

BONNIE

THE BEST COMPANION CAREBOT FOR YOUR ELDERLY

PROPOSED BY
TEAM 20239

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Executive summary

As the homophone of 「幫你」, "Bonnie" is a companion robot tailored to the elderly with the hope of empowering them to get their hands on technology while relieving their loneliness and forming deeper connections with their family with technology. Nowadays, the rapid advancement of technology is leading the people to a more convenient and entertaining life while the elderly are left behind. However, We believe that 'every older adult deserves a chance to embrace technology, to engage the new generation, and to keep enjoying the ride throughout the life journey.'

Bonnie is designed to be the senior best assistant in their exploration of technology. Differ from the existing smart home or companion robot, Bonnie is more localized and adapted to fit the learning process of the elderly. By offering timely and human-like assistance in addition to interactive user guides, our users could set up the product alone without the aid of their grandchildren. Plus the features accommodating their physical condition, the seniors would be more comfortable when dealing with technology and develop a virtuous cycle where they would be excited to experience different new technology themselves. Also, we hope the elderly could be more connected to their families with technologies, like video call and video message. In addition to that, Bonnie could help reduce the generation gap between the seniors and their grandchildren as it can retrieve and read out top news to keep them informed of the current situation, plus providing common topics for casual communication.

Bonnie also relieves caregivers' pressure with its mobile app which could be installed by the guardians alongside the purchase of companion robots. Elderly's personal information, such as health conditions and reminders are first stored in the app, then transferred to the companion robot and make it a volatile yet personal interlocutor.

Targeting the middle age group as the targeted segment and the elderly as the targeted end users, Bonnie's price would be set as \$2899. We would expect to achieve positive EBIT in 3 years after launching together with 35% market penetration rate and 35% gross margin in 5 years.

Background

Pain points existing in the society

According to the Hong Kong Population Projection from 2017 to 2066, population ageing is projected to endure for 30 years at the minimum and the elderly population will more than double in the coming 20 years. It is also significant to note that the number of elderly persons is anticipated to reach 2.59 million by 2066 (2017). A joint study conducted by the Sau Po Centre on Ageing at The University of Hong Kong, The Women's Foundation, and HSBC Life has revealed a distinct increase in the expense of elderly care in which the cost of nursing the elderly people who are receiving either residential care or home care is estimated to reach HK\$222.4 million per year by 2060 (Lou, Nott, & Moncreiffe, 2019). A considerable growth of the demand for senior care products to mitigate the burden of the future generations to support their elder parents is expected.

In the traditional Chinese culture, family is the root platform for elderly support. Every adult has to bear filial responsibility for taking physical and psychological care of their elderly parents. Owing to the social-economic development and increasing migration, however, there are less than half of the elderly living at home with their children and/or spouses in Hong Kong (Lam & Fong, 2020). Particularly, considering the increasing percentage of lonely older adults from 11% to 13% (2016) , plus the lengthening of life expectancy, a continually rising trend of the elderly living alone is observed (Bai, Yang, Wang, & Knapp, 2017).

Home-based seniors face copious difficulties. They are suffering from a lack of social contact resulting in aching loneliness throughout the rest of their life (Knott, 2020). The physical proximity of family members and other social networks become distant due to the deterioration in mobility and health. Participation in social activities is restricted as a result and hence the experience of societal disengagement and the rising severity of solitary (Chui, 2008).

In accordance with a research related to loneliness and ageing conducted by the IBM institute, elderly loneliness has been a new societal issue which requires us to foster stronger connections among older adults by fitting in with customization and the accommodation of the wide variation of technology (Palmarini & Fraser, 2020). This suggests the market potential for the industry to tackle loneliness in older adults is considerable.

In terms of purchase patterns in carebots, buyers usually concern about the extent of the care offered. Robot is not a human and cannot understand users' mentality. Some may then doubt the effectiveness of carebots especially in their delivery of emotional support to users. However, carebots can indeed demonstrate external aspects of care without having emotions as humans do (Yew, 2020). Therefore, we were inspired to design an eldercare robot that is able to store and integrate users' behaviours, then respond meaningfully in order to proffer care in social and emotional aspects.

First-hand market research

We have conducted an online survey to gain deeper comprehension of the working population's opinion towards eldercare. The survey result is attached in the appendix. Amongst the 105 respondents, 67% are aged 31 to 50, and over 50% are Associate or Bachelor Degree holder and Postgraduate. Approximately two-third of the participants admitted that they are unable to show ample care to their elderly under financial pressure and time constraint. With nearly all respondents agreed that we should stimulate the usage of technology by the seniors, about two-third opined that easy manipulation for the elderly is the most imperative factor when purchasing a carebot for eldercare. We have taken all aspects of the above results into account when designing our robot, Bonnie, and it is fortunate that a large proportion of the participants agree that our price setting of Bonnie at \$2899 is appropriate.

Market Segmentation

We have two groups of target audience, namely the working adults caregivers as our target segment, and the elderly as our target end users.

Target segment

In Hong Kong, the number of caregivers will double to 89,000 in the following 20 years, and increases 2.2 times to 97,000 by 2060. For informal working caregivers who give up both their income and career advancement opportunities, the opportunity cost is projected to increase drastically – approximately four times – from HK\$1.8 billion in 2018 to HK\$7.2 billion in 2060. A study also found that more than one-third (35.7%) of respondents provided at least 20 hours of caregiving per week, equivalent to half of the working hours of a full-time job. This is significant as 90.6% of our respondents are working full-time with the remainder working part-time. As a result, it is projected that many caregivers would have the incentive to look for an alternative solution of taking care of the elderly that could lower their opportunity cost. The increase in the number of caregivers would also likely to enlarge the number of our potential customers.

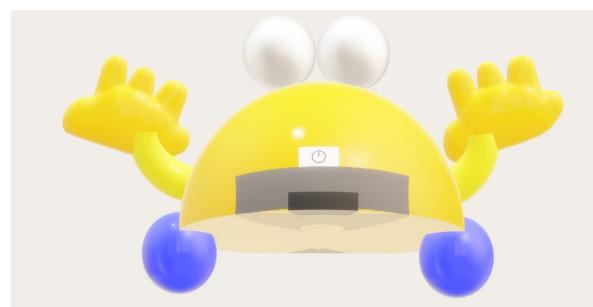
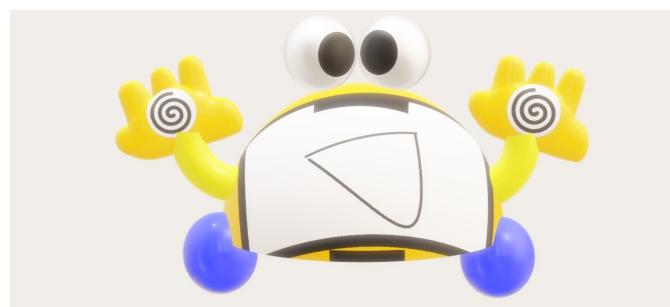
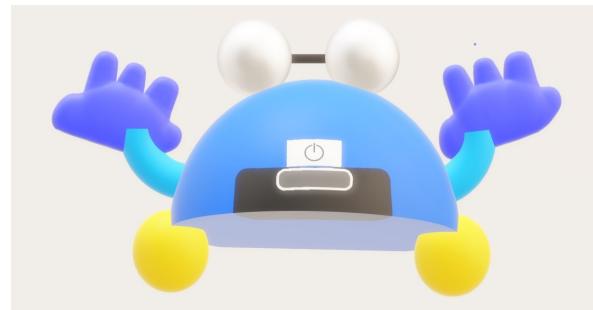
We have set our target segment as working adults at the age of 21 to 55, who are currently at their prime working age. The working population is further segmented into “Millennials”, who aged 21-35, and “Gen X”, who aged 36-55. For Millennials, 8 out of 10 of them never buy anything without reading a review (Revel Systems, n.d.). Moreover, nearly two-third of Millennials claim that if a brand engages them on social networks, they are more likely to become a loyal customer. Therefore, it is crucial to exploit online platforms in order to build up our brand recognition among Millennials. As for Gen X, digital marketing should be the primary way of advertising. As shown in a survey, 67% of Gen X use a laptop/ PC daily, which exceeds the 58% of Millennials who use a laptop/ PC daily. In lieu of advertising through social media, Gen X are much more likely to be influenced by email marketing (Revel Systems, n.d.). As regarding the pricing model, both generations are highly incentivised by discounts. Therefore, seasonal discounting can be adopted to build brand loyalty.

