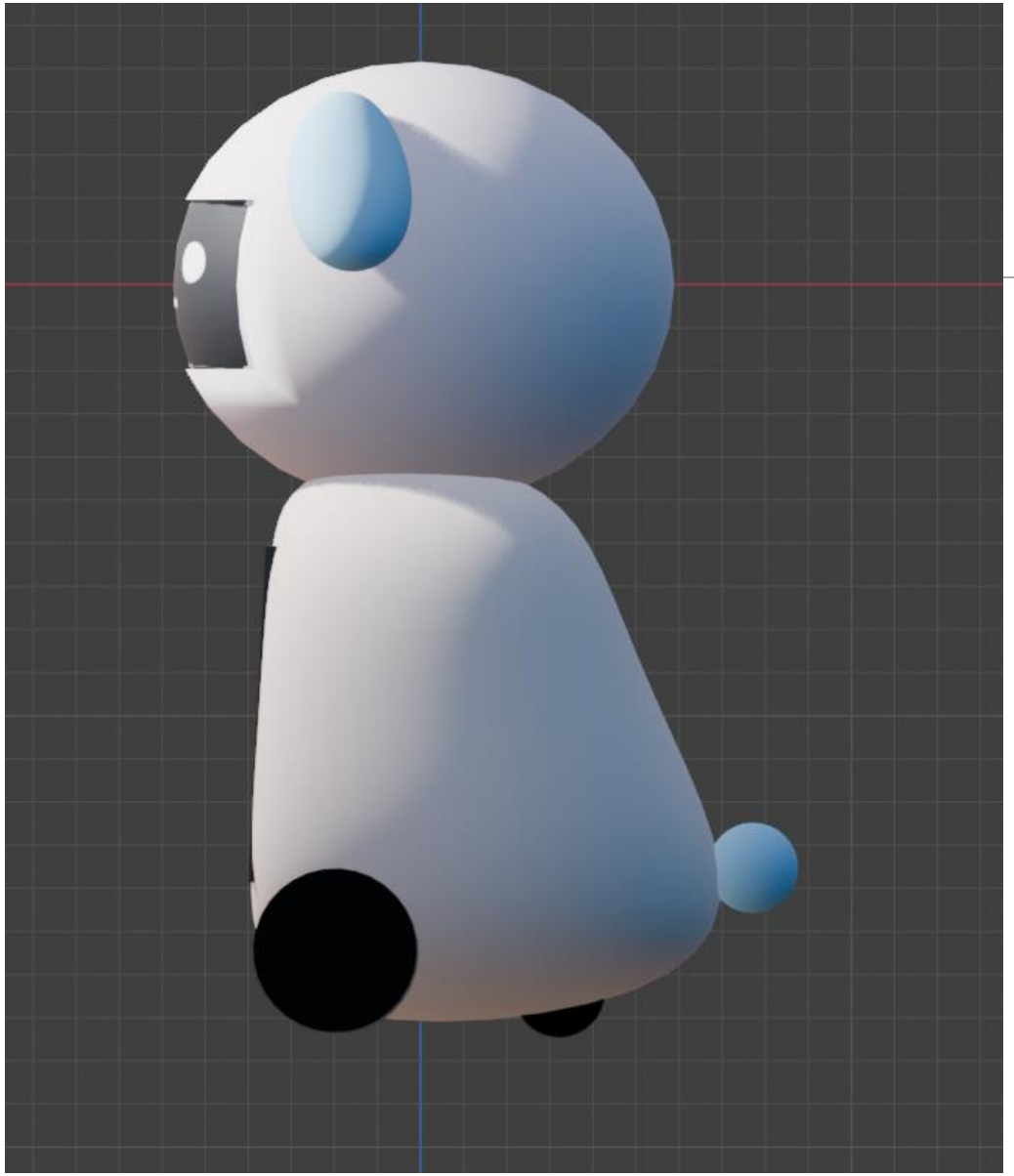
List all care centers:

Feedback after Review 2

- The video: Have animations to show how the product functions and even a mock-up to show how it functions.
- The features need to go from qualitative to quantitative. (For e.g. The tail how long is it, what are the sensors it uses, the pressure etc.)
- Continue to conduct more interviews with the stakeholders to learn more about the pricing of the product.
- Ask some peers to roleplay as elderly to provide responses for the product. It would be great to receive at least 50 responses.
- Looks for specification sheet, warranty etc
- Representation: Push boundaries, make a mockups, rendered animation
- Visualization and story-telling
- Engagement of stakeholders: Close to your domain who can guide you.



