

Towards Inclusive Digital Transactions: Disability and The Case of Singapore's Singpass App

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Abstract

With the increasing prevalence of digital transactions and growth of the 'Smart City' policy agenda in Asia, we adopt a critical disability studies lens to analyse the inclusiveness of state-designed digital transactions in Singapore. In this paper, we offer a preliminary analysis of the Singpass app – Singapore's national digital app, to understand how digital transactions can be designed and operationalized for disability inclusion. We situate the case of Singpass app within the rise of global digital transactions and the political-technical infrastructures that shape their accessibility. We analyse the ways Singpass centers disability, the problems it may still entail as well as possible implications for inclusion.

Keywords: Disability; Digital Inclusion; Digital Transactions

1. Introduction

On the website of the Singpass app, a government app that enables the verification of Singapore citizens' and residents' digital identity and enables them to transact with government, private businesses, and agencies, proclaims loudly the app's three key design principles, namely, safe and secure data; trusted ecosystem of partners; and *inclusive* design for *all* residents [emphasis ours] (Singpass, 2023). Beyond its focus on "inclusion", the Singpass app website also highlights the extensive reach of the National Digital ID in Singapore life – over 41 million transactions made through the app every month, 4.2 million users, and who are connected to over 2,700 services through the Singpass app. As the Singpass team explain in their blog, thought and effort was made in ensuring the

mobile application and its experience was "seamless and more inclusive", one instance was through the use of biometric authentication so as to do away with the remembering of long and lengthy passwords (National Digital Identity (Singapore), 2019). Singpass is an important case study for several key reasons. The first is the centrality of the Singpass app in mediating social relations (or more precisely, government to people relations) in Singapore. From its inception in 2003 (Salim, 2021), Singpass has grown to be a key tool by which government transacts with its citizen – all Singapore government webpages and services rely on the use of Singpass as a key form of authentication, as well as some private corporates.

Such a focus also replicates events globally, where digital transactions have come to mediate the ways we interact with the world(s) around us. We make payments using our smart wallets, we rely on apps like Facebook and Instagram to stay connected to our friends, we browse the internet for information, and look through news apps to stay updated. Increasingly, our mobile devices and apps are providing key affordances to transact digitally.

In this working paper, we offer a preliminary analysis of the Singpass app and its implications for inclusion. In particular, we base our analysis on a corpus of publicly available sources, preliminary interviews, as well as a series of yet-to-be conducted focus group discussions with app and software developers at GovTech Singapore, the developers of the Singpass app and disabled user-testers of the app. Our discussion aims to understand the following questions.

- How is Singpass designed for inclusion and how does it center disability?
- What are the possible barriers that Singpass might pose to disabled people's inclusion?

We begin with a discussion of our analytical framework and introduce our methodology and the broader study. Next, we offer a discussion of the

literature underpinning our work, focusing on an overview of digitization and digital inclusion in the Asian region and Singapore, followed by a discussion of digital transactions from a disability studies perspective. Thereafter, we present a case study of the Singpass app with a quick analysis of its purported features and workings, offer initial comments with regards to accessibility, and analysis of barriers that may pose problems for inclusion before concluding.

2. Conceptual framework and methods

We position our work as a case study to examine the usefulness of existing global accessibility standards, drawing from disability studies perspectives and ‘smart equality’ to demonstrate the importance of context in the implementation of international standards of accessibility with a focus on also on the social affordances that apps like Singpass afford to its disabled users.

Our conceptual framework for this paper builds on the concept of “smart equality”, which highlights how “digital inclusion can build on disability as the organizing principle in order to reimagine digital infrastructure” (Goggin & Zhuang, 2022, p. 262), but also digital relationships and transactions. As Goggin and Zhuang explain, rather than to see digital inclusion from the perspective of guidelines, compliance and regulation (or the lack thereof, which is nonetheless important as we shall explain), smart equality allows for attention to be paid instead to how disability can offer new opportunities and possibilities for inclusion in itself. In the case of Singpass, smart equality ask that we consider how disability can instead be the basis for inclusion, rather than its object of study.