Target end users

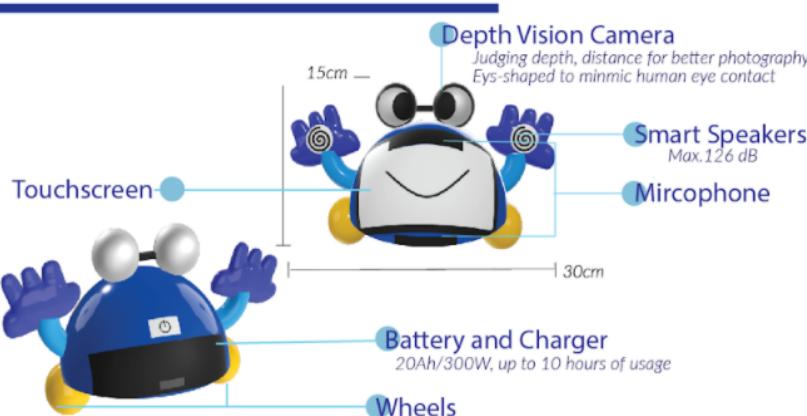
We will mainly focus on the solitary elderly as our target end users. The elderly population has been increasing continuously and the trend is likely to be continued at a faster pace. It is estimated that there will be over 2 million people who will be aged 65 or above in 2030, constituting over 30% of the total population of Hong Kong in the same year (Census and Statistics Department, Hong Kong, 2016). This population would sustain for over 30 years. According to a survey by NGO Big Silver Community, less than 32% of carers have sought for social care services, and 86% of them found these services “very insufficient” (Jennifer Creery, 2018). With a huge elderly population base and inadequate support received by the carers, the market for products that cater to the elderly’s needs and problems are expected to expand.

Product Features

There are two versions of Bonnie: Bonnie in blue signifies calmness and brings inner peace to users, and Bonnie in yellow represents cheerfulness, happiness and hope that can instantly lighten one's mood. Together with the supplementary app, Bonnie would bring unprecedented and unparalleled benefits to the elderly in the following three perspectives.



EMBEDDED HARDWARE



Size	Height:15 cm, Width: 30 cm
Weight	4 kg
Sound	2 speakers of max.126 dB
Connectivity	Wifi, Bluetooth
Motion	2 wheels, 2 hands: express Bonnie's feelings, enhancing interaction
Camera	Depth vision camera: judging depth, distance for better photography Eyes-shaped to mimic human eye contact
Battery	20Ah/300W, up to 10 hours of usage



Functions for the elderly to choose from



Subtitles while speaking



Yes/ No button on touch screen



Video call/ Video messages

1.Individual benefits: Less hassle and getting the elderly's hands on technology.

Design: Bonnie is specially designed for the elderly with accommodating features. We believe the interplay of voice-control and touch screen can optimise user experience and aggrandises Bonnie's fault tolerance. There are two smart speakers on Bonnie's hands, which allow Bonnie to carry out humanlike conversation with users. Below the speakers, there are microphones for our elderly users to talk and give commands to. Bonnie is a considerate companion as it can respond to one's feelings appropriately by machine learning.

On top of voice control, elder users can also utilise the touchscreen on Bonnie to give commands, which facilitates users who are inarticulate and allows graceful degradation by preventing possible mishearing by Bonnie. Subtitles in large font size will also be generated automatically when Bonnie is speaking, this accommodates elders who have hearing problems. Given the elderly's loss of muscle mass and flexibility, we abandoned the use of scroll bars and double-tapping. Hoping to enable the elderly to press effortlessly and efficiently, all virtual buttons on Bonnie's touchscreen will be 31.77 mm with spacing ranging from 3.17mm to 12.7 mm to minimise error rates (Caprani, E., & Gurri, 2012). We adopt high contrasting colours between the background and the texts to resolve the vision loss problem of our target users. Moreover, to remedy the potential vision disability of the elderly, we keep the font size to be at least 16 pixels (Ollie Campbell, 2015).

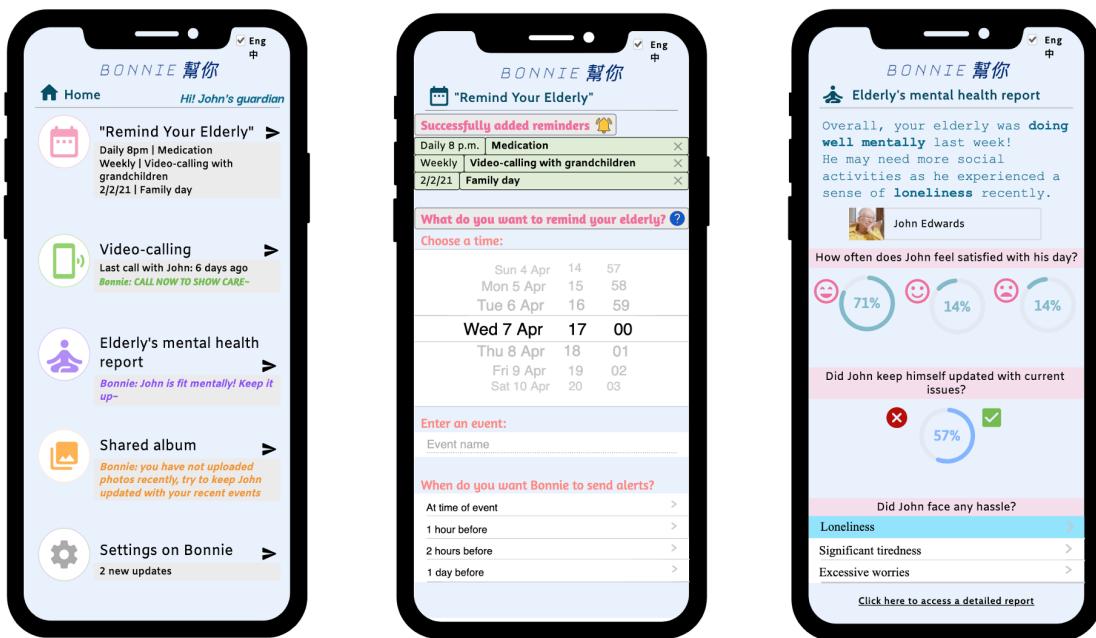
With the use of voice recognition technology, the volume can be told to turn up in case of the failure in hearing occurs in our users. All the verbal messages are repeatable followed up with a simple Yes/No question to ensure users' understanding. Such function caters for the seniors who suffer reduced vision or dexterity. Users with severe hearing loss have also been taken into account in which live captions are generated automatically through the speech recognition software inside Bonnie and displayed on the touchscreen. There is a tiny hand on each side accompanied by in total of two smart speakers with the maximum loudness of 126 dB on them to provide timely and precise guidances through the application. Immediate activity and input feedback is also offered considering the deteriorating working memory, lower information processing speed and divided attention. With a height and radius of 15 cm, Bonnie accommodates the generally small flats in Hong Kong. It can be placed on the table so that the elder users are enabled to interact with its touchscreen at a higher position and hence the prevention of arm fatigue. The on/off button is at the back so that the elderly would not turn on or off Bonnie accidentally.