Width: 0.4m
Height: 0.5m
Fur-like exterior: A medium-sized stuffed dog toy with hollow inside
Main controller: ESP32/Arduino Nano—tail/ led face
Led face: OLED Display 0.96 inch？
Interactive facial interface
Touch sensor:FSR?
Plush Dog Toy/Faux Fur
Wheels:**2WD Smart Robot Car Chassis**



Responsive tail： micro servo SG90
Power supply:Battery Pack + holder

Items for mock-up

https://www.lazada.sg/products/faux-fox-fur-fabric-5cm-fur-plush-diy-handmade-cosplay-animal-ear-clothing-home-textiles-sewing-fabric-50x20cm-i3063603364-s20899164860.html?from_gmc=1&fl_tag=1.

https://sg.cytron.io/p-2wd-smart-robot-car-chassis

Chassis size: ~215mm x ~150mm

Wheel Diameter: 67mm

Castor Height: 34mm

https://sg.cytron.io/search?search=L298N%20Motor%20Driver

O-led display:

https://shopee.sg/product/310018469/24275073940?gads_t_sig=VTJGc2RHVmtYMTlxTFVSVVRrdENkY0N5akVpcE5OamJEdjRRTHBOTzhmbGVwdHVIb1dKTE42R3FtazE4TXNPeHlqTzRJNzNUeEhteUpBeGdDYThDVjhpaHRHL1pOVjhNYUdMK3VXZWNObktiTFRKald6MHdPaWE0WXZBOE1OcTc

https://sg.cytron.io/p-sg90-micro-servo

Maker-uno

https://sg.cytron.io/p-maker-uno-simplifying-arduino-for-education?gclid=CjwKCAjw4efDBhATEiwAaDBpbtQIaID4nMQ0vY_Cou4-kYfemrsPVNzFH5VeYPtCeCi_tZt3YbYr5hoCNXAQAvD_BwE

1)Financial statement : components

2)Balance sheet

3)Profit and loss statement

4)Components:

5)-Outer body:

Current Robots Pricing in the Market

Loona, the pet dog - $499 USD(Not considering shipping) SGD 636.63

Link: https://www.amazon.com/Loona-ChatGPT-4o-AI-Powered-Interaction-Monitoring/dp/B0DCF53PCH?th=1

Pet Companion robot with fur-like body structure -$139.99(not considering shipping) SGD178.60

Our Robot should cost between SG$190.60 to SG650 (Considering $12 for shipping fee?)

Components breakdown

1) Two LCD screens -
2) GPT-4o -
3) 3D ToF LiDAR sensor
4) 4-Microphone Array
5) Spaker
6) USB-C port
7) Brushless DC Motor
8) Auto-Charging Contacts - $78.99 USD
9) App control?
10) Wheels
11) Fur-like body
12) Tactile touch sensors
13) Product size: 15.24 x 9.02 x 10.12 inches
14) Product weight: 2.42 pounds

Feedback on Operational costs

100 pieces

Identify bill of material cost for one robot.

Operational cost. Manpower cost, wastage cost, own margin(profit margin).

Renting a place, the components, recruitment and salaries. Production in Singapore context.

Incoming and outcoming

$5000 per month for 50 units, Outgoing shipping cost, import cost rent etc.

Reduce the number of staff, shit place of production, vendors providing cheaper rates. (Spending cost) or increase selling rate(50 units to 100 units).

Investment offering: Percentage to ask, growing the sales or sustaining the sales, recruit more engineers. Will not fund increase more employees. More funds for future technologies or enhancing features, increasing the sales. Investor povs vary. Open to receive feedback but must have some confidence in what we ask for.

How are you running the company, build trust. How are you handling customers before and after sales. After sales: upgrades, technical difficulties, warranty? How many years?.

To display in shore rooms, your product needs to be established.