Such a frame also pivots to disability as a generative form of knowledge and embodiment (Goodley, 2016), one which affords new ways of seeing, knowing and doing. More precisely, we spotlight how disability (more accurately, its lived experiences) can be a form of generative knowledge with important lessons for design, both digital and otherwise (Hendren, 2020; Pullin, 2009). In the areas of science and technology, centring disability and its insights can provide new key insights to the workings of technology, especially when mobilized and deployed by disabled people themselves (Hamraie & Fritsch, 2019), providing new affordances for world-making (Dokumaci, 2023). Importantly, as Goggin, Ellis and Hawkins (2019, p. 298) highlight, disability can provide “a rich and indispensable site and ‘test bed’ for how societies can confront technology for better futures.”

A key corollary of the analysis is to understand the kinds of affordances technology can provide for

disabled people in mediating social relation. Explaining, Hutchby (2001, p. 444) notes that affordances “are functional and relational aspects which frame, while not determining, the possibilities for agentic action in relation to an object”. Understanding how technology – in this case, inclusive apps – can provide key affordances thus turns attention to the ways in which technology enables but also the limitations on the actions that users can or cannot take (Hopkins, 2016)

We also note that disability studies, which builds from the advent of the disability rights movement globally from the 1970s has led to a transformation of how disability is understood in contemporary societies. A key analytical frame offered by disability studies has been to examine the social structures that inhibit our worlds and which continue to pose barriers to disabled peoples’ participation and obstruct their emancipation (Oliver, 1996). In other words, while we focus on smart equality, we are also cognizant of the possible problems that may be present, both in terms of structural barriers that may pre-exist and are embedded within its development, but also current problems and issues.

While our framework of analysis begins from smart equality and social barriers, we are cognizant of the role that international instruments and standards play in creating new norms and possibilities for inclusion. As Article 9 of the United Nations Convention on the Rights of Persons with Disabilities highlights, state parties have obligations to ensure equal access to information communication technologies and systems (United Nations General Assembly, 2007). Pertaining to questions of digital access, the World Wide Web Consortium (W3C) has been fundamental in setting standards and guidelines for how the internet can be made more accessible. The Web Content Accessibility Guidelines (WCAG), now at version 2.2, while geared towards making web content accessible, also provides useful guidance for inclusive mobile apps. In a document published in 2015 and building off version 2.0, the W3C highlights 17 accessibility considerations based on the four principles of WCAG – perceivable, robust, open, understandable and robust (w3c, 2015), including considerations such as “zoom/magnification”, “contrast”, “consistent layout”; “providing easy methods for data entry”, among others.

The 17 listed consideration are, however, a subset of the range of criteria that can be considered. The latest reiteration of the WCAG, version 2.2 (w3c, 2023), highlights how both web content and mobile apps should aim to comply to its various considerations and success criteria (of which there are now 86). While this W3C document and the WCAG

2.2 present a useful frame to consider and assess the inclusivity of mobile apps, we turn instead to our broader framing of smart equality and social barriers for two key reasons. One, as we will highlight later, standards are political – the WCAG while useful as a starting point has been critiqued for exporting minority world standards to other contexts (Lewthwaite & Swan, 2013). Two, what may be considered as central for inclusivity in apps for Singapore is dependent also on contextual factors and may be different from what is set out in the WCAG as we shall show. Notwithstanding this, various institutions and agencies (audioeye, 2024; Level Access, 2022; UK Government, 2023) has highlighted the importance of using the four principles of WCAG as the starting point. Where possible, our preliminary analysis will also point out elements of the Singpass App that attempt to meet with the four principles of WCAG – Perceivable, Operable, Understandable and Robust.