Function: a) Chat-bot

Powered by Machine Learning and Natural Language Processing, Bonnie performs human-like conversation with users. Designed to offer companionship to the elderly, it is able to capture one's feelings such as interpreting facial expressions, voice patterns and then respond appropriately with emotional speech like comfort and support so as to fight off anxiety, frustration and insecurity. Moreover, a chatbot is installed to conduct conversations with elders, which imitates real life chit chat. It is psychologically beneficial for seniors with dementia or ageing brains and their carers due to its tolerance to repeated stories, questions and conversation.

2. Cross-generational benefits: Lives effervescently and breaks down generational communication gap.

Design: With the seniors being our target users, the younger generation, is also deemed important in helping the elders to embrace technology. The supplementary app is designated for the guardians of the elder users alongside the purchase of the robot. It complements the robot and allows younger people to show solicitude for the elders. Guardians are expected to input elderly's personal data, namely name, age, contacts and health conditions and daily routine in the app, the data will then be transferred to the database of Bonnie. All the contact groups can be pre-set before use yet editable afterwards through either the app or the guidance of Bonnie. Besides, guardians can select photos on their smart devices and share the album with their elderly through Bonnie. The elderly can indulge themselves in reminiscing, which preserves family history and reduces depression (Ruby Cemental, 2019).



Function: b) Reminder-Bot

Prior input of to-do items in the mobile app enables Bonnie to remind the elderly in due course. Serving as a patient voice assistant, our robot delivers reminders verbally with variations each time in a pleasant and friendly voice at a rate of speech of 140 words per minute. Upon task completion, users can verbally inform the robot, it will then send an instant push notification to their guardians, and this keeps them informed even when they are on-the-go and are unable to visit their elderly in person. The information does not come only from the retrieval of entries, up-to-date news is also a kind of reminder. Bonnie can gather today's top news and read them aloud for the elder users based on their preferences and interests, which are recorded and updated seamlessly in daily conversations. In this way, they can get to know more about the current situation rather than feeling left out.

3.Social benefits: Brings mental wellness and encourages social engagement

Design: To stimulate social interaction, not only are the guardians enabled to share recent photos, create reminders and schedule meetings for users with the app, older adults are also able to learn to invite their contacts to meetings with the aid of the smart speakers on Bonnie step by step. After installing the app, other non-robot users are able to communicate with the elderly by entering the specific code of their Bonnie. They can also remotely manipulate the gesture of the robot during video calls such as hugging and blowing a kiss so as to bring warmth, intimacy and a sense of humanity to the elderly despite the long distance. Furthermore, users' mental health report, which delineates users' mental fitness in the previous week, is available on the supplementary app to inform the guardians with the elders' emotional health conditions. Other notifications from the robot can also be received in the app.

Function: c) Video message and video call

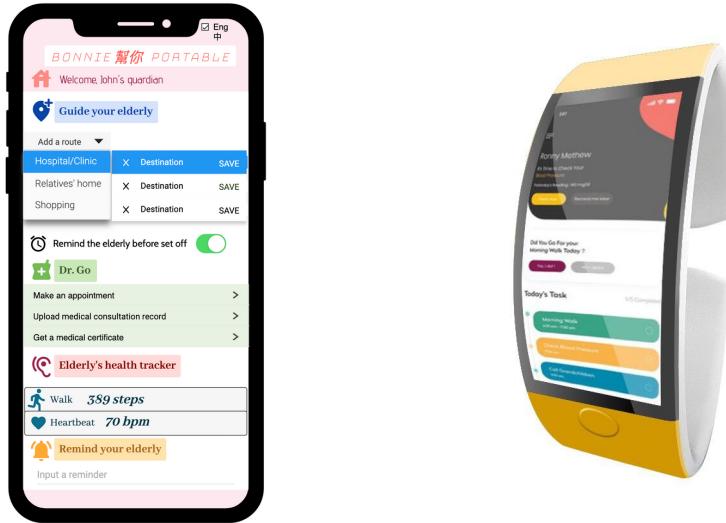
Concerning the potential unavailability of attending virtual meetings and the hectic life of general urban dwellers, video messages within 3 minutes are enabled to be recorded and shared between Bonnie and the supplementary mobile app in order to facilitate more flexible and interactive communication between the elderly and the younger generations. For the elder users, there are two virtual buttons on the touchscreen where they can instantly record and send short videos to their family and friends. On the other hand, alongside scheduling a virtual meeting, non-robot users can choose to deliver video messages anywhere anytime by clicking on the 'video-calling' button in the app. Meanwhile, to cope with vision and hearing decline, the video sound is able to be either amplified or slowed down and the size of the video can also be scaled up using voice commands. The above can mimic the experience of the elderly talking to someone face-to-face and make the conversation more engaging for both parties.

Scalability of Bonnie

1. Bonnie 2.0: Expand social connection

After retirement, the elderly usually experience shrinkage in their social circles and feel isolated. If our robot gains popularity and has a larger user base, we will incorporate an online socialising service for the elderly to strike up friendships in no time by Bonnie. Elder users' engagement in online gathering can be impeded from intricate operations existing in the current social media apps, e.g. personality test and the swipe to like function. Therefore, our online dating service will connect users based only on their locational proximity. As conveyed in the "propinquity effect", the closer you are to someone, the more likely you are to like them (Itzik Amiel, 2016). If two users both agree to match, they can connect virtually through video message and video call, which are the built-in functions of Bonnie. As some people may concern about their privacy when using online dating, personal information such as the elderly's mental health condition and address will not be disclosed under stipulation.

2. Bonnie Portable: Proffer holistic protection to the elderly



There will be a potential product that complements Bonnie, namely “Bonnie Portable”. Our robot Bonnie, targets the elderly’s mental health, while Bonnie Portable, conversely focuses on their physical fitness. Bonnie Portable is a smart wristband which has a stylish design. It is operated under voice-control and acts as a carer for the elderly even when they are not at home. According to a survey, Over 60% of the elderly (61.3%) said they are willing or very willing to try online medical consultations when relevant technology is fully developed (Lingnan University, 2020). We will partner with Dr. Go, which is a telemedicine video consultation app and connects users to Hong Kong registered doctors. After the guardians have made an appointment for their elderly parents via the supplementary app, the elderly can consult a doctor through the video call function of Bonnie. As Bonnie Portable keeps track of the elderly’s basic physical health status like their heart rate and sleeping pattern, additional information can be provided to doctors for a more thorough prognosis. Annually, fall accidents are reported by one-third of all people over the age of 65, and more than half of all fatal falls involve people 75 or over (Shell Point Retirement Community, 2012). Therefore, a gesture detector is installed in Bonnie Portable to detect unusual movement performed by our users. When a fall is detected, Bonnie Portable will offer 24/7 emergency assistance and prompt alarm will be sent to the guardians.

Therewithal, the guardians can set up routes to guide the elderly to their commonly visited destinations, e.g, hospital or wet market, by GPS. Functions like reminders will also be integrated into Bonnie Portable. Overall, we recommend Bonnie Portable to be used in tandem with Bonnie, as to provide over-the-edge protection to the seniors. Overall, we recommend Bonnie Portable to be used in tandem with Bonnie, as to provide over-the-edge protection to the seniors.

Competitor Analysis

1.Buddy

Description: Developed by Blue Frog Robotics, a company based in France, Buddy is branded as an emotional companion for all members of a domestic household with functions applicable to all of them, children and elderly in particular. It can serve as playmates, personal assistant, communication tool and security guard. The robot is embedded with artificial and emotional intelligence. These technologies allow it to communicate and navigate around the environment.

