SMU SINGAPORE MANAGEMENT UNIVERSITY | **Centre for Research on Successful Ageing**

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DIGITAL LITERACY AMONG OLDER ADULTS IN SINGAPORE

SUMMARY OF KEY FINDINGS AND RECOMMENDATIONS

Key findings

Preliminary analysis suggests the following key points:

1. **Both structural and attitudinal barriers exist with regards to the use of technology among older adults in Singapore.**

   a. Smartphone ownership (92.03%) ranks highest among respondents, followed by computer/laptop (43.11%) and tablet (34.12%) ownership.

   b. 55.82% of respondents own 2 or more digital devices, compared to 38.1% who own 1 and 6.08% who own none.

   c. Respondents who are older (aged 72-76), female, reside in HDB 1-3 Room flats, and are less educated own fewer digital devices than their younger and more affluent peers.

   d. Respondents who owned 2 or more devices were significantly more likely to feel that using smartphones could help them accomplish more, compared to respondents who owned fewer devices. This suggests that perceptions of the usefulness of technology may be an important factor shaping digital literacy.

2. **Technologies are predominantly used by older adults for leisure activities, rather than for functional purposes, possibly due to concerns over safety.**

   a. A majority of respondents (at least 75%) have used leisure applications on their devices, such as browsing social media or watching videos online.

   b. On the other hand, the use of applications for more functional purposes like managing bank accounts or accessing telehealth services is less popular, with only 10.49% of respondents using telehealth services for instance.

   c. Respondents who felt confident that they could protect themselves from scams were more likely to use functional applications like online banking. 60.51% of respondents who at least slightly agreed that they were confident in protecting themselves from scams and phishing attempts used mobile banking applications, compared to just 30.70% of those who did not agree.

3. **The social environment can be an important factor shaping the adoption of technology.**

   a. 93.66% of respondents agreed that they can seek help from someone should they face difficulties using their digital device.

   b. On average, respondents were more confident about learning how to use new digital technologies (e.g., digital device, digital application, social media platform, website page) with assistance from others, as opposed to on their own.

   c. Respondents primarily seek help from their children (93.35%), friends (79.66%), and co-workers (67.23%) when they want to learn how to use a new digital device or application.

Policy recommendations

1. Lower-income older adults remain a vulnerable group in regards to digital ownership, an important factor associated with mental well-being. This group may benefit from greater

support in identifying and applying for existing public schemes such as DigitalAccess@Home, Public Rental Scheme, and ComCare Assistance that provide households with subsidized broadband and digital devices (Tham, 2023). In addition, more digital devices can be made available for public loan in neighbourhood settings, such as libraries, community centres (CCs) and residents' committees (RCs).

2. Older adults who are more isolated and lacking in social support and digital skills may lack the necessary social resources to rely on in learning how to use new technologies. More can be done to provide such older adults with opportunities to learn new technological skills. Existing initiatives by the government in this regard such as the Seniors Go Digital program are helpful, but should also be supported by ground-up initiatives including programs run by non-governmental organizations (NGOs) like the Retired & Senior Volunteer Programme (RSVP). Neighbourhood communities should also be encouraged to step in and reach out to isolated older adults to help them learn new technologies.

3. Educational efforts to encourage the use of technology among older adults should target improving perceptions of the use of technology, as well as equip older adults with the skills needed to protect themselves from scams and phishing attempts.

INTRODUCTION

Singapore stands as the fourth most digitally competitive country, after Denmark, USA, and Sweden, in the latest edition of the IMD World Digital Competitiveness Ranking (IMD World Competitiveness Center, 2022). This global ranking measures the capacities of 63 nations to adopt and explore digitally transformative practices across government, industry, and wider society. Among households in Singapore, an astounding 99% have Internet access and 92% have computer access (Infocomm Media Development Authority, 2023). Even within the eldest surveyed cohort, proportions of smartphone usage have risen from 28% in 2017 to 48% in 2021 among resident Singaporeans aged 75 and above, and the proportion of Singaporeans using the internet has risen from 15% in 2017 to 52% in 2021 (Infocomm Media Development Authority, 2023).

While older adults have made significant digital gains in recent years, they remain outpaced by younger generations in terms of digital ownership, usage, and literacy. National and global statistics may be misleading, however, as rising proportions of digital ownership and Internet accessibility may not necessarily correspond with levels of digital literacy. In other words, there is more to the digital divide than meets the eye. The reality for some older adults may be one of shallow participation in a pool of rich social, cognitive, and health-related resources in digital spaces. Thus, adopting a digital literacy lens may be useful for measuring how far Singapore has come in terms of digital transformation within society and for identifying what more needs to happen to ensure that older adults are able to reach a certain level of digital proficiency that affords them meaningful opportunities to stay socially connected and cognitively engaged.

The Ministry of Health's *2023 Action Plan for Successful Ageing* represents a renewed pledge to carry out the goals set forth in the original 2015 action plan. It centres on three interrelated themes – *care, contribution, and connectedness* – otherwise known as the 3Cs. In this co-created, refreshed action plan, digital connectedness represents a key driver and facilitator of successful aging in Singapore. Some of the key concerns and sentiments expressed by older adult Singaporeans include a lack of digital literacy, and uncertainties about how to stay connected with loved ones, find jobs, and remain of value to society (Ministry of Health, 2023). Public engagement sessions made possible by the *Forward Singapore* movement have strengthened the nation's social compact by addressing a balance of priorities concerning digitalization – ensuring that Singapore remains "digital first, but not digital-only" such that those who need more time and resources to gain digital skills are not left behind (Wong, 2023).

In light of MOH's renewed national blueprint for successful ageing, this research brief on digital literacy aims to examine how digitally connected and proficient older adult Singaporeans are at present. It is through this preliminary examination that we hope to provide some indication of how to better support older adults in building their digital literacy, and ultimately safeguard their overall well-being.

STUDY

In this research brief, we aim to examine older adults' digital literacy and provide an overview of digital ownership, usage, and perceptions on learning how to use new digital technologies. Specifically, we will look at older adults':

1. Ownership of digital devices
2. Usage of digital applications and functions
3. Perceptions on ease of use, confidence, and social support in learning to use new digital technologies

4. Effects of the use of technology and on mental well-being and social isolation

To study the above, this research brief utilizes data from the Singapore Life Panel© (SLP), a population representative monthly online survey of Singaporeans and their spouses aged 57 to 76 in 2022 that has been conducted since 2015 (see Vaithianathan et al., (2018) for details regarding methodology). The findings in this report are based on the survey data from November 2022. In total, 6,548 respondents completed the November survey.