At time of writing, our analysis builds on a corpus of publicly available documents, including policy briefs and documents centred on disability and digital development in Singapore, as well as media reports and interviews showcasing Singpass and its developments. Our analysis (and focus on biometrics and Singpass’s accessibility features) is also based off five initial one-on-one interviews/conservations we had with disabled users and also GovTech developers. In addition, both Author 1 and Author 2 have had longstanding involvement in and with the disability sector and community in Singapore.

Concurrently, we expect the final analysis to be enriched by a series of qualitative data collection to be completed by December 2024. We are currently conducting three focus group discussions over zoom (two with blind user testers and one with developers of the Singpass app, which are currently ongoing) with an expected total of 20 participants.

Participants will be consulted on their accessibility needs prior to each session. These consultations allows us to “scaffold inclusion” to accommodate various access needs (Bigby et al., 2014, p. 61). Author 2 is the main facilitator for each session, while Author 1 provided technical support – his contact information are shared prior to each session so participants could call him whenever they required support. The 2-hour sessions were conducted in a semi-structured manner, with an aide-mémoire prepared beforehand but providing flexibility to pursue any topics raised by participants (Longhurst, 2003). We expect to conduct thematic analysis from the data gathered. Each session will be audio and video recorded, and a transcript will be generated. To ensure confidentiality of information, all data will be anonymized, and participants have been assured that their involvement in this study

would not affect or penalize them from any services offered by GovTech.

3. Literature review and background

3.1 Digital transactions and disability in Asia

As Athique (2019) points out, using information from the ITU and Internet World Stats, Asia is increasingly seeing an upsurge in internet and mobile users; the population of users have equaled and exceeded the rest of the world in 2018. Discussing both the myriad ways in which digital transactions mediate the ways in which we interact, and the increasing number of internet and mobile users, Athique (2019) describes the coming of the “age of transactions”, where how we partake in the world are recasted with implications for social relations. the unprecedented sheer volume, not to mention diversity of digital transactions across various contexts in Asia.

In Southeast Asia, for instance, digital platform companies such as Gojek and Grab have established a foothold not only in their home countries (Indonesia and Malaysia) but also expanded across the region. Such extensive digitalization of society is mirrored by a longer historical trajectory of Southeast Asian governments adopting the smart and technology as enablers for economic growth of development, for instance, in Singapore (Goggin & Zhuang, 2022) and Malaysia (Bunnell, 2004), just to name two. The recasting of social relations with technological change is also exacerbated by various factors – various nation-states across Asia embracing the city as purported means of uplifting the lives of its population. In Singapore, but also in China, Korea, Japan, Taiwan and India, smart cities are increasingly prevalent, and this has created new possibilities but also problems (Datta, 2015; Zhuang & Goggin, 2024b).

The case of Singapore provides a key exemplar of the adoption of technology in society. First, as a young nation-state celebrating 59 years of independence in 2024, Singapore has seen rapid economic growth, industrialization and urbanization in its transformation from third world to first (Lee, 2000). Its rapid development has also seen Singapore become one of the most digital connected societies – in 2023, the Info-comms Media Development Authority in its digital society report highlights that 99% of resident households are connected to the internet, with 97% of residents owning smartphones and the mobile penetration rate at 166.1% (Infocomm Media Development Authority, 2024a, 2024b).

Yet, the question of digital participation for not only disabled people but also marginalized groups are still very much unaddressed. As Irene Ng et al. (2021) highlights, groups in Singapore (namely, students from low-income households, seniors, low-income

adults) continue to face barriers to digital access, exacerbated by the Covid-19 pandemic. Writing about disability and digital inclusion across Asia, Goggin et al. highlights how this remains to be largely understudied (2019). In Asia and the Pacific, this has had implications on disabled people, given that they number over 650 million and comprise about 1 in 6 of the total population (United Nations Department of Economic and Social Affairs, 2017).