Their growth strategy includes offering partnerships and internships, which could help to add more functionality and services to Buddy. The bot is also built with popular open-sourced platforms, which increase the ease for developers to collaborate with. These popular platforms include Arduino, OpenCV and Unity3D. The SDK is a web-based C++/ Csharp visual programming tool, which could be readily integrated with other apps. It is rich in animations, sounds and vocalizations, with technological bricks such as Emotions, Feel, Move. There is an API so that the developers could start developing apps on the bot. Hardware-based solutions are also welcome to be added on Buddy.

Our competitive advantage: However, it has a significant drawback of mishearing commands, which fails to strike up a meaningful conversation between users and Buddy. We can stand out by incorporating a touchscreen on Bonnie, which guarantees our fault tolerance and prevents miscommunication.

2.Zenbo

Description: A domestic robot by ASUS that targets helping elders to enjoy digital life and acts as a family care helper. Zenbo facilitates elderly on video calls, usage of social media, shopping and video streaming services. It can also send out reminders e.g. doctor appointments by its voice, simultaneously make different responses (dialogue, expression or action) through its sensors e.g. facial recognition/ anti-drop/ ultrasonic ranging/ infrared/ line sensor. Zenbo robot uses NPL so that it is able to respond to voice commands like “Hey, Zenbo”. One plus point is that its response will improve gradually with machine learning. In terms of providing family care, Zenbo can warn and contact parents if their kids are in a dangerous position. It can also control smart home appliances including lighting and television, or even help with cookery by reading recipes.

Our competitive advantage: With a wide range of functions, Zenbo appears to be lacking a standout feature to distinguish it from bigger brands. Most of its functions can already be done by other existing products namely medical alert bracelet or smart home hub. Conversely, Bonnie has a unique proposition which enables emotional recognition and concerns about the elderly’s mental fitness. Meanwhile, our companion journey first begins with Bonnie’s pre-recorded verbal guidance. Under progressive disclosure, elderly users can use our product at a pace that they are comfortable with while gaining hands-on experience and practicing voice-controlling the robot. This assures each elder to engage in technology step-by-step with limited initial technical skills.

3.Durcal

Description: Durcal is a family app developed by Grup Basera SL, which aims at connecting the elderly with their family members. It keeps track of the elderly’s location and their physical health condition. Family members can share photos and keep the elderly updated about what they have encountered. In the future, it plans to incorporate more functions, such as checking the elderly’s heart rate, sleeping quality, blood oxygen level and body’s energy. In order to cater the elders’ needs, there is a senior version, which has its functionally specially adapted for the elderly to enjoy the usage.

Our competitive advantage: Since Durcal is only a software to be installed in smart gadgets, it cannot perform actions like Bonnie. Bonnie can entice the general public by its ability to interpret the elderly’s facial expressions and give relevant responses, unfortunately, we cannot expect an app to blow you a kiss and give a hug.

4.Freedom Guardian

Description: A wearable medical alert watch specially designed for the seniors. It offers location tracking through GPS and Wi-Fi Positioning Systems. Alerts and weather forecast is also available to facilitate users' lives. Freedom Guardian incorporates functions including message reading aloud, flexible colour adjustment, and features such as the quick access to fast acting emergency button and up to 48 hours battery life. One of the biggest allures is its two-way communication feature, which enables the watch to perform similarly to a walkie-talkie and users can connect to emergency services or get non-emergency help. Additionally, there is a companion mobile app which allows their loved ones to send and receive SMS messages to communicate with the elderly, and keeps track of the elders' daily schedule and routine. Our competitive advantage: Other than the overlapping functions of Bonnie Portable and Freedom Guardian, we will outperform by the provision of an extra health shield, online medical consultation enabled by partnering with the telemedicine platform. Bonnie, Bonnie Portable and the supplementary app jointly proffer all-rounded physical and mental health protection to the seniors.

Operational Planning

1.Business Objectives

Our company aims to empower the graying population to get both socially and emotionally connected across generations through technology by offering intelligent yet uncomplicated products. Leveraging the availability of Big Data, machine learning and natural language processing, we would like to create a not only better but more self-determined, enriched and purposeful life for every elderly as we believe the use of technology should never be confined to one's age and capability.

The vision we would like to convey is that, '*Every older adult deserves a chance to embrace technology, to engage the new generation, and to keep enjoying the ride throughout the life journey.*'

To be explicit, there are two strategic objectives in our product. Primarily, we would like to enhance connections between the elderly and their family members. Secondarily, we would like to equip the elderly with the use of technology in daily life. Ultimately, both the quality of life of them and their carers could be ameliorated.

Several operational objectives are also established in order to achieve our ultimate goal and vision within the first five years.

1. To create a website and social media account for launching and the promotion of Bonnie by the end of 2021
2. To successfully launch our introductory product, Bonnie and its mobile app in 2022
3. To showcase Bonnie in Gerontech and Innovation Expo cum Summit (GIES) 2022
4. To successfully release Bonnie 2.0 and Bonnie portable in 2023
5. To achieve positive EBIT and 35% of gross margin by 2025, by targeting 5% of market penetration rate by 2025

2. Production Process

To satisfy objectives, various raw materials, equipment and technologies are essential for the initiation of the product development process.

The body of Bonnie is made of aluminum which is lighter than steel and iron in order to accommodate muscle weaknesses in the elderly. It is claimed that aluminum enables the robot outward appearance to be better looking with a high polish and the fragile parts to be protected (Matthews, 2019). And the limbs and wheels of Bonnie are expected to be made of plastic to lower production cost. As for the controller, a detailed computer program is crucial to give commands for the robots. Python is suggested to be the programming language adopted for machine learning such as speech recognition, natural language processing and emotion detection. Plus, a robot operating system (ROS) could be developed with the use of Python to facilitate robot application. A touchscreen with elderly friendly features will also be embedded in the middle of Bonnie. Alongside the mechanical parts and controller, the sensors which inform Bonnie with its surroundings are the omnidirectional cameras and microphones. A pair of speakers is necessary for Bonnie to communicate with its users as well.

As our vision is to tighten the connection between the elderly and younger generations, we highly value the life experience of our users which is also a critical role in the innovative design of the product (Huang & Liu, 2019). Therefore, older adults would be invited to participate in the prototyping and trial-production process of Bonnie in the future so that more insights about their preferences could be acquired to enhance the usability and users' satisfaction. In addition, prior to an extensive roll-out, a test market selling is adopted in the elderly homes to evaluate the viability of our products and user acceptance. There will be a succinct product test report to keep a record of the quality of every prototype and the status of the product development process for modification and correction. It is regarded as a final document to confirm the exact date of product release.

Automation is applied in the material handling and supervision during the production and delivery of our product. In low-cost countries such as China, by harnessing automation, the number of workers could be reduced from 80 to 15 and the raw material cost will decrease by 5% (Venkatasamy, 2019). Besides, a centralised system ensures the availability of real time data to shorten the changeover time and improve throughput. In the long run, it is believed automating our product lines enables us to achieve production efficiency and enhance profit margins.

3.Day-to-day Operation

At our initial production stage, professionals in the industry will be employed with full-time contracts. To make our objectives practical, the following talents and experts are essential,

- 1) Two to three manufacturing engineers who excel at including but not limited to Robot Operating System, 3D Computer-Aided Design/ Computer-Aided Manufacture, Internet of Things and robotics programming languages. They have also to perform an in-depth analysis of Bonnie prior to the design process. They will be responsible for product testing, development and maintenance in the long run. Experience with consumer electronics or wearable technologies is preferred.
- 2) One UX designer who is proficient at interaction design and the creation of easy-to-use and delightful user experience for our guardian buyers and elderly users. By identifying the pain points of our target segments, they will have to create a wireframe and coordinate with other developers. Being in charge of the design of product interfaces, functionality and usability, knowledge of user interface engineering, specially voice-controlled interface, is a plus.
- 3) One computer software engineer who is interested in mobile app development and website maintenance.
- 4) One supply chain and product manager who is experienced in production flow management to coordinate different stages from the purchase of raw materials to the delivery of the final product and inventory storage.
- 5) One customer relationship manager who is responsible for the implementation of marketing strategies and interaction with existing as well as past and potential buyers. They might have to help coordinate with our potential partners in the future as well.