FINDINGS

Ownership of digital devices among older adults in November 2022

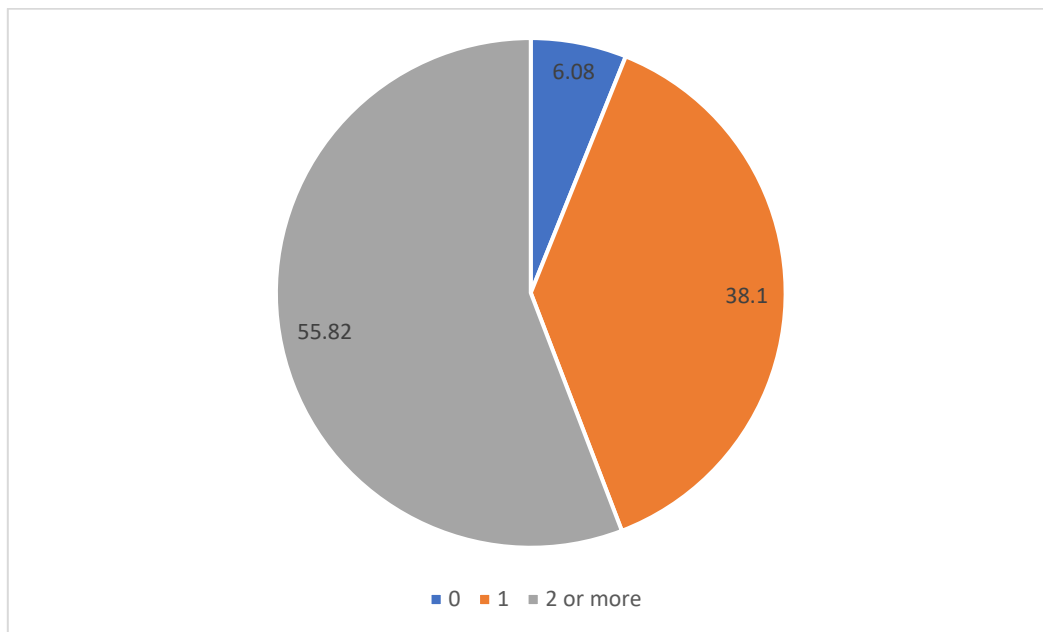*Figure 1: Proportion (%) of respondents who own digital devices*
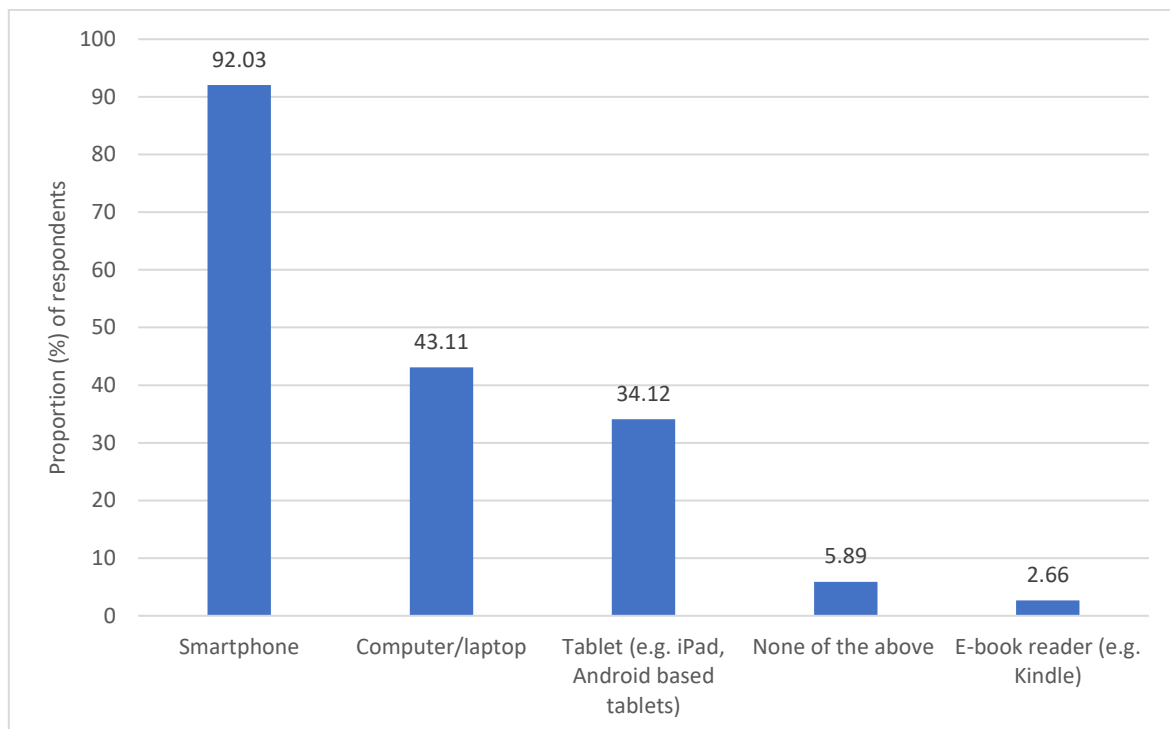
Figure 1 above illustrates a breakdown of digital ownership among older adults in November 2022. Respondents were asked if they own a smartphone, tablet (e.g., iPad, Android based tablets), e-book reader (e.g., Kindle), computer/laptop, or none of the above. In general, digital ownership was high among respondents, with 92.03% of respondents owning a smartphone, 43.11% owning a computer/laptop, and 34.12% owning a tablet. Only 5.89% of respondents reported that they did not own any digital devices. Given rapid technological innovations, future surveys on digital ownership may include a wider range of digital devices, such as wearables (e.g., smart watches).

Figure 2: Proportion (%) of respondents who own 0, 1, or 2 or more digital devices

Based on the question above, we also calculated the proportions of respondents who own either 0, 1, or 2 or more devices based on the devices listed in Figure 1 previously. As shown in Figure 2 above, a majority (55.82%) of respondents own 2 or more digital devices, followed by 38.1% who own 1, and 6.08% who own none.

Delving deeper into digital ownership among older adults, we sought to understand the kinds of factors that may shape the number of devices that our respondents are likely to own. We first examined how structural factors, such as demographic factors, may be correlated with the number of devices that our respondents owned. To do this, we examined the demographic distribution of respondents who own 0, 1, or 2 or more digital devices (see Table 1). Despite the increasing multifunctionality and seamlessness of digital technologies, affording users access to many applications and functions through a single digital device (such as a smartphone), it is likely that a digital divide still exists. Older adults with lower socio-economic status (SES) may not own as many digital devices as others with greater resources. Indeed, the preliminary findings of this research brief suggest that, on average, respondents who are older (aged 72-76), female, reside in HDB 1-3 Room flats, and are less educated own fewer digital devices than their younger and more affluent peers (see the full demographic breakdown in Table 1 below).

Table 1: Demographic distribution of respondents who own 0, 1, 2 or more digital devices

Variable	Proportion of respondents who own digital devices			Test for significant differences[1]
	0	1	2 or more	
Age*				
57-61 (n=1903)	3.73	33.11	63.16	Age is found to be negatively correlated with the ownership of devices, with younger respondents being more likely to own more devices than older respondents (p < .001)
62-66 (n=1977)	3.84	39.50	56.65	
67-71 (n=1475)	6.98	39.80	53.22	
72-76 (n=1081)	12.12	42.74	45.14	
Gender*				
Male (n=3108)	4.79	34.65	60.55	Men are found to own more devices on average than women. (p < .001)
Female (n=3435)	7.22	41.22	51.56	
Marital Status				
Married (n=5077)	4.92	38.21	56.86	Respondents who are widowed are found to own significantly fewer devices compared to Married, Single, and Divorced respondents (p < .001). No other significant differences are found.
Single (never married) (n=605)	10.08	30.41	59.50	
Separated (n=30)	13.33	46.67	40.00	
Divorced (n=346)	5.20	40.17	54.62	
Widowed (n=490)	13.27	44.49	42.24	
Housing Type*				
HDB 1-3 Room (n=1166)	12.78	49.40	37.82	Respondents in more affluent housing owned, on average, a greater number of devices (p < .001).
HDB 4-5 Room or Executive Flat/Condominium (n=3791)	5.35	40.07	54.58	
Private Apartment/Property (n=1061)	1.04	18.19	80.77	
Education*				
Primary/None (n=1385)	16.53	61.01	22.45	Respondents with higher education owned, on average, a greater number of devices (p < .001).
Secondary (n=2656)	4.89	44.24	50.87	
Post-secondary without tertiary (n=1314)	2.28	23.74	73.97	
Post-secondary with tertiary (n=1010)	0.40	11.19	88.42	

Primarily, we observed that proportions of digital ownership decreased with age. Among the oldest respondents (aged 72-76), 12.12% did not own any digital devices, compared to only 3.73% of the youngest respondents (aged 57-61). In terms of gender, a higher proportion of females (7.22%) relative to males (4.79%) reported no digital ownership. In terms of housing type, the proportions of digital ownership were lowest among respondents living in 1 to 3-room HDB flats and highest for those living in more affluent housing types, such as private apartments or property. In addition, we observed relatively lower proportions of digital ownership at lower education strata. It is concerning that

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[1] To test for significant differences in the number of devices owned according to demographic group, Pearson's correlation coefficient, Oneway ANOVA, and independent sample T-tests were used to determine significant correlations or differences in the number of digital devices owned (a categorical variable is presented in the table above for ease of comprehension, while the number of devices owned was used for the purposes of conducting the statistical tests of significance).

16.53% of respondents with primary/no education reported no digital ownership, compared with just 0.40% of those with university degrees (post-secondary with tertiary education). While most demographic groups were more likely to own 2 or more digital devices (rather than 1 or 0 devices), older adults residing in HDB 1-3 Room flats, and have primary/no education were more likely to own 1 or 0 digital devices (rather than 2 or more). We did not find significant trends in relation to marital status.