As to the impact digital transformation has on disability, a broad range of scholars have critiqued and spotlighted the inequalities, biases, and problems, that continue to exist for disabled people and the digital across a spate of global locations (Dobransky & Hargittai, 2016; Goggin, 2017; Hargittai, 2022). Importantly, the Covid-19 pandemic has exacerbated some of these transformations which has had impact (some beneficial, but also negative) on disabled people. As Hargittai (2022) highlights, while technological adoption during the pandemic has led to new forms of work and sociality, some of which have benefits for disabled people (like remote and flexible work), yet disabled people are still very much disadvantaged when it comes to digital connection.

More importantly, we note how emerging technologies can both be beneficial and problematic when it concerns disability. Such a statement is borne out in Roulstone's (1998) discussion of how technologies – such as keyboards, mouse, and in today's context, zoom technology – come to be adopted for workplaces, and the benefits these adoptions can provide for disabled people. The recent (re)emergence and uptake in artificial intelligence and generative artificial intelligence is a useful example. While the deployment of artificial intelligence can create new possibilities – enabling and supporting disabled people at work, it can also create new problems (Zhuang & Goggin, 2024a). More pointedly, scholars have highlighted the inherent biases embedded with the normative visions of emerging technologies like artificial intelligence (Whittaker et al., 2019). The net effect, is that emerging technologies can create new forms of digital inequalities. Our focus on disability and digital transactions thus builds on this body of work in its examination of a new and emerging aspect of digital society.

Digital transactions are an important aspect of digital societies for several key reasons. As Athique and Goggin (Forthcoming) highlight, there are a range of transactions that take place digitally across various platforms such as banking and payment, among others. This is unsurprising, given how most transactions that take place digitally tend to be financial in nature. A key part of this move has been the optimism that

digital transactions can drive financial inclusion for those left-out in society (World Bank, 2024). Yet as with all new forms of digital transactions we see that there can be problems, for instance when ATMs were first introduced (Goggin & Newell, 2007), its design presented key challenges to disabled people.

More important to our discussion of Singpass app is how digital transactions come to mediate citizenship today. In Singapore but also across Asia today, a range of technologies and devices and politics enabled the emergence of “citizenship platforms [which] facilitate virtual exchanges between government and the governed” (Athique & Goggin, Forthcoming, p. up). More important, we note that the turn to digital society and digital transactions has wide ranging implications (but also creating new possibilities) for disabled people's citizenship and inclusion in nation-states where they reside (Goggin et al., Forthcoming; van Toorn & Cox, 2024).

3.2 Disability Rights and Inclusion

Across Asia and the Pacific, great attention and emphasis has also been placed not only on disability rights but also digital inclusion. This is encapsulated by global instruments such as the United Nations Convention on the Rights of Persons with Disabilities, and also the Jakarta Declaration on the Asian and Pacific Decade of Persons with Disabilities 2023-2032. In particular, the United Nations Convention on the Rights of Persons with Disabilities represented the key milestone where disability rights is coded into international discourse (Degener, 2016); Article 9 of the Convention highlights the obligations of state parties towards ensuring equal access to information and communications technologies and systems (United Nations General Assembly, 2007). Regional initiatives like the Incheon Strategy and the ASEAN Enabling Masterplan also put forth key recommendations to support the development of inclusive ICTs.

More crucially, the implementation of the Convention in Southeast Asian contexts as Cogburn (2017) points out, represents an important step in addressing the “grand challenge” of disability rights. Importantly, Reuter and Cogburn highlight how the signing and ratification of the Convention allowed for “a common basis as a starting point for disability rights implementation”; however, actual implementation is still uneven across Southeast Asian nation-states (Reuter & Cogburn, 2017, p. 271).

Such a perspective is particularly relevant – Singapore has signed and ratified the Convention, yet as scholars have pointed out, how inclusion functions in Singapore is vastly different from these

international norms and standards, given how the Singapore state has steadfastly refused the passing of any disability rights legislation (Yang et al., 2023). This is despite the enacting of the Enabling Masterplans, a state-led roadmap to chart out the steps needed to take towards inclusion, first implemented in 2007 and now in its 4th edition covering 2022-2030. The state of affairs can be characterised as a pervasive reliance on medicalized notions of disability together with a focus on communitarianism, where family and society is encouraged to take the first step in supporting disabled people (Zhuang, 2016), rather than the rule of law.