In order to save the production cost, the product research and development will be based in Hong Kong while product production will be outsourced to other low-cost manufacturing countries such as China, India or Vietnam.

After approximately 5 years of operation, we will adopt crowdsourcing to further lower our future research and development cost. Through crowdsourcing, we can collectively mobilise knowledge and services from a large body of professionals, and design functions that are more accommodating in the long term operation. This way of operation is suitable especially for high-tech businesses like us, which requires high venture capital in R&D investment and demands continuous advancement in product. Crowdsourcing sites, such as InnoCentive, or social media platforms will be utilised to gather solutions for software updates or design refinement in which winning individual contributors will be rewarded for their ideas, technical solutions and knowledge provided (Chanal & Caron-Fasan, 20008). According to a recent research, a myriad of future designers revealed favourable and open attitudes towards designing robots that satisfy the needs of the elderly and improve their quality of life (Huang & Liu, 2019). As a result, we are confident to be able to promote freelance designers or engineers to create more values and possibilities for Bonnie.

4. Timeline

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2021	Confirm business plan & refine product concept		Technical specification & raw material sourcing			Prototyping & Trial Production Bonnie the Robot				(Bonnie the robot and app) Testing and Quality Check		Test Marketing Selling (TMS)
	Hire professionals & Seek an office for R&D			Bonnie App Create a wireframe			Bonnie App App infrastructure, design and development					Create a website & social media accounts
						Revamp supply chain organization, Approach factories and retailers						
						Set up production line and distribution channel						
2022	TMS → receive feedback	Evaluate initial customer acceptance, validate the viability of the products and financials		Early-bird sale to the elderly homes		Product roll-out				Bonnie 2.0 and Bonnie Portable Prototyping, infrastructure, And design		
				Approach new distribution channels Partnership arrangement			Bonnie 2.0 and Bonnie Portable Planning				GIES	
						Ongoing digital marketing						
2023	Bonnie 2.0 and Bonnie Portable Trial Production	Bonnie 2.0 and Bonnie Portable		Bonnie 2.0 and Bonnie Portable Roll-out		"#HappyAgeing" Marketing Campaign				Sales Evaluation Revamp business strategies		
	Alpha testing	Beta testing										
	Ongoing digital marketing	More focus on TV seasonal advertising				Ongoing digital marketing						
2024										50% Market Penetration Rate	35% Gross Margin	
						Future Product Research and Development						

Marketing Strategies

1. Distribution Plan

In order to enhance our product accessibility for our consumers, Bonnie is proposed to be for sale both online and offline. The distribution objectives are not only to gain access to our target segments and increase consumption rate, but also to strengthen the promotional support to Bonnie.

Large brands with chain stores which also match the purchasing behaviour of our targeted customers, specifically Fortress, will be our target retail stores. Since it shares similar visions which is to harness innovation to create an easier and happier life, we would like to piggyback on its stable customer base and sophisticated promotion strategies without spending too much cost on educating our potential consumers. Meanwhile, our product could also enable Fortress to further enhance its variety of innovative products locally originated. It is worth noting that among its 79 retail outlets in Hong Kong and Macau, there are 22 TechLife concept stores in which a wide range of smart gadgets such as robots are demonstrated.

Furthermore, cross-channel purchasing options, namely in-store purchase and buying online, are offered. Taking the consumption habits of Hong Kong people into account, a research has revealed that 75% of them preferred purchasing in physical stores while 97% believed they would research products in the shops in advance of buying them online (Yuen, 2020). As a result, we select Fortress as our main distribution channel because its convenient locations and provision of a more unified shopping experience would ensure Bonnie's market coverage and brand awareness within the shortest time possible.

After 5 years at which 35% of market penetration rate has been acquired, we will partner with the local telecommunication stores which could be our value-added resellers by offering our products such as Bonnie and Bonnie portable at a discount price together with their services or products like phones for the elderly and family mobile service plan. CSL is one of our prime target partners considering it is a partner of "Jockey Club Age-friendly City project" which aims to serve the needs of all ages. It could be a turnkey solution for the resellers to offer more customised bundling services for their clients while we could create opportunities to further facilitate the product sales. Moreover, by displaying Bonnie alongside their products with the same target end-users, the likelihood for the elderly or their caretakers to notice the product could be increased.

Online retailing would be our additional distribution channel in order to suit the trend in the purchasing behaviour of our targeted segment and to provide the best convenience to our buyers. 35% of the Hong Kong population aged from 35-44 and in total 23% of the whole population shopped online in 2016 (Consumer Council, 2016). And the number has been increasing ever since then. Therefore, we hope to provide an online store for both B2C and B2B customers to provide flexibility to their buying channels. Also, we also aim to increase exposure and attract both potential partners and customers through search engine optimisation, such as optimising keyword search. In addition, we hope to present user reviews and contents that answers questions from searchers on our website to the buyers for a more informed online purchase. And these will be discussed as one of our promotion strategies as well. Equivalently, our website would be useful for web rooming which allows the buyers to learn more about the product before their purchase in the physical store.

Promotion Tactics

Introduction stage: *Increase brand awareness and customer loyalty*

As a new commodity in the market, it is essential for Bonnie to enhance brand recognition.

A. Exhibition

To activate the product life cycle, Bonnie will be promoted on events like Gerontech and Innovation Expo cum Summit (GIES) which showcase the latest innovative products and technologies as a promising solution for the elderly. "The marketing power of exhibition" (2019) stated that over 80% of visitors obtain the authority and the influential power upon purchase. Therefore, with over 40 media agencies reported and 340,000 social media impressions, Bonnie could not only be introduced to international professionals but also arouse public awareness in the trade show.

B. Digital Marketing Campaigns

According to an internet report, there are 5.80 million active social users in Hong Kong (2020). Social media marketing firm Napoleon Cat stated that most Facebook and Instagram users belong in the 25 - 44 year-old-age groups, which both account for more than 60 % of the population respectively (Samurai, 2020). Since 98% of adults in Hong Kong tend to conduct online product research before buying in the stores (Yuen, 2020), the game plan for reaching our target segment will be deliberately invested in social networking platforms and the internet.

First, by enticing them into our social media channels, we could offer inspiring, useful and relatable articles that drive their attention and interest which could be exemplified by technology shortcuts for seniors, communication tips on how to care for them and how to strengthen family bonds. Also, when our products are launched, we could boost our word-of-mouth through which a user-generated content campaign ("#HappyAgeing") could be created on Instagram or Facebook to encourage buyers and users to post themselves sharing relishing family moments with Bonnie. Hashtags are provided for us to share the posts on our feeds by adding product descriptions and generating delightful interactions with them. Statista revealed that almost 70% of adults claim to upload selfies to social media (Brook, 2020). These could enable us to keep track of the struggles faced by the elderly and their carers, as well as foster intimate and authentic relationships with our potential buyers. An engaging community could therefore be established to promote our brand organically and enhance customer recognition.

Second, in order to further expand audience reach and strengthen brand credibility, search engine marketing such as paid search or pay-per-click could be adopted on Google Ads, Facebook Ads and Instagram Ads so as to enhance the brand visibility in front of our target consumers who are looking for elderly care services and products, or seeking companion care for their senior parent.

Third, we would like to bring the most value to our consumers. To establish customer loyalty, every of our consumers will receive a welcome email from us in which useful information, for instance, profound insights about how they could fully utilise Bonnie to take care of their elder parents will be acquired. Moreover, they will be informed timely of company announcements, new releases, updates of our service with a discount or special offer essentially when new products are launched.