Figure 3. Attitudes toward smartphones by number of digital devices owned
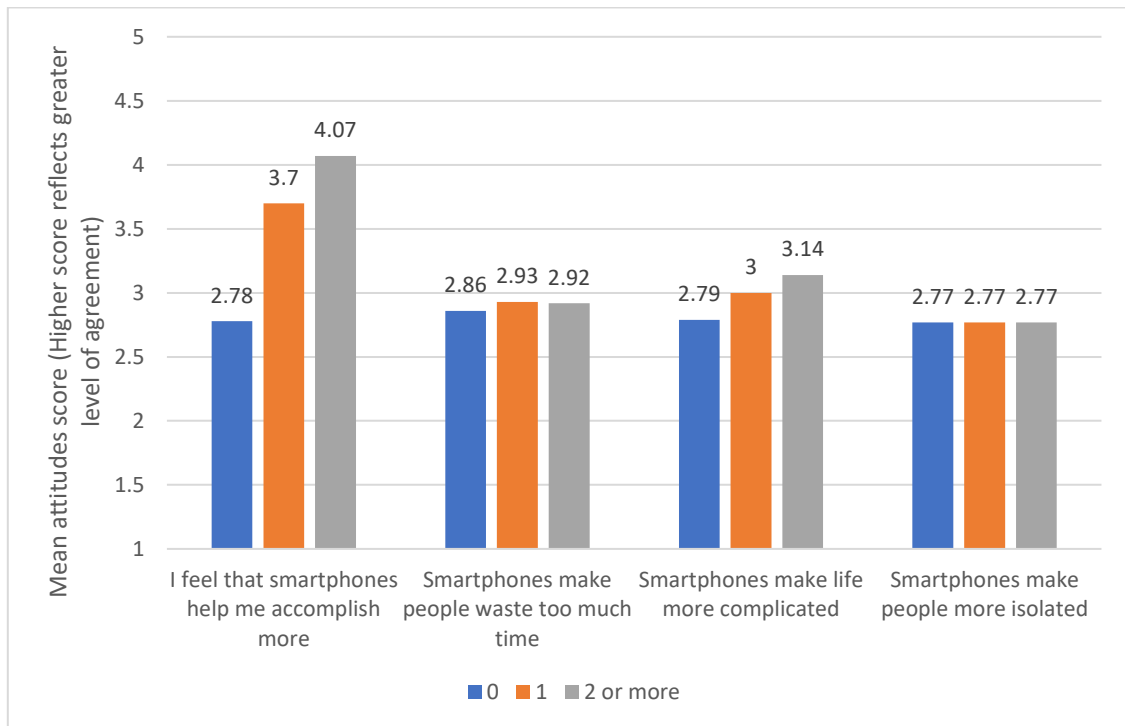
We also sought to examine if the subjective opinions that respondents held with respect to the use of technology might be related to the number of devices that respondents own. In particular, we asked respondents to rate their level of agreement with four statements regarding their attitudes towards smartphones. The chart above displays the level of agreement that respondents had with each statement, with respondents grouped according to the number of digital devices they own ('0', '1', or '2 or more').

Based on Kendall's tau-b tests, we observed a statistically significant (p<0.05) relation between respondents' attitudes towards the first statement ("I feel that smartphones help me accomplish more") with regards to the number of digital devices that they own. Respondents who own more digital devices appear to have a more favourable attitude towards smartphones helping them to accomplish more. In terms of respondents' attitudes toward smartphones scores, 32.55% of variation can be explained by the number of digital devices that they own. This potentially suggests that having a more positive view with respect to the usefulness of technology in helping them to complete tasks or 'accomplish more' may be an important factor shaping whether our respondents would be likely to own more devices.

However, we did not find statistically significant differences regarding the remaining 3 statements, in particular whether smartphones or technology may be a waste of time, may make life more complicated, or may make people more isolated. Thus, these results suggest in terms of subjective

factors shaping the number of devices older adults are likely to own, perceptions regarding the usefulness of owning such devices may be the most important factor.

Usage of digital applications and functions

Figure 4: Proportion (%) of respondents who have successfully used a certain type of digital application or function[2]
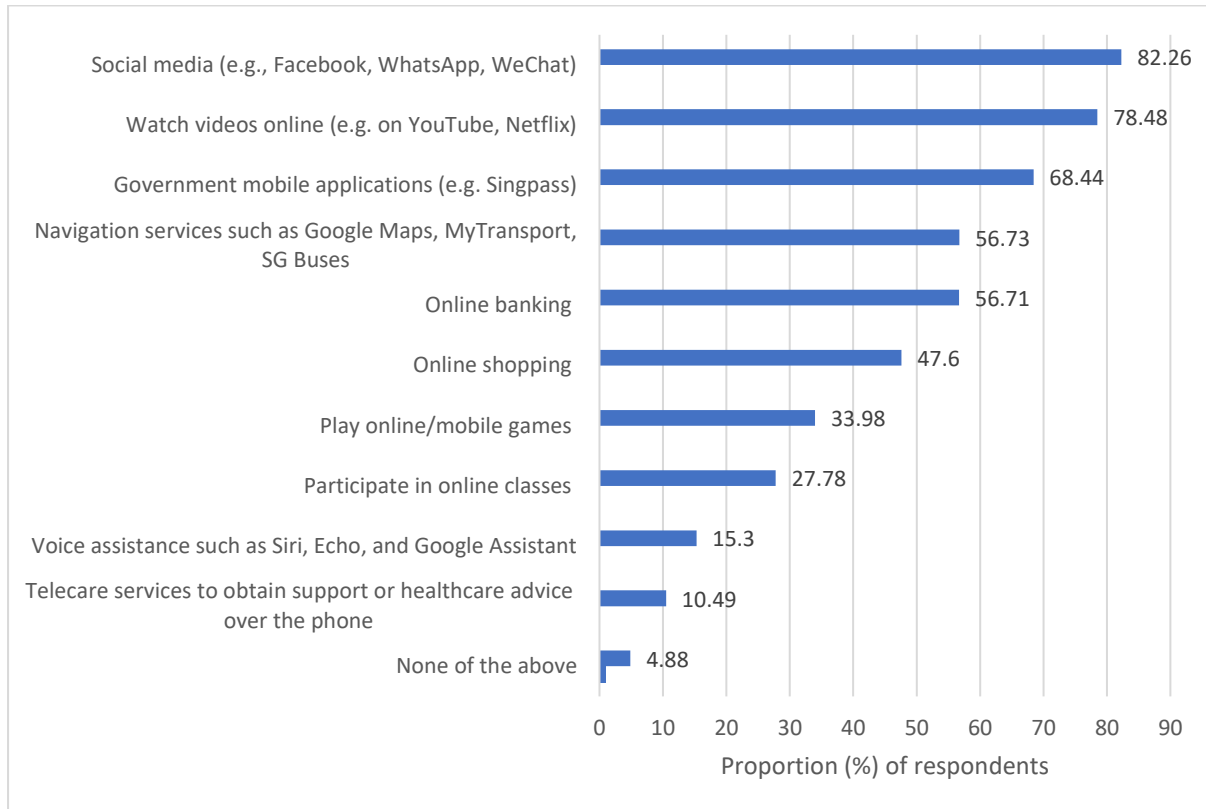

To examine older adults' digital usage, we gave respondents a non-exhaustive list of digital applications and functions and asked them to select the ones that they have successfully used (see Figure 4). More than half of respondents reported that they have successfully used the following digital applications and functions: social media, watch videos online, government mobile applications, navigation services, and online banking. Other digital applications and functions such as online shopping, play online/mobile games, participate in online classes, voice assistance, and telecare services were less successfully used by respondents. Finally, about 1 in 20 respondents indicated that they have not successfully used any of the listed digital applications and functions.

These findings suggest that applications (and by extension, digital devices) are largely used by older adults in Singapore for leisure purposes, such as social networking or browsing online entertainment (e.g., watching Youtube). On the other hand, the use of applications for more functional purposes like managing bank accounts or accessing telehealth services is less popular, with only 10.49% of respondents using telehealth services for instance. One likely barrier preventing older adults from using such services is the fear of getting 'scammed', an issue that has been especially prevalent lately. This is unfortunate as such services can be useful to older adults. As such, these findings suggest that

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[2] Proportions are calculated out of respondents who stated that they own a smartphone.

more can be done to prepare and equip older adults with the necessary skills to utilize such online services, and to do so safely.