Amidst this focus of disability inclusion, we note of course the effects and rapid transformation wrought by changes during the Covid-19 pandemic, which has seen Singapore pivot to the digital. This is not to pinpoint the pandemic as the main cause of digital transformation – Singapore has had a long tradition of mobilizing technology for the good of the nation, both in terms of economic growth and for societal transformation (Goggin & Zhuang, 2022), but the event of the pandemic has accelerated these transformations. In the context of this paper, we note the wide-ranging embrace of digital forms of transactions present in Singapore – ranging from Bluetooth contact tracing during the pandemic (Goggin, 2020), but also e-payments, such as contactless payment, QR code payment method, government issued e-vouchers, and in the context of this study, national digital ID systems and the kinds of transactions that they encapsulate.

Putting these two developments in conversation with each other – one the widespread use, adoption, and prevalence of digital transactions in society; two, the focus on disability and digital inclusion across Asia and the Pacific, we turn to examine the case of Singpass App within the lens of smart equality and its possible problems.

4. Case study: Introducing Singpass as app and technology

First launched as a national ID system in 2003, the introduction of the app version in 2018 provides new affordances. In his landmark study on the operations of mobile apps, Goggin (2021, pp. 2-3) highlights how apps “provide bridges across the messy ecologies of media, technology, environments, and bodies”, and bring together a range of technologies, software and hardware, ranging from the mobile web and internet, to phones and software development, and also technologies such as biometric and so on. In doing so, apps provide key affordances – for instance, to access social media and entry into digital society.

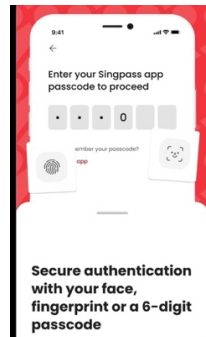


Figure 1: Screenshot of Singpass app on the App Store by Author 2 describing various authentication methods

It is precisely within this confluence of media and communication technologies that the Singpass app operates. A brief discussion of how Singpass app operates would be useful. First of all, the use of the app's functions requires the use of facial, fingerprint or 6-digit passcode authentication as a security measure (fig. 1).

Upon entry, the user is able to access different functions. One key function is the provision of digital identification (fig. 2) and the consolidation of personal information from different government agencies, including financial, driving, family, employment, education, property and other government information and documents (fig. 3). Users can also receive government notifications and digitally sign official documents without having to make in-person visits.

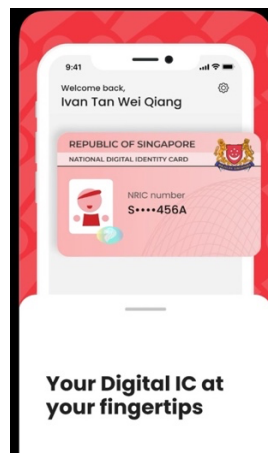


Figure 2: Screenshot of Singpass app on the App Store taken by Author 2, illustrating national identity documents on Singpass

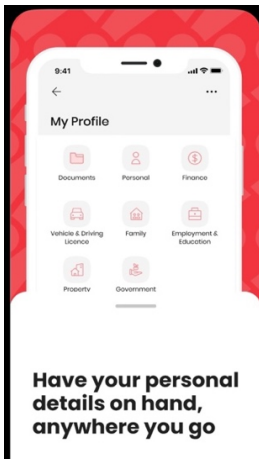


Figure 3: Screenshot of Singpass app on the App Store by Author 2 showing different categories of official documents available on Singpass

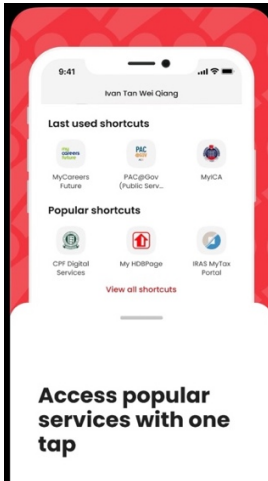


Figure 4: Screenshot of Singpass app on the App Store by Author 2, featuring key shortcuts to different government service portals