C. Seasonality

Our promotion campaigns will be adjusted based on seasonality to acquire new customers. Bonnie's positioning is to offer companionship and optimise emotional wellness for the elderly who are distant to their family members. The sales are anticipated to be boosted before or during holidays such as Mother's Day and Father's Day. Apart from social platforms, more advertisements will be placed on a spectrum of mass media specifically television to increase turnover considering television has still remained the top media (92%) in Hong Kong (Wen, 2017) and over 30 % of adult consumers shop online the most often while they are watching TV (Yuen, 2020). Since filial piety is one of the pillars of the traditional Chinese culture, the main message the commercials delivered will be regarding how Bonnie helps children to express love, honoUr and respect to their elder parents.

D. Test market selling at elderly homes

The pandemic limits social activities, including the regular visits of the elderly in elderly homes. We will promote Bonnie to elderly homes by persuasion marketing. By offering 14 days free trials to elderly homes, we encourage word-of-mouth of our new product by enabling the elderly and their guardians to try-before-you-buy. From the perspective of the elderly homes, we can mitigate the existence of high pressure of workers in elderly homes as Bonnie can give out reminders and provide entertainment to elders. To enhance the conversion rate after the free trials, we give exclusive discounts to incentivise customers, with a larger markdown if there are customer referrals. Users' opinions can also be used for continuous refinement in our robot.

Growth stage: *Increase profits*

When acceptance and awareness has been increasingly established among consumers and the general public, we would like to enhance our competitiveness and product sales by augmenting new product features and support services through partnership.

A. Launching new features

In this stage, Bonnie 2.0 will be released as an update of the current version comprising new features namely the online dating and shopping services.

Moreover, in order to prolong the growth phase and continue our competitiveness, we plan to launch Bonnie Portable along with Bonnie 2.0, the complement to Bonnie so as to encourage repeat business and increase the usage of Bonnie with the ultimate objective to promote holistic well-being for the elderly including both physical and mental health. To celebrate the release of Bonnie Portable, existing buyers who successfully recommend either Bonnie or Bonnie portable to their peers and colleagues could enjoy a 25% discount on Bonnie portable. "Nielsen Global Online Consumer Survey" (2009) disclosed that peer recommendation is the most trusted channel among various marketing channels. By offering referral discounts, not only is Bonnie portable promoted, more new and valuable target consumers could be acquired to ensure consistent sales.

B. Partnership with telecommunication companies

Moreover, distribution channels are expected to expand by partnering with telecommunication stores. Currently, there are several telecommunication service plans that target the elderly. 'Smart Pama Service Plan' and 'Caring for the Elderly Service Plan' from CSL are the examples. We would like to collaborate with them to place Bonnie as an additional service. Bonnie will be sold at a discount price so that plan owners could choose to pay installments throughout the duration of the plan, similar to data plans that are tied with a mobile phone. The bundle encourages purchase of both products, and expands both telecommunication companies' and our company's customer base.

C. Partnership with online shopping platforms

Elderly are often observed to purchase necessities in brick-and-mortar stores, which is unsafe and inconvenient for the elderly who have physical disabilities. By partnering with online shopping sites, including HKTV mall and ParknShop, and food delivery platforms like Foodpanda, our elder users are able to make purchases through verbally instructing Bonnie. This enhances our coverage and reinforces Bonnie to be a well-rounded carer, on the other hand boosts the sales of our partnered shopping platforms. Services are anticipated to be available on the Bonnie 2.0 version.

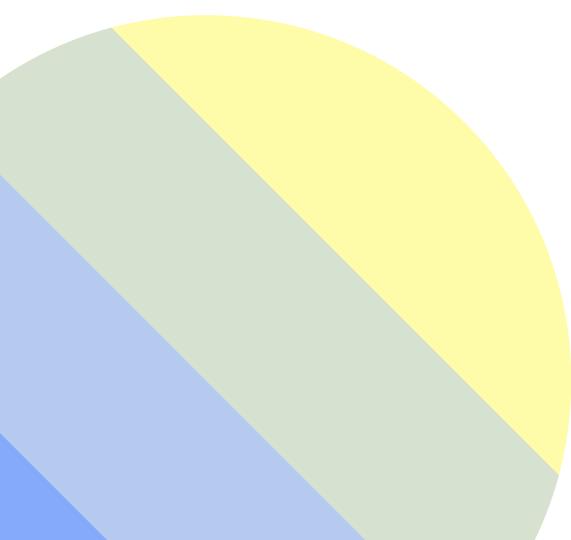
Maturity stage: *Become socially responsible and sustain our competitiveness*

It is expected sales will reach the peak upon maturity stage. Therefore, the stable annual cash inflow should enable us to donate a portion of our profits to organisations that cope with the elderly mental health issues, essentially Caritas HK/ HKFWS. We pledge to donate 5% of our profits to different organisations in accordance to their social impact. We enable transparency by showcasing the benefited elderly on TV and social media advertisements, given that the above are the most common types of entertainment for the elders and Gen X respectively. This manifests our CSR and frames our corporate image as being ethical and not solely aims at profits.

Financial model

We set the selling price at \$2,899. As we are geographically targeting the Hong Kong population in which there is a pursuit of luck in the traditional culture, '28' (「易發」) resonates with 'becoming wealthy easily' and '99' (「(長長)久久」) echoes eternity in Chinese. Furthermore, a competitive pricing analysis has been conducted. Although the price of some more advanced social robots namely Buddy and Zenbo ranges from HK\$4645 to \$11631, other similar social robots targeting the elderly such as The Miko 2 Robot are priced between HK\$ 1931 to \$2318. Considering over half of the primary caregivers spend approximately 10% of their monthly income, which is more than HK\$128 on caregiving for the elderly (You, Ho, & Sham, 2008), we would like to set a price that is profitable while able to relieve the economic burden of our main consumer segment.

With the number of working adults caregivers in 2022 estimated to be 53,000 (Lou, Nott, & Moncreiffe, 2019), if we assume the market penetration rate is at 3%, we will attain \$3,975,000 in the first year of sales. Revenues in the following years are calculated in a similar way and these are recorded in the pro forma income statement 2021-2025. Before the product roll-out, we estimate to put \$1 million and \$480,000 upfront into R&D and supplementary app development respectively. Each year, there will be an insurance expense of \$4,652 for basic coverage of a small company (Business Insurance Cost for Startups, 2021). Starting from 2022, we will launch our robot together with heavy advertising and the promotion expense is estimated to be at around \$990,000 each year. The app maintenance cost at \$76,800 every year is 16% of the initial app development cost (Kh. & A., 2020). Lastly, we came up with the professional fees of \$1,361,098 annually, which is estimated from the summation of median annual income of our potential workers: \$375,648 for 2 manufacturing engineers, \$328,206 for one UX designer, \$360,000 for one computer software engineer, \$270,084 for one supply chain manager and \$162,960 for one customer relationship manager. Hopefully, we will first achieve positive EBIT in 2024 after 3 years of product roll-out.



We surmised that the current business environment will provide us an once-in-the-life-time opportunity to start a business with extremely high upfront development costs. To alleviate the economic downturn struck by the pandemic, the Federal Reserve has made an emergency 100 basis points cut in the fed fund rates. In response to U.S.' rate cut, HKMA lowered its base rate by 64 bsp to 0.86% on 16th March, 2020 (Trading Economics, 2020). Hong Kong is well-known for its low interest rate which favours business activities, under COVID-19, our borrowing cost will be foreseeably and continuously shed. If possible, we can secure fixed-rate loans from financial institutions, so as to seize the chance of low interest rate and sustain a low rate even if the economy improves and interest rate rebounds.

