



Fairness in design: a model for critically analysing digital government forms

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Declaration

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— Arjun Khara

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This is a PhD thesis written on the topic of fairness in design, and is my original contribution to the discipline of information design. No contribution of any significance is ever complete without the support of a special group of people.

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Abstract

This thesis investigates the role of fairness in the design of digital government forms, and attempts to answer the primary research objective: how can digital government forms facilitate fairness for everyone, i.e. forms users and issuers?

The research begins with an overview of government forms in Singapore, then reviews concomitant literature on the design of paper and digital forms. The review shows there is a consensus that forms are co-authored documents involving an exchange of information between issuers and users. Government forms add an additional layer of complexity to these exchanges since they not only serve as information documents, but also legal instruments, with power to enforce user participation and impose punitive measures for incomplete or false responses. Users are therefore subjected to exchanges in which the rules of participation are dominated by issuers, while typically bearing the penalties for errors that arise from poorly designed forms; this leads to unfairness for users. However, it is also unfair for issuers to absorb complete blame for failed exchanges, given the co-authored nature of transactions embodied in forms.

Accordingly, the thesis explores prevailing philosophies of fairness across disciplines, ultimately settling on Rawlsian notions of cooperation, reciprocity, and compromise. These are matched with extant forms design practices to establish a framework capable of integrating Rawlsian principles of fairness with co-authorship. This framework is used to analyse two digital government forms in Singapore. The findings are then mapped onto a **fairness model** – a qualitative approach to identify problems in the design of digital forms.

The model equates effort needed by least advantaged forms users, with design opportunities that issuers ought to provide to every user regardless of any user's inherent abilities. In doing so, the fairness model responds to the primary research objective by: (i) identifying fairness gaps in Singapore's digital government forms design; (ii) drawing out optimal fairness zones for participation between users and issuers; and (iii) establishing a set of criteria for integrating the fairness model into existing, and emerging, design