Another primary function of Singpass is to provide access to all online government services, such as the IRAS MyTax portal for any tax-related services (fig. 4). In this case, upon authentication, users will be directed to the IRAS MyTax portal on their mobile browser. Alternatively, users can also access tax services directly from the respective government service portal on their mobile device, tablet or on a computer. Upon clicking on the logon button on the tax portal, they would be directed first of all to a webpage that offers two ways of logging in – one, a QR code which allows one to login with the app and two, password login (fig 5).

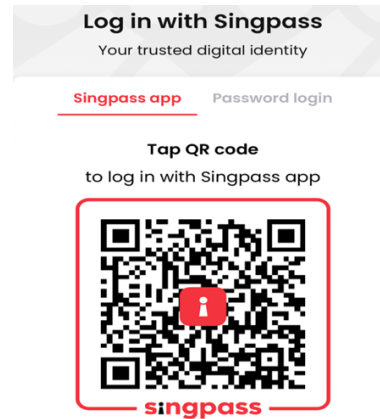


Figure 5: Screenshot of Singpass App by Author 1. It shows a QR code which allows users to verify their identity for government services through the app.

Clicking on the QR code redirects to the Singpass app (presumably installed on the same mobile device), where the user can choose to approve or reject the request (see fig 6).

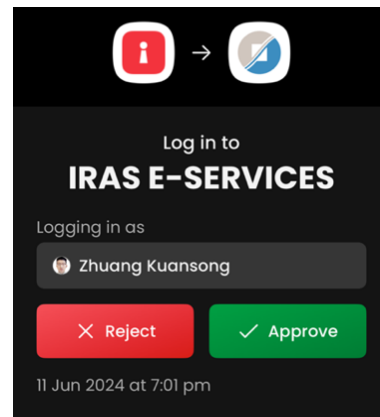


Figure 6: Screenshot of Singpass app by Author 1. The user is then asked to approve or reject the authentication request via the App.

Upon clicking the “approve” button, the mobile device will authenticate the user. In this instance, an apple I-phone 13 uses face ID to biometrically authenticate the user (the user may also use other forms of authentication, including but not limited to inputting the Singpass app passcode if biometrics are not recognized, and/or the use of SMS one-time password for two factor authentication). Upon successful authentication, the user may then return to their initial logon page by clicking on the link for the browser (see fig. 7). Importantly, depending on the browser and systems used (desktop/mobile), the user experience for authentication may differ.

This brief description of the logon and authentication process serves as an entryway into the

processes, ecosystems, and technologies that are embedded and also entangled within the Singpass app. Importantly, in this process we highlight the confluence of different forms of media and technology. What is immediately recognizable are mobile internet and broadband service, web, phone hardware such as camera and sensors, biometric face and/or fingerprint recognition, short messaging service. Other forms of technology and features may be available but not quite recognizable. As our initial interviews highlight, this includes the development of accessibility in smartphones such as voiceover, assistive touch buttons, among others, which have allowed key affordances for the disabled users in using and navigating the app and its ecosystem.

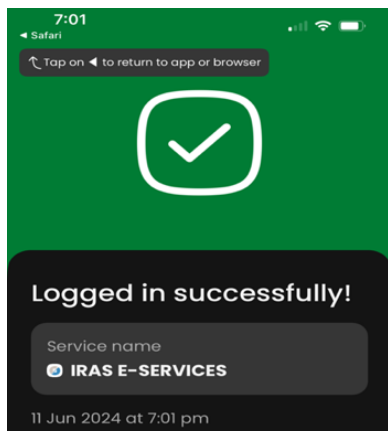


Figure 7: Image taken by Author 1. It shows the mobile screen after successful authentication and login. The user is required to click on the link on the screen to return to app or browser.