Estimated first year's (2022's) market size

	2018	2040	2060
Eldercare recipients	342,000	729,000	890,000
Working adults caregivers	45,000	89,000	97,000

Assumptions

Price (HKD)	2899			
Per year growth rate in number of working adults caregivers	0.0444			
<i>Calculation</i>				
Number of working adults caregivers	53,000	55,000	57,000	59,000
Market Size (HKD)	153,647,000	159,445,000	165,243,000	171,041,000

Estimated revenue in 2022-2025

<i>Assumptions</i>	2022	2023	2024	2025
Price (HKD)	2899	2899	2899	2899
Market penetration rate	0.0300	0.0400	0.0450	0.0500
<i>Calculation</i>		2022	2023	2024
Number of consumers	1,590	2,200	2,565	2,950
Potential Revenue (HKD)	4,609,410	6,377,800	7,435,935	8,552,050

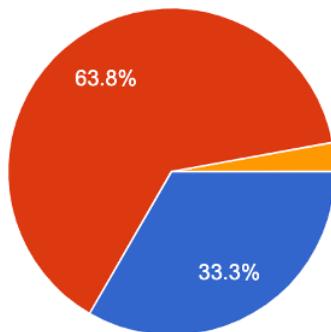
Pro Forma Income Statement - 2021 - 2025

HKD\$000	2021	2022	2023	2024	2025
Revenue	0	4,609,410	6,377,800	7,435,935	8,552,050
COGS	0	3,687,528	4,783,350	5,205,155	5,558,833
Gross Profit	0	921,882	1,594,450	2,230,781	2,993,218
Gross Margin	-	20%	25%	30%	35%
Operating Expenses					
Advertising & Promotion	0	993,750	990,000	990,000	990,000
Insurance	4,652.34	4,652.34	4,652.34	4,652.34	4,652.34
App maintenance cost	0	76,800	76,800	76,800	76,800
App development cost	480,000	0	0	0	0
R&D	1,000,000	0	0	0	0
Professional Fees	1361098	1361098	1361098	1361098	1361098
Total Expenses	2,845,750.34	2,436,300	2,432,550	2,432,550	2,432,550
EBIT	-2,845,750.34	(1,514,418)	(838,100)	(201,770)	560,667

Appendix

在以下三項描述，你認為自己比較貼合哪一項？Which of the following best describes you?

105 responses

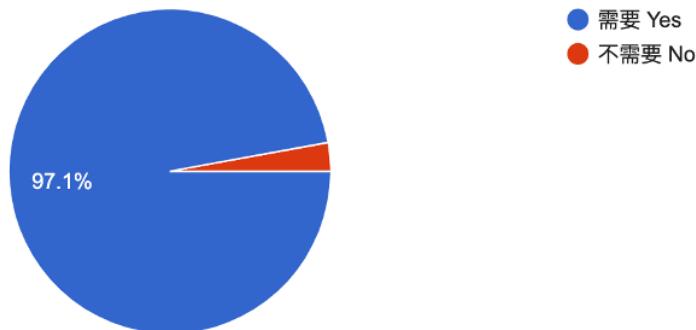


- 與長者同住，或經常探望長者，因此能全面照顧自己長者的生活和心理需要。 I live with my elderly, or spend much time with them, so I can extensively take care of their physical and mental health.
- 希望關心長者，但因工作繁忙或家庭及經濟上的壓力，而忽略了自己長者的需要。 Under the economic pressure and time constraint, it is regrettable that I have...
- 並不關心自己的長者。 I do not care about my elderly at all.

隨着科技發展，你認為長者是否需要進一步了解科技，以提升生活水平以及追上時代的節奏？

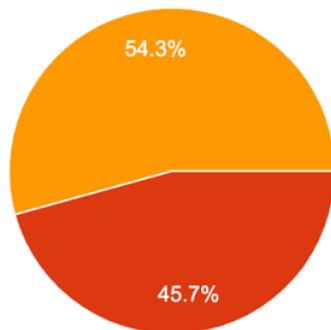
Do you think we should promote usage of technology by the elderly, given the convenience it brings and its rising popularity and acceptance?

105 responses



你有接觸過專責照顧長者的家居機械人嗎？ Have you heard of carebot for eldercare?

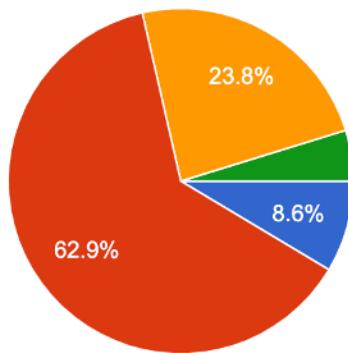
105 responses



- 已購買 I have bought it
- 聽聞過但沒有購買 I have heard of it but didn't purchase it
- 沒有聽聞過 I have never heard of it

若有一部家居機械人（專責照顧長者的心理健康：例如定時提醒服藥，新聞資訊以及天氣提醒，可供視像通話，與長者聊天及全聲控），定價為\$2899，你會認為..... Imagine a carebot which focuses on healing the elderly's mental health and provides functions like reminders on medication, news and weather forecast, video-calling, voice control and can chat with the elderly. If it is priced at \$2899, what do you think?

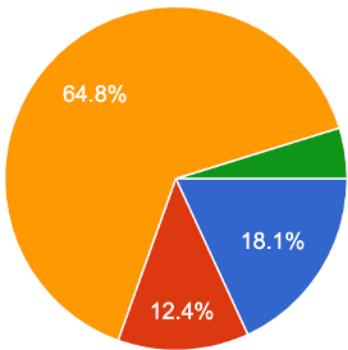
105 responses



- 價錢太低，質疑其功能，耐用性及信譽
The price is too low, I doubt its function, durability and reputation.
- 價錢剛好，符合自己預算並會購買
The price is just right, it fits my budget and I will go for it.
- 價錢偏高，需要深思熟慮才會購買
The price is quite high, it demands careful...
- 價錢太高，不會購買
The price is too high and I will not buy it.

當購買專責照顧長者的家居機械人時，你會最考慮以下哪項因素？Which of the following factors would you give primacy to when purchasing a carebot for eldercare?

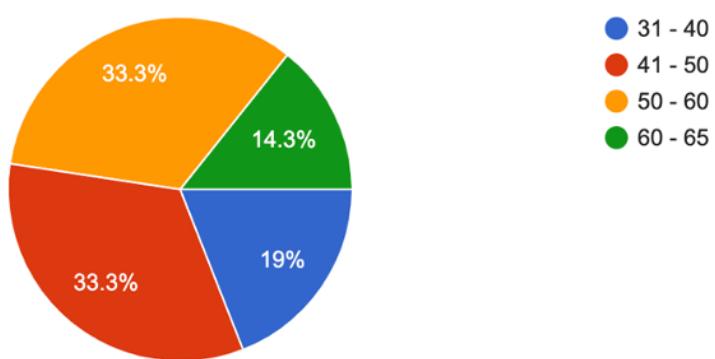
105 responses



- 功能多樣及實用 Diversified and useful functions
- 長者喜好 The elderly's preference
- 操作簡便以助長者輕鬆上手 Simple manipulation to assist the elderly to get their hands on technology
- 價格效能 (根據它的價格所能提供的性能的能力) Cost-effectiveness

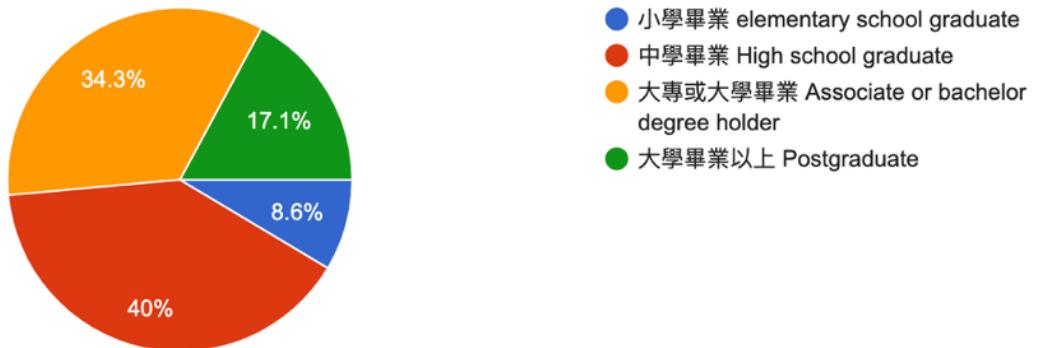
你的年齡是 What is your age?