Figure 5: Proportion (%) of respondents who have successfully used a certain number of digital applications or functions[3]
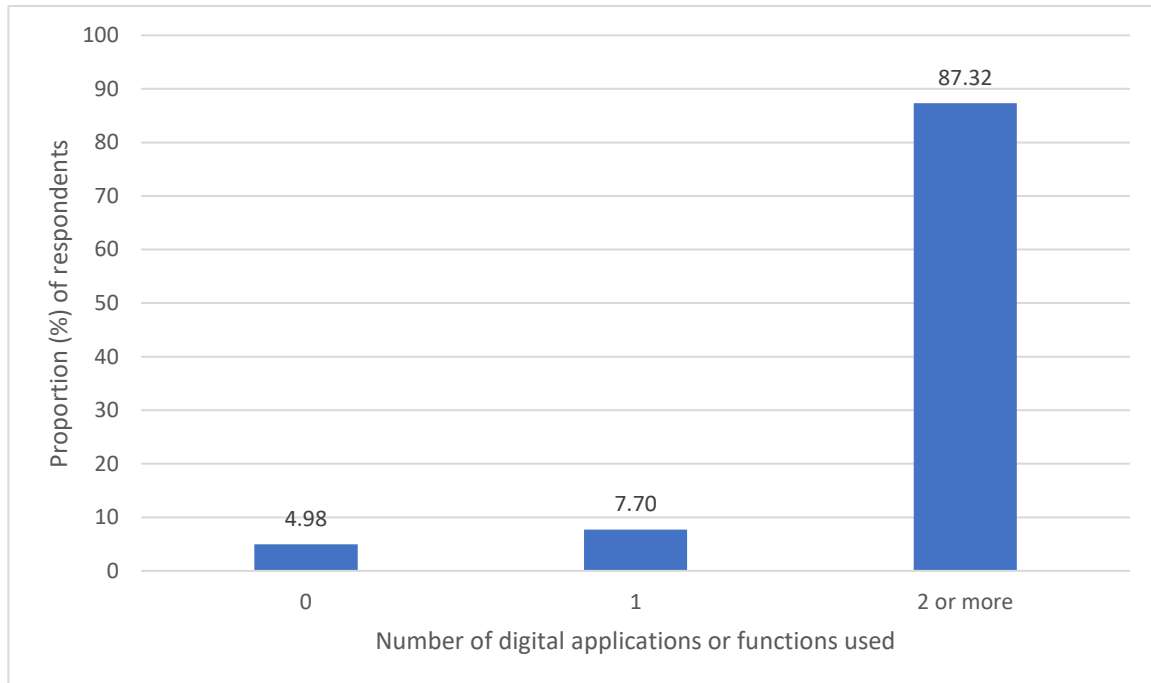
Based on the question discussed above, we also calculated the proportion of respondents who had successfully used 0, 1, or 2 or more digital applications or functions. As shown in Figure 5 above, 87.32% of respondents indicated that they have successfully used at least 2 digital applications or functions. While this is encouraging as it indicates that a large majority of our respondents have managed to use several of these functions, it remains concerning that 4.98% of respondents, or nearly 1 in 20, have not successfully used any digital applications or functions, and an additional 7.70% of respondents have only used 1 digital application or function, suggesting the need to examine the underlying factors that may help to close this gap.

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[3] Proportions are calculated out of respondents who stated that they own a smartphone.

Figure 6: Proportion (%) of respondents who have successfully used government mobile applications[4]
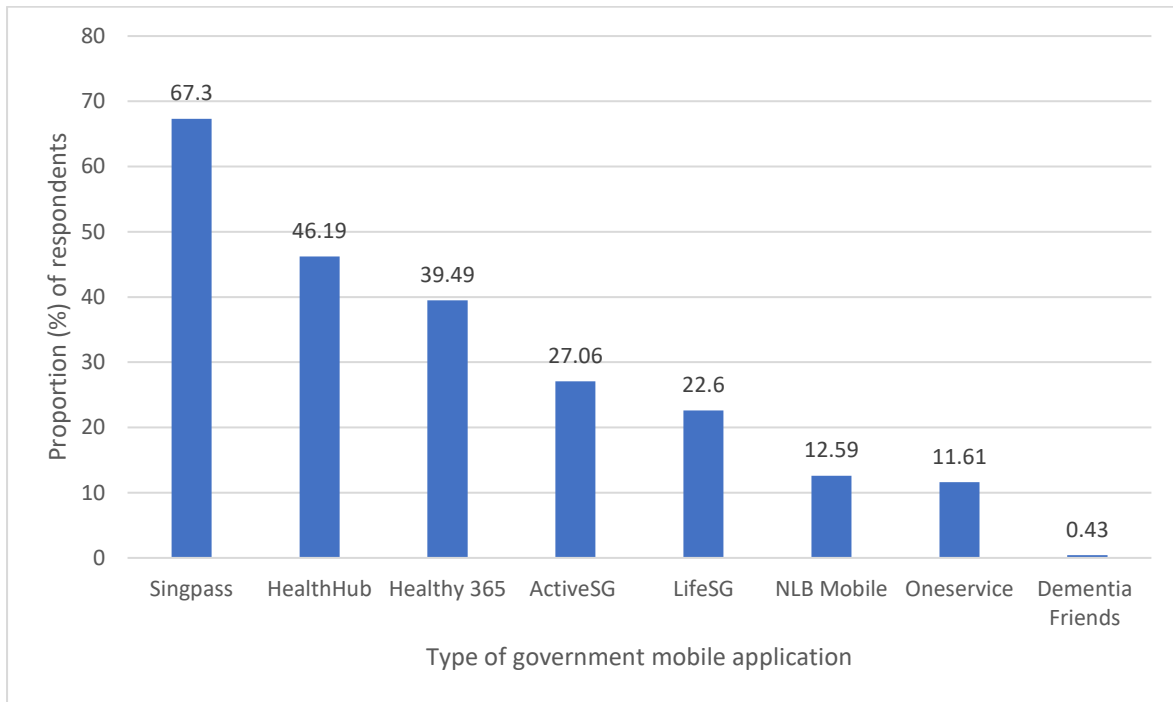

To examine older adults' digital usage of government resources, respondents were given a non-exhaustive list of government mobile applications and asked to select the ones that they have successfully used (See Figure 6). Based on preliminary findings, the top three government mobile applications successfully used by the most respondents include Singpass, HealthHub, and Healthy 365. Singpass provides access to commonly used government digital services like Central Provident Fund (CPF) and Housing & Development Board (HDB). HealthHub is the national platform for digital health that enables users to view their health records, access evidence-based health and wellness information, and perform health transactions (e.g., appointments, bill payments, and refilling of medications). And Healthy 365 is a digital application by the Health Promotion Board (HPB) that promotes the uptake of healthier lifestyles through gamification and rewards (e.g., Healthpoints) and pairs with fitness tracking devices.

Other government mobile applications, such as NLB Mobile, OneService, and Dementia Friends were less successfully used by respondents. NLB Mobile is a digital gateway to national library resources. OneService enables citizens to report municipal issues to relevant government agencies and town councils. And Dementia Friends was developed to provide caregivers of persons with dementia a sense of community and empower them with greater knowledge, resources, and support. This application was decommissioned on 31 December 2022 and transitioned to CARA (an acronym for Community, Assurance, Rewards and Acceptance), developed by Dementia Singapore with support from the Agency of Integrated Care (AIC) and the National Council of Social Service (NCSS).

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[4] Proportions are calculated out of respondents who stated that they own a smartphone.

Figure 7: Proportion (%) of respondents who have successfully used 0, 1, or 2 or more government mobile applications[5]
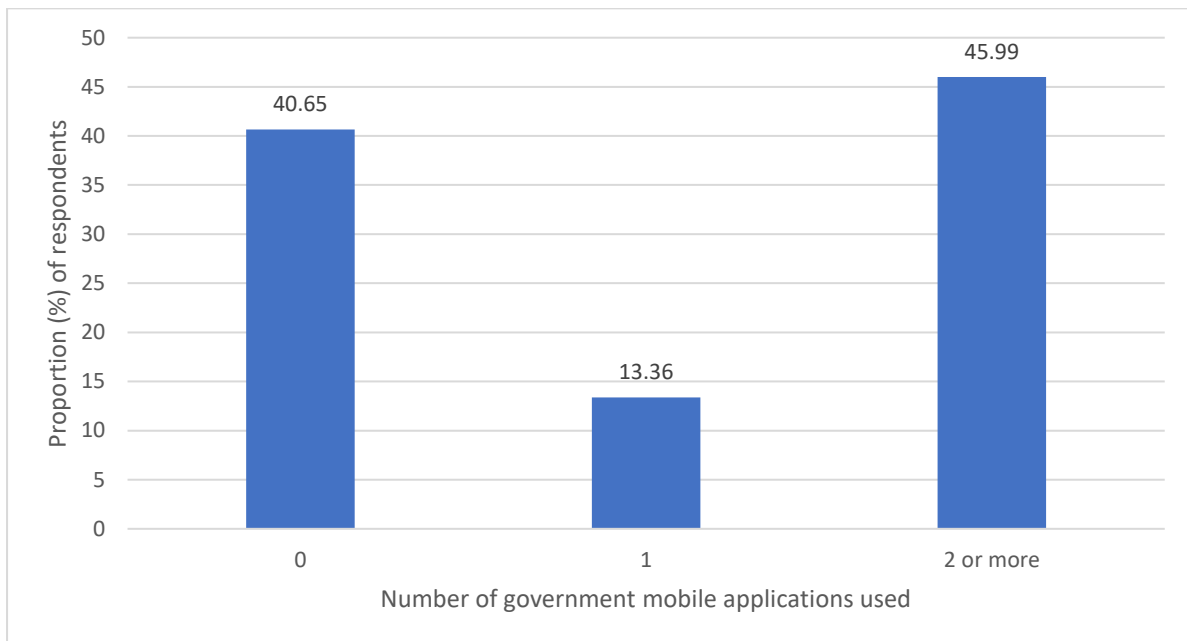
We then asked respondents how many government mobile applications they have successfully used, based on the above list (see Figure 7). As shown in Figure 7 above, a large proportion (40.65%) of respondents have not used any government mobile applications, followed by 45.99% who have used 2 or more, and 13.36% who have used only 1.