Beyond this ecosystem that Singpass is embedded within, we note other features within the app that are built for accessibility (GovTech, 2022, 2024). These features crucially fulfil the WCAG principles of Perceivable and Understandable – which states users must be able to perceive information and understand content and operation, respectively.

Beyond allowing for accessibility features such as text contrast, text size, and other features embedded within accessibility in IOS and Android systems, Singpass also moves beyond to incorporate issues present in local contexts. This includes the ability to toggle between the four languages used in Singapore (English, Mandarin, Malay and Tamil), given that not all of the population are literate in English. Crucially, the app offers connectivity not just with a whole range of services which interface with not only government agencies but select corporate entities. Beyond authentication, the user can also e-sign documents,

receive important notifications from government agencies in their app inbox, pre-fill digital forms, and display digital IDs, providing a one-stop accessible interface for government-to-people transactions and moving away from physical interfaces and providing ease of connection not only to both disabled and non-disabled populations. As GovTech explains, the key reason why Singpass app was built this way was to allow for a wide diversity of user experience and to allow for a more inclusive app (GovTech, 2024). In the context of “smart equality”, what this highlights is that disability can provide generative insights for design and benefits a larger segment of society.

Yet, as Goggin (2021) points out, apps while beneficial, can also create problems – especially when they are unavailable, inaccessible, or expensive, or when other problems emerge. The same applies to the Singpass app. In the next sections, we highlight two possible problems.

6. Biometrics as technological systems

National ID systems, digital or otherwise are also information systems for governance (and also surveillance), they allow for recognition of one’s identity and allow access to services in their nation-states/jurisdiction, while reducing identification to data and rules (Lyon, 2009). As Hayes de Kalaf and Fernandes (2023) note in tracking emerging trends vis-à-vis digital ID, national ID systems can also systemically exclude by design and deny people access to important services.

More worrying is the deployment of biometrics within digital ID systems. As Joseph Pugliese (2012) highlights, the development of biometrics as technology are intimately linked to the pursuit of biopolitics – the body and its corresponding imprints (e.g. fingerprints, facial details...etc), are captured as templates and verified as truth. Pugliese points out that biometrics are in fact “underpinned by the authorising discourse of science” in making truth claims (4). Disability, in addition to whiteness and other identifiers are then seen as external and invisibilized within biometric technologies. In this way, biometrics also reproduces the clinical gaze through scientific knowledge – what is seen and visualized through biometric systems are ultimately what comes to be recognized within a purportedly “seemingly objective scientific gaze” (16). Pugliese highlights the case of the US Government Accountability Office and its discussion of biometric enrolment – noting that disabled people can be systemically excluded from biometric systems and not counted and enrolled (89).

These questions of exclusion and non-enrolment are important to address, as with any technological

system (for instance in terms of AI bias). Design of biometric systems can pose problems in terms of the kinds of biometric data it requires, as well as the ways in which the interface (between human and machine) operates (Blanco-Gonzalo et al., 2018; Stanton et al., 2008). Importantly the availability of a range of authentication methods are key to overcoming such barriers (ten Brink & Scollan, 2019). Such an approach is also present in the Singpass app, where a variety of authentication methods, beyond biometrics, are available for the user. The use of alternative formats of authentication also meets WCAG guidelines of Operable.

While digital ID systems may pose problems, Gleb and Metz (2018), citing the case of India are more optimistic in noting how it may also provide the catalyst for sustainable development and equality, noting that such systems may allow access to much needed services. Similarly, Banerjee (2016) highlights the various affordances the Aadhaar, India's digital ID system, provides for digital inclusion.

The operations of the Singpass app can also be beneficial in the kinds of affordances it provides. Here we note how disability status is not officially captured as data within the Singpass app and more broadly within Singapore national ID systems. Take for instance, the application for a transport concession card through SG Enable, where Singpass is used to provide basic information. The application process is clear that the applicant will also need to furnish additional disability information (such as medical documents), indicating that Singpass does not capture disability data (SG Enable, u.d.). The non-capture of disability data in Singpass has also allowed some disabled people to circumvent discriminatory attitudes that they may encounter in face-to-face physical transactions. For instance, in our initial interviews, blind users shared that they face problems in opening bank accounts physically in Singapore, but the advent and use of Singpass to transact digitally have allowed them to circumvent discrimination, without the need to account for one's disability.