105 responses



你的教育程度是 What is your education level?

105 responses



References

- Bai, X., Yang, S., Wang, F. L., & Knapp, M. (2017). Social Support and Sense of Loneliness in Solitary Older Adults. Emerging Technologies for Education Lecture Notes in Computer Science, 326-330. doi:10.1007/978-3-319-52836-6_34
- Brook, C. (2020, August 05). User Generated Content Statistics: UGC VS Professional Content. Retrieved January 31, 2021, from <https://hi.photoslurp.com/blog/user-generated-content-statistics/>
- Chanal, Valérie & Caron-Fasan, Marie-Laurence. (2008). How to invent a new business model based on crowdsourcing : the Crowd Spirit ® case. HAL, Post-Print. Business Insurance Cost for Startups. (n.d.). Retrieved January 12, 2021, from <https://howmuch.net/costs/business-insurance-for-startups-cost>
- Chui, E. (2008). Ageing in Place in Hong Kong—Challenges and Opportunities in a Capitalist Chinese City. Ageing International, 32(3), 167-182. doi:10.1007/s12126-008-9015-2
- HONG KONG DIGITAL MARKETING 2020: Insight: AsiaPac - Digital Marketing Agency Asia. (2020, June 5). Retrieved January 12, 2021, from <https://www.asiapacdigital.com/digital-marketing-insight/hk-digital-marketing-2020>
- Hong Kong Population Projections - statistics.gov.hk. (n.d.). Retrieved January 30, 2021, from <https://www.statistics.gov.hk/pub/B1120015072017XXXXB0100.pdf>
- Hong Kong 2016 Population By-census - Thematic Report : Older Persons. (2016). Retrieved January 12, 2021, from <https://www.statistics.gov.hk/pub/B11201052016XXXXB0100.pdf>
- Huang, & Liu. (2019). Acceptability of Robots to Assist the Elderly by Future Designers: A Case of Guangdong Ocean University Industrial Design Students. Sustainability, 11(15), 4139. doi:10.3390/su11154139
- Itzik Amiel. (2016, May 24). The Secret of the “Propinquity Effect”. i-Zik. <http://itzikamiel.com/propinquity-effect/>
- Jennifer Creery. (2018, December 2). ‘What kind of life is this?’: the unseen reality of Hong Kong’s carers. <https://hongkongfp.com/2018/12/02/kind-life-unseen-reality-hong-kongs-carers/>
- Kh., N., & A., E. (2020, January 3). How much does it cost to make an app for your business in 2021. Retrieved January 12, 2021, from <https://www.cleveroad.com/blog/how-much-does-it-cost-to-create-an-app>

References

- Knott, K. (2020, May 16). How social isolation is making the elderly feel even more alone. Retrieved January 12, 2021, from [beghttps://www.scmp.com/lifestyle/health-wellness/article/3084501/social-isolation-adds-loneliness-elderly-charities-reach](https://www.scmp.com/lifestyle/health-wellness/article/3084501/social-isolation-adds-loneliness-elderly-charities-reach)
- Lam, C. Y., & Fong, B. Y. (2020). “Ageing in place” - social and health implications in Hong KongCarina Y.H. Lam. Retrieved January 12, 2021, from <http://weblib.cpce-polyu.edu.hk/apps/wps/assets/pdf/cw20200101.pdf>
- Lingnan University. (2020, June 19). Survey finds over 60% senior citizens are willing to try online medical consultations. <https://www.ln.edu.hk/research-and-impact/research-press-conferences/survey-findings-on-video-medical-consultation-for-elderly>
- Lou, V., Nott, F., & Moncreiffe, E. (2019, May). Eldercare Hong Kong - The Projected Societal Cost of Eldercare in Hong Kong 2018 to 2060. Retrieved December, 2020, from <https://retailbank.hsbc.com.hk/media/3421/the-cost-of-eldercare-report-english-8may-v5.pdf>
- Matthews, K. (2019, August 19). Materials to evaluate for designing and building robust robots. Retrieved January 31, 2021, from <https://www.therobotreport.com/materials-rugged-robot-design-building/>
- Nielsen Global Online Consumer Survey - Trust, Value and Engagement in Advertising (Rep.). (2009, July). Retrieved<https://www.nielsen.com/wp-content/uploads/sites/3/2019/04/trustinadvertising0709.pdf>
- Ollie Campbell. (2015). Designing For The Elderly: Ways Older People Use Digital Technology Differently. Smashing Magazine. <https://www.smashingmagazine.com/2015/02/designing-digital-technology-for-the-elderly/>
- Palmarini, N., & Fraser, H. (2020, March). Loneliness and aging. Retrieved January 12, 2021, from <https://www.ibm.com/downloads/cas/RZO0JVMN>
- Revel Systems. (n.d.). The Generational Breakdown of Purchasing Patterns. Revel Systems. <https://revelsystems.com/resources/generational-breakdown-purchasing-patterns/>
- Ruby Cemental. (2019). 9 Reasons Why Reminiscing Can Benefit Seniors. Caring Senior Service. <https://www.caringseniorservice.com/blog/9-reasons-why-reminiscing-can-benefit-seniors>

References

- The marketing power of exhibitions. (2019, June 21). The Marketing Power of Exhibitions. <https://eeaa.com.au/what-we-do/our-campaigns/the-marketing-power-of-exhibitions/#:~:text=Exhibitions%20%20%E2%80%93often%20known%20as%20' expos,products%20or%20services%20on%20show>.
- Trading Economics. (2020, March 16). Hong Kong Interest Rate. Retrieved January 30, 2021, from <https://tradingeconomics.com/hong-kong/interest-rate>
- Samurai, T. (2020, December 21). Influencer Marketing In Hong Kong. Retrieved January 31, 2021, from <https://www.infocubic.co.jp/en/blog/hong-kong/influencer-marketing-hong-kong/>
- Shell Point Retirement Community. (2012, August 13). 10 Shocking Statistics About Elderly Falls. Senior Health & Wellness Blog.
- Venkatasamy, J. (2019, November 26). Automation and its Impact on Cost Structure. Retrieved January 31, 2021, from <https://www.beroeinc.com/article/automation-and-its-impact-on-cost-structure/>
- Wen, C. (Ed.). (2017, May 30). TV Remains As Top Media Channel In Hong Kong. Retrieved January 12, 2021, from <https://www.nielsen.com/hk/en/press-releases/2017/tv-remains-as-top-media-channel-in-hong-kong/>
- Yew, G. (2020, May 23). Trust in and Ethical Design of Carebots: The Case for Ethics of Care. Retrieved January 12, 2021, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7245509/#Fn11>
- You, J. H., Ho, S. C., & Sham, A. (2008). Economic Burden Of Informal Caregivers For Elderly Chinese In Hong Kong. Journal of the American Geriatrics Society, 56(8), 1577-1578. doi:10.1111/j.1532-5415.2008.01778.x
https://www.researchgate.net/publication/23274388_Economic_burden_of_informal_caregivers_for_Chinese_Elderly_in_Hong_Kong
- Yuen, S. (2020, February 28). Report: Unified channels key to engaging Hong Kong's changing shopping habits. Report: Unified Channels Key to Engaging Hong Kong's Changing Shopping Habits. <https://www.marketing-interactive.com/report-unified-channels-key-to-engaging-hong-kong%E2%80%99s-changing-shopping-habits>