With regards to these preliminary results, it is important to highlight two caveats. The first is that the lists of digital applications (see Figures 4 and 5) were non-exhaustive, meaning that our respondents may have successfully used others that were not included. And second, based on our preliminary findings alone, we cannot distinguish whether respondents (1) do not know how to use these digital applications, (2) do not know if they exist, or (3) do not find them useful or valuable to their lives. Further investigation is needed to ascertain these differences.

Despite these caveats, we can still observe that far fewer respondents used the government mobile applications listed compared to other mobile applications such as social networking applications. Applications like HealthHub and Healthy 365 can greatly benefit the physical health of older adults in Singapore, but are underutilized compared to other applications like social media applications that are used by more than 75% of respondents surveyed. This suggests that respondents are likely to have the skills to use such applications but choose not to. As such, more can be done to encourage older adults to use applications like HealthHub and Health 365 that can benefit their physical well-being, and to convince older adults that such applications can benefit them.

*Perceptions on ease of use, confidence, and social support in learning to use new digital technologies*

In the following section, we present preliminary findings on older adults' perceptions towards using and learning new digital technologies. Specifically, we asked respondents who owned at least a handphone or a tablet (1) how easy it is for them to use their digital devices, (2) how confident they

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[5] Proportions are calculated out of respondents who stated that they own a smartphone.

are in protecting themselves online and gaining new digital skills, and (3) who they rely on for support in learning how to use new digital devices or applications.

Firstly, to provide a general overview of older adult perceptions towards using and learning new digital technologies, respondents were asked to what extent would they rate their level of agreement with each of the 3 statements regarding ease of use, support, and confidence in performing digital activities (see Figure 8).

Figure 8: Proportion (%) of respondents who "disagree" or "agree" with statements regarding digital ease of use and support
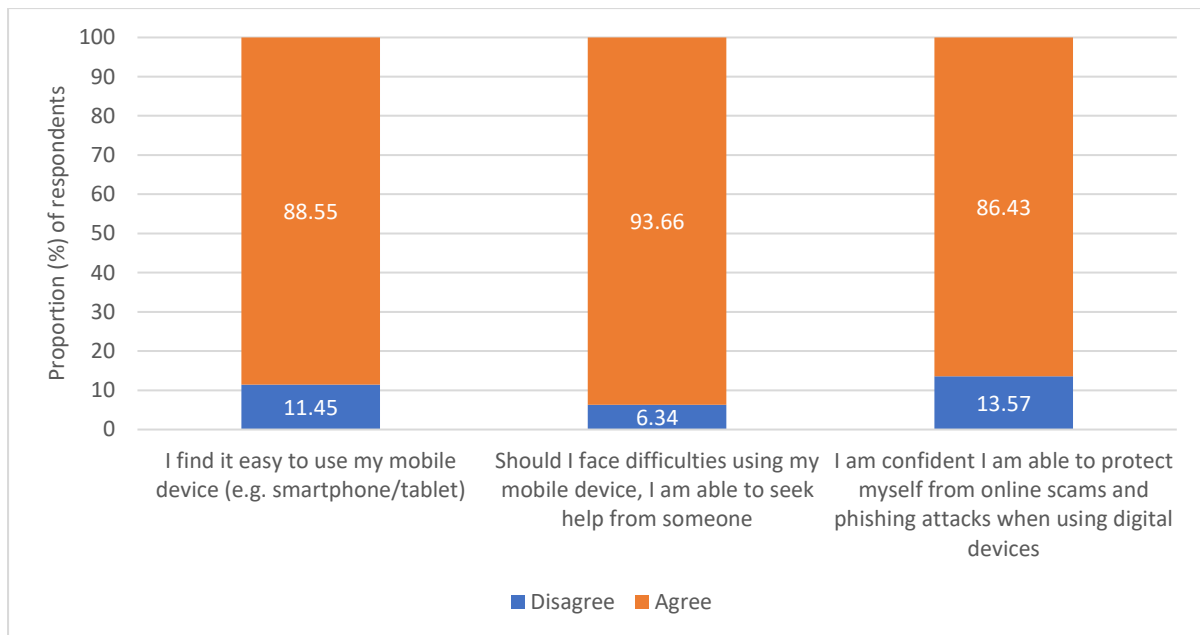
As shown in Figure 8, among respondents who owned at least either a handphone or tablet, a large majority (88.55%) agreed with the first statement, "I find it easy to use my mobile device (e.g., smartphone/tablet)," compared to 11.45% who disagreed. 93.66% of respondents agreed with the second statement, "Should I face difficulties using my mobile device, I am able to seek help from someone," while 6.34% disagreed.

Interestingly, we also find that a majority (86.43%) agreed with the third statement, "I am confident I am able to protect myself from online scams and phishing attacks when using digital devices," while 13.57% disagreed. This is despite the number of phishing scams involving seniors tripling from 153 in 2020 to 561 in 2021 (Yeo and Lim, 2022). Further research is needed to understand the disparity between subjective opinions with regards to the ability to detect and avoid scams, and the trend of an increasing prevalence of older adults falling prey to such scams.

Nevertheless, preliminary analysis suggests that such subjective opinions with respect to avoiding scams are an important factor shaping the usage of applications. As seen in the table below, respondents who did not feel confident in protecting themselves from online scams and phishing attacks were much less likely to use applications, especially functional applications such as online banking.

Figure 9: Proportion (%) of respondents who used each application type among those who agreed and disagreed that they felt confident in protecting themselves from scams
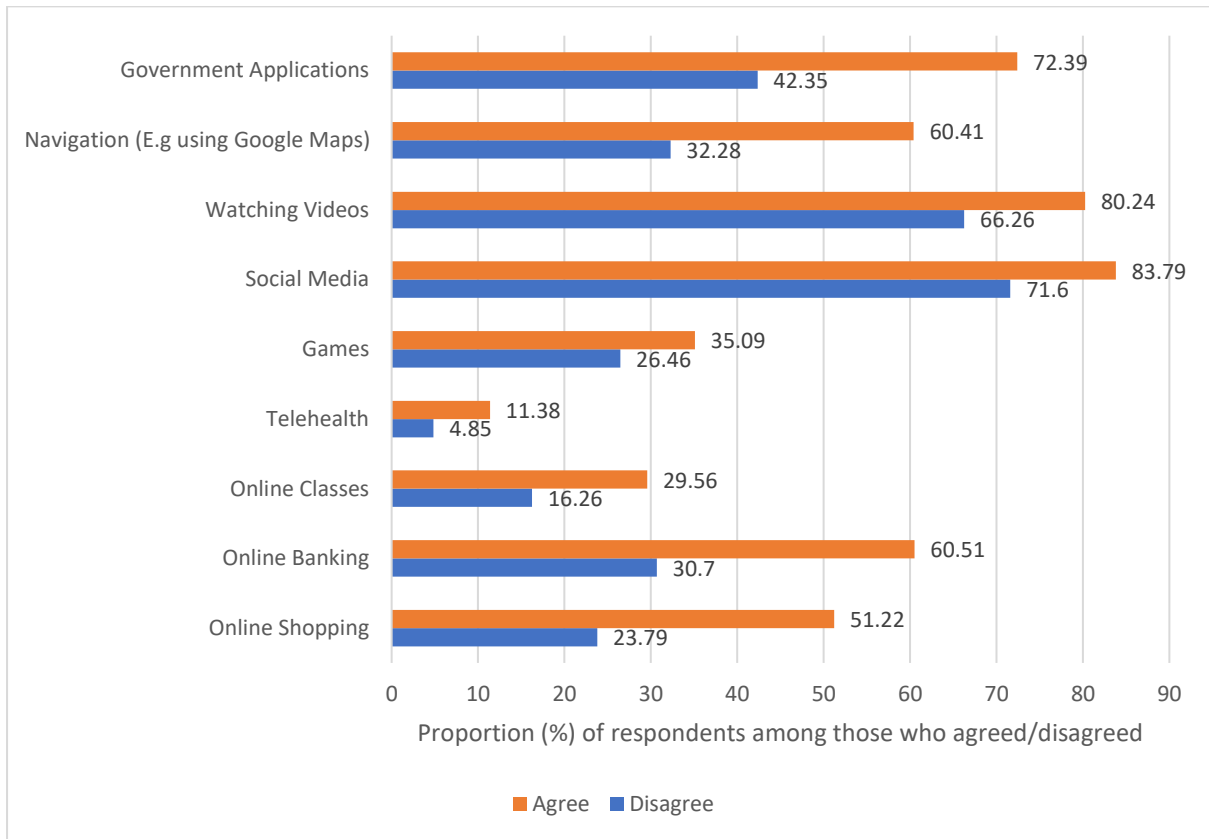
As can be seen, respondents who disagreed or lacked confidence in their ability to avoid scams were only half as likely to use online banking applications as those who were more confident (30.7% versus 60.5%). The disparity in usage was lower when considering leisure applications such as applications to watch videos or for social media, suggesting that individuals who feel less confident in protecting themselves from scams felt the need to avoid functional applications where they are possibly at greater risk of falling prey to such scams, but did not feel the same need when it comes to leisure applications.

Secondly, respondents were asked to rate their confidence in performing the following digital activities – learning how to use a new digital device, social media platform, digital application, website page on their own or with assistance from others (see Figure 10).

Figure 10: Proportion (%) of respondents who reported "not confident" or "confident" about using a new digital device on own or with assistance from others
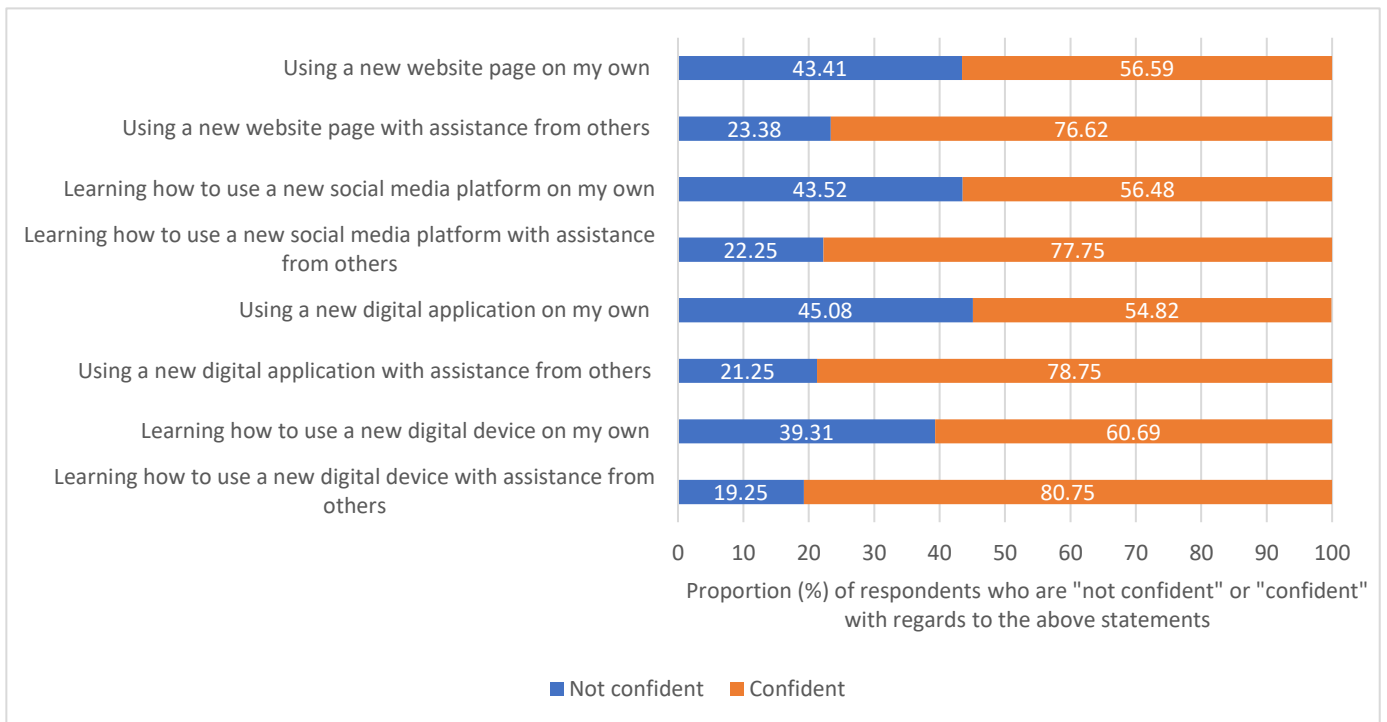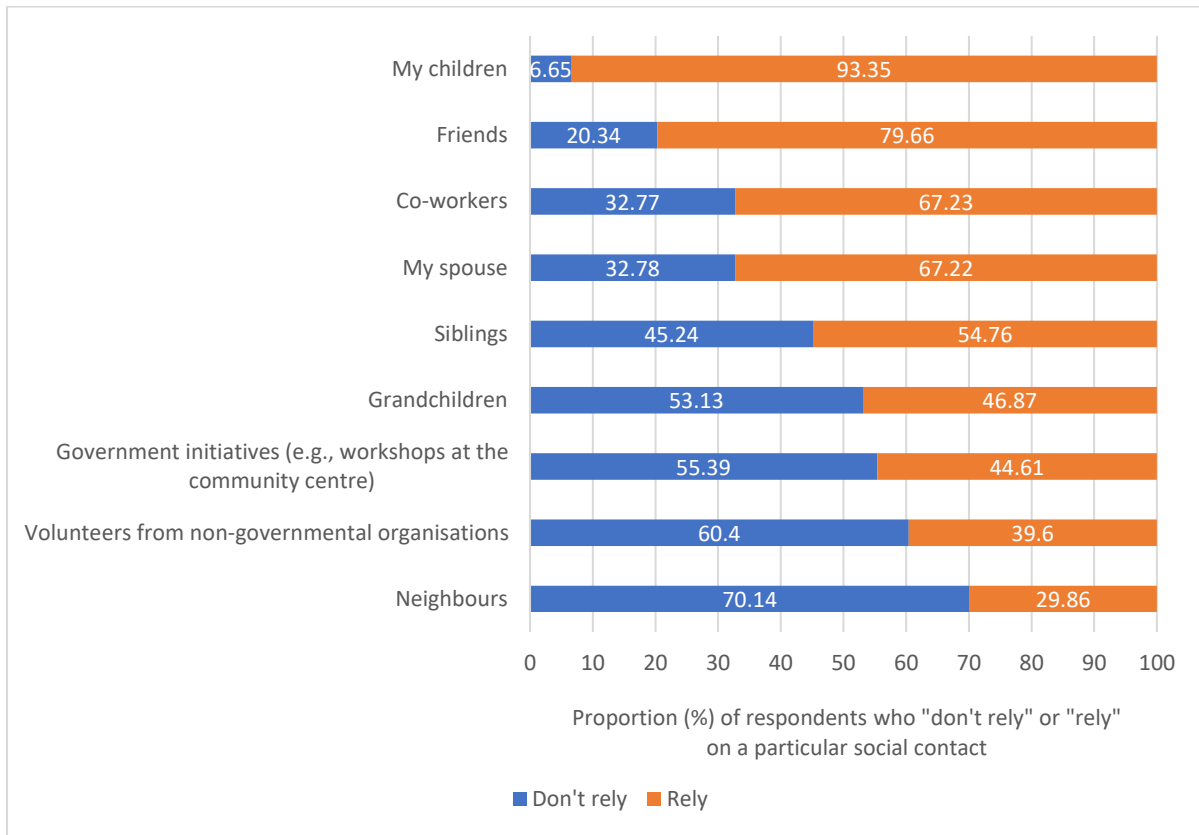

Figure 10 above illustrates respondents' level of confidence in learning how to use new digital technologies on their own or with assistance from others. We preliminarily observed higher levels of confidence in gaining new digital skills with assistance from others, as opposed to learning by oneself. Specifically, the proportion of respondents who were 'Not confident' in learning new technology by themselves was twice that of learning with assistance.

These findings suggest that older adults may feel *more* confident about learning new digital technologies when they have help from others, and highlights the importance of the social environment in supporting older adults in the adoption of new technologies. While younger generations may be more able to learn how to use new technologies and applications on their own (Hickman et al., 2007), older adults, perhaps because of generational differences, feel more confident learning how to use such technologies and applications with the help of others.

To better understand this, we further inquired about respondents' sources of social support in learning how to use new digital technologies. To do so, we asked respondents about who they seek help from when they want to learn how to use a new digital device or application.

As shown in Figure 11, respondents predominately rely on their children (93.35%) for digital learning support, followed by their friends (79.66%), co-workers (67.23%), and spouse (67.22%)[6]. These preliminary findings provide some indication of the importance of kin-ties, particularly intergenerational relationships (e.g., children), and rich social networks consisting of friends and co-workers (past and/or present) for digital literacy.

Beyond kin-ties and frequent social contacts (e.g., friends, co-workers), respondents also indicated reliance on government initiatives (44.61%), volunteers from non-governmental organizations (39.6%), and neighbours (29.86%) for learning new digital skills, albeit to a lesser extent. These results seem to suggest a greater preference for community-based resources over neighbours for digital learning support. For older adults who are more socially isolated or disconnected, government and non-governmental organizations can and should continue to play a supportive role in increasing digital literacy and strengthening neighbourhood cohesion.

*The effects of the use of technology on mental well-being (MWB) and social isolation*

Extant research has focused on the use of technology and how it influences older adult well-being (Sen et al., 2022; Shapira et al., 2007). In a recent ROSA research brief (Tan et al., 2023) on the social well-being of older adults in Singapore, it was preliminarily found that social well-being significantly increases with high frequency of digital contact with others, suggesting the importance of keeping

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[6] It should be noted that these proportions were calculated *out of the number of respondents who had such a source of social support available to them*. E.g 93.35% of respondents *with children* relied on their children when learning to use a new digital device or application.

older adults digitally connected. Other scholars have contributed to building an integrative research model that identifies several key mediating factors such as loneliness (Chopik, 2016), social support (Heo et al., 2015), and Internet skills (Hofer, 2019) that potentially shape the extent to which technology use can enhance older adult well-being. Given that social isolation and loneliness are reaching epidemic proportions among older adults in Singapore, we sought to explore whether older adults' technology use may positively influence their mental well-being.

In this section, we aim to examine the mental well-being (MWB) of respondents based on their (1) ownership of digital devices and (2) usage of digital applications and functions. We computed a MWB index based on respondents' self-reported levels of stress, sadness, loneliness, and happiness. Higher scores reflect higher mental well-being among respondents.

Figure 12. Mean mental well-being score of respondents who own 0, 1, or 2 or more digital devices
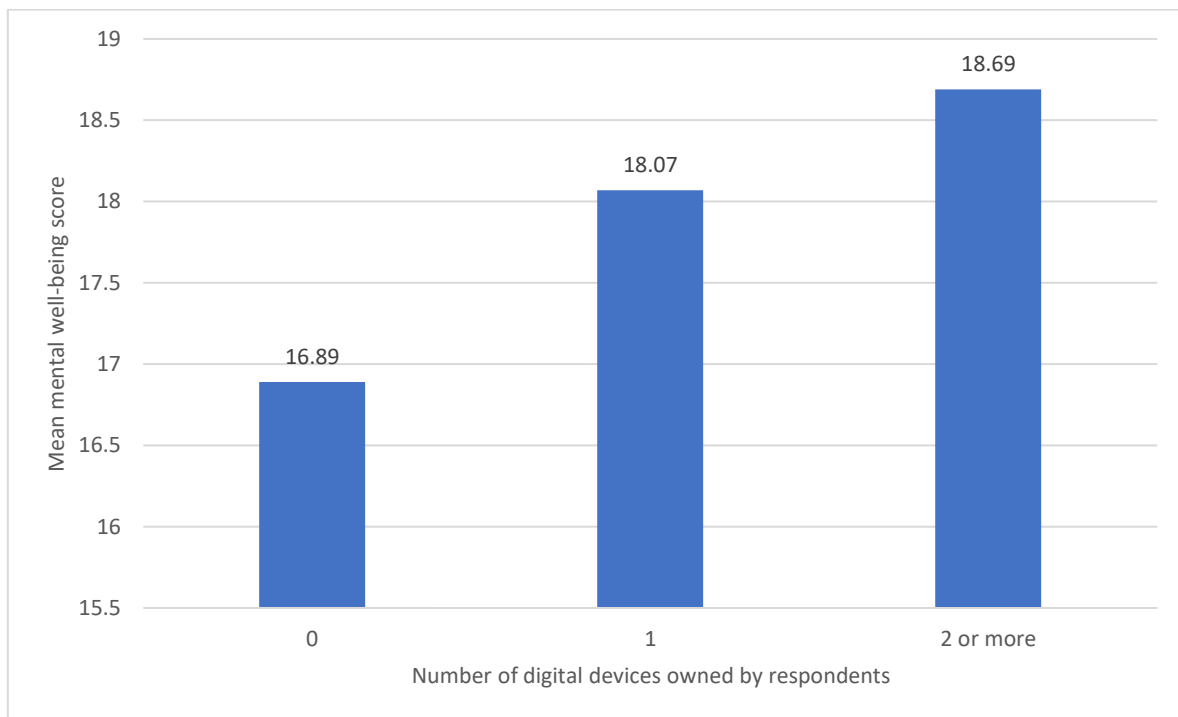
After deriving a mean MWB score for each respondent, we compared their MWB and digital ownership scores. As shown in Figure 12 above, respondents' MWB scores were higher among those who own more digital devices. To test for the statistical significance of this relationship, we ran a linear regression predicting MWB with the number of digital devices owned included as a predictor while controlling for demographic factors including socio-economic status (measured as education level and house type). Results revealed statistically significant differences across digital ownership groups.

Figure 13. Mean mental well-being score of respondents who have successfully used digital applications or functions
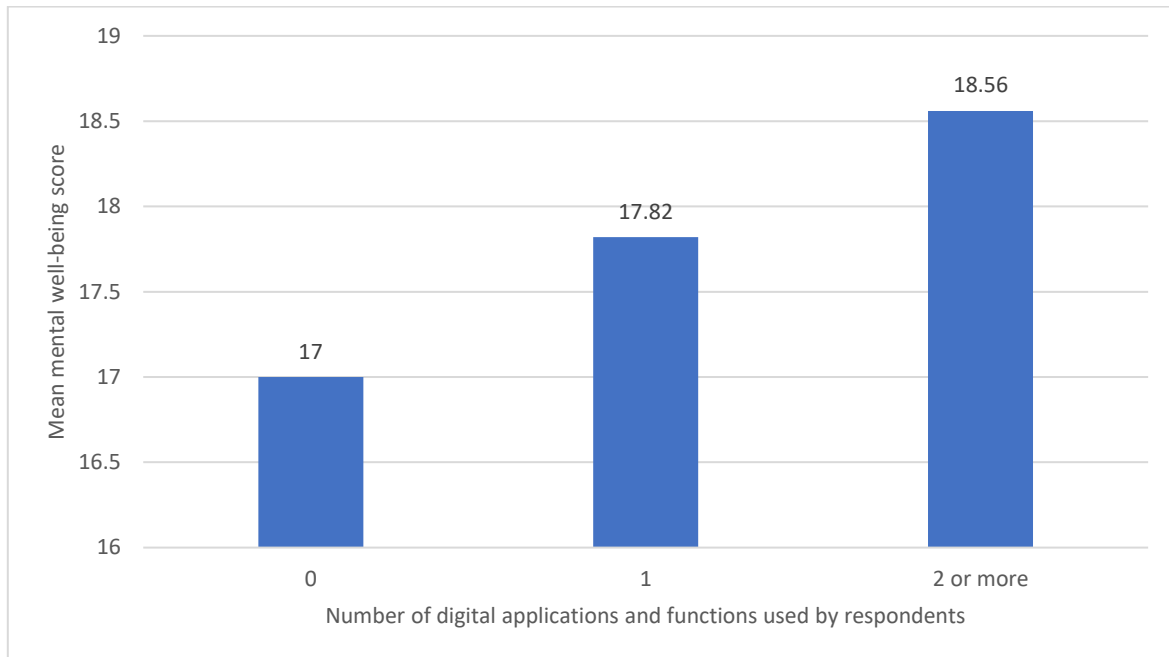
Similarly, respondents' mean MWB scores were higher among those who have successfully used a larger number of digital applications or functions. As shown in Figure 13 above, we observed an upward trend in MWB with an increase in digital usage. Similar to before, a regression model was also run to test this relationship while controlling for demographic factors such as socioeconomic status. Results revealed statistically significant differences across digital usage groups.

Another important way in which the use of technology can shape well-being among older adults is through the use of technology to reduce levels of social isolation. Social isolation has been identified as a key issue for older adult well-being (Nicholson, 2012), and research has demonstrated that the use of technology can help to reduce levels of social isolation among older adults (Sen et al., 2022). Given this, we wanted to also preliminarily examine how the ownership of digital devices may be correlated with levels of social isolation among our respondents.

Figure 14: Average Social Isolation Score[7] of respondents based on number of devices owned
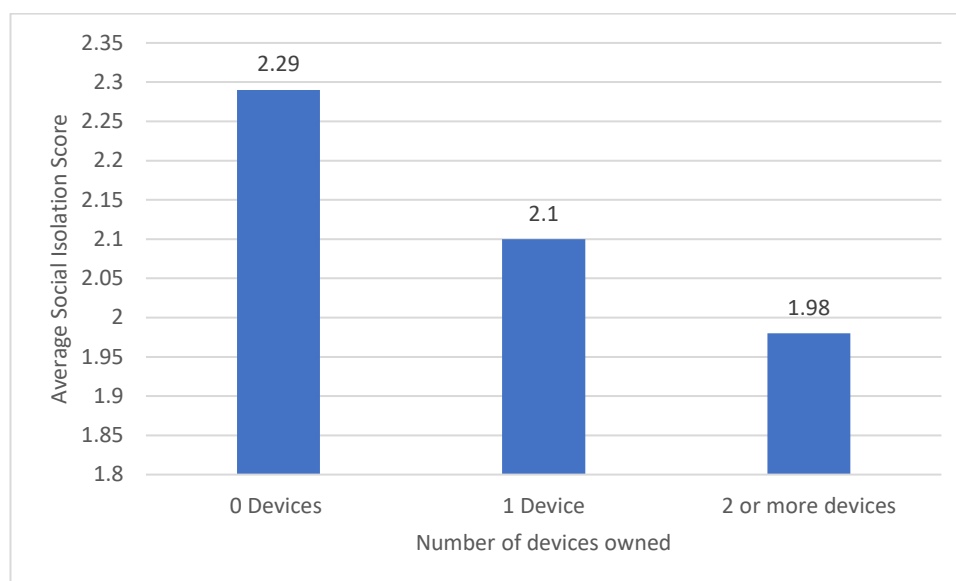
As can be seen, respondents who did not own any device or only 1 device had higher levels of social isolation compared to respondents who own 2 or more devices (see Figure 14). Based on a final regression model controlling again for demographic factors include socio-economic status, these differences were found to be statistically significant, with social isolation scores being significantly less as the number of devices owned increases.

DISCUSSION & RECOMMENDATIONS

Overall, we found that digital ownership is generally high among our respondents, with over 90% owning at least 1 digital device and over 50% owning 2 or more digital devices. However, there are areas where we can continue to level the playing field within and across older adult cohorts, particularly for older adult Singaporeans with lower socioeconomic status (SES) (Ngiam et al., 2022). When comparing across demographic groups, we found that respondents who own 2 or more digital devices tend to be younger, male, reside in more affluent housing types, and are more educated.

In terms of older adults' general usage of digital applications and functions, we observed that nearly 1 in 10 older adults have not successfully used any (see Figure 4). In addition, about 4 in 10 respondents reported that they have not successfully used any of the listed government mobile applications (see Figure 6). With regards to these preliminary results, there are two caveats. Firstly, these lists of digital applications and functions were fairly comprehensive but non-exhaustive. Secondly, our survey instruments lacked the precision to differentiate those respondents who do not know how to use certain digital applications and functions from those who are either unaware of their existence or do not find them to be of particular use or value to their lives. We aim to investigate these differences in future research.

In terms of older adults' perceptions on learning to use new digital technologies, we preliminarily found that 88.55% of respondents find it easy to use their mobile device, 93.66% can seek help from someone should they face difficulties using their digital device, and 86.43% feel confident about protecting themselves from online scams and phishing attacks when using their digital devices. On average, respondents were more confident about learning how to use new digital technologies with

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[7] Respondents were asked to rate how often they feel isolated from others on a 5-point scale (1 None of the time – 5 All of the time). Higher scores reflect higher levels of social isolation among respondents.

assistance from others, as opposed to on their own. Respondents primarily seek help from their children (93.35%), friends (79.66%), and co-workers (67.23%) when they want to learn how to use a new digital device or application.

Finally, we found statistically significant differences in the mental well-being (MWB) and social isolation scores of respondents based on their levels of digital ownership and usage. On average, owning fewer digital devices was significantly correlated with lower MWB scores and higher social isolation scores among respondents, and lower use of digital applications and functions was linked to lower MWB scores. There is a growing scholarship (Cotten et al., 2014; Heo et al., 2015) on the interplay between digital literacy and older adult well-being, and the preliminary findings from this brief support the need for further research into the nature of these relationships.

In sum, we wish to highlight several key takeaways from this brief based on our preliminary analysis of the results;

1. **Both structural and attitudinal barriers exist with regards to the use of technology among older adults in Singapore.**

   In terms of structural barriers, these can include having low levels of SES and social support that contribute to gaps in the use of technology among older adults in Singapore. It is imperative that we fill these gaps in order to fully leverage on digital technologies to improve well-being among older adult Singaporeans. This will likely require continued government and societal efforts towards increasing digital inclusion and literacy, as well as promoting greater awareness of the utility and value of certain digital applications and functions towards enhancing older adult well-being.

   In terms of attitudinal barriers, we find that respondents who felt that the use of technology would not benefit them were less likely to own or use technological devices or applications as well. More research will need to be done to understand why such perceptions of the use of technology exist, but the results nevertheless suggest that efforts to increase the use of technology among older persons may require educational efforts as well to improve perceptions of the use of technology.

2. **Technologies are predominantly used for leisure activities, rather than for functional purposes by older adults.**

   Older adults surveyed were more likely to use applications related to leisure activities such as browsing social media or watching videos, compared to online banking or telehealth applications. One possible reason for this that was briefly explored is the lack of confidence that respondents would be able to protect themselves from scams and phishing attempts. These findings suggest that more can be done to encourage and equip older adults with the necessary skills to increase their confidence in using more functional applications which can improve their quality of life.

3. **The social environment can be an important factor shaping the adoption of technology.**

   Our preliminary results suggest that technology use can be shaped by social factors, and the adoption of technology can be a social process as well. Our findings suggest that cultivating and maintaining the social support networks of older adults are positive steps towards building digital literacies. Two key factors are identified as being important in the selection of sources for social support with respect to learning new technologies; firstly, older adults turn

to those they trust and are more intimately connected with (such as kin relationships), and secondly, older adults rely on their younger contacts who are more technologically savvy such as their children or colleagues.

Based on these preliminary results and implications, we make the following three suggestions with regards to how policymakers can best support older adults in increasing their digital literacy:

1. Lower-income older adults remain a vulnerable group in regards to digital ownership, an important factor associated with mental well-being. This group may benefit from greater support in identifying and applying for existing public schemes such as DigitalAccess@Home, Public Rental Scheme, and ComCare Assistance that provide households with subsidized broadband and digital devices (Tham, 2023). In addition, more digital devices can be made available for public loan in neighbourhood settings, such as libraries, community centres (CCs) and residents' committees (RCs).

2. Older adults who are more isolated and lacking in social support and digital skills may lack the necessary social resources to rely on in learning how to use new technologies. More can be done to provide such older adults with opportunities to learn new technological skills. Existing initiatives by the government in this regard such as the Seniors Go Digital program are helpful, but should also be supported by ground-up initiatives including programs run by non-governmental organizations (NGOs) like the Retired & Senior Volunteer Programme (RSVP). Neighbourhood communities should also be encouraged to step in and reach out to isolated older adults to help them learn new technologies.

3. Educational efforts to encourage the use of technology among older adults should target improving perceptions of the use of technology, as well as equip older adults with the skills needed to protect themselves from scams and phishing attempts.

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About the Centre for Research on Successful Ageing (ROSA)