7. Standards and accessibility

As we document in a separate work in progress paper, accessibility was not consciously adopted as part of the development of the Singpass app, instead, developers accidentally embed accessible design because of their need to conform to Apple's app store guidelines when developing the app. In both its accessibility and developer guidelines, Apple lays out the ways in which apps can be developed for accessibility (Apple, 2024a, 2024b). The study of accessibility in apps is also an area of scholarly

concern, and many have pointed out how these accessibility guidelines may differ between apps and also app stores (between Google and Apple) (Ballantyne et al., 2018; Yan & Ramachandran, 2019).

The question of app accessibility, however also connects to the larger issue of web and internet accessibility, a subject we will note of considered scholarly attention, especially in terms of the problems it has posed for disabled people (Ellis & Kent, 2011; Goggin & Newell, 2003). As Jaegar (2012, p. 4) notes, "Many new Web products are developed and launched seemingly with the intent to be openly discriminatory against persons with disabilities." Importantly, while Singpass may have accessibility incorporated in its design, it interfaces with government websites that may not be fully accessible as disabled users share. The Enabling Masterplans also layouts the need for all high traffic government websites to be accessible by 2030, in contrast to the 61% in 2022 (Ministry of Social and Family Development, 2022, p. 152).

Standards of accessibility (especially web and app accessibility) are political. As DeNardis (2010, p. 133) writes, standards operate at a technical level and embed particular values and norms which reflects the interests of those who create the standards. Ellcessor (2010) points out that while the development of web accessibility standards embedded in the WCAG is critical in creating a more accessible internet, these standards are also based on particular understandings of access/accessibility. Ellcessor (2010) notes how WCAG focuses on "variances in humans' encounters with internet technology" (298-299) in developing the guidelines, which contrasts with the standards drawn up by Section 508 for enforcement and the kinds of standards embedded within the Americans with Disabilities Act (which are focused on accommodation).

More broadly, web and internet access as standards can also be problematic. Lewthwaite and Swan (2013, p. 157) highlights that while the development of WCAG provides key impetus for global web accessibility, these standards "fail to account for disability as a socio-cultural product dependent on any given context". Importantly, disability standards, evident in the WCAG, are built and geared towards minority world contexts and does not take into account issues across majority worlds (Lewthwaite & Swan, 2013). Importantly, Lewthwaite (2014, p. 1377) notes how these standards do not understand disability as "one amongst multiple and inter-related identities and indices of disadvantage..

By building an app that conforms to accessibility guidelines dictated in the Apple store, the Singpass app conforms to standards and norms dictated by a North American context – in particular, the Americans with Disabilities Act, as well as other associated laws such as Section 508 of the Rehabilitation Act. In this instance, the absence of any disability rights legislation, laws and/or standards, despite Singapore’s ratification of the Convention on the Rights of Persons with Disabilities has not prevent its conformance to accessibility standards propagated in minority world contexts. In initial interviews, blind users have highlighted how Singpass App is accessible (although in the same vein they have highlighted problems for the other apps/sites connected in its ecosystem)

8. Conclusion and next steps

Media is central to society today (Couldry et al., 2018), more so given how transactions are increasingly taken place in digital forms. Yet as we highlight, the Singpass app (both in terms of its development, use and placement within the broader ecosystem of apps, internet, and media technologies), must be understood in both its local and global contexts. In the next phase, building on data collection with Singpass disabled user testers and app developers – to be completed by December 2024, we will add on the paper by highlighting policy implications and offer a fuller analysis, in terms of our frames of smart equality, social barriers and affordances, but also of the four WCAG principles.

9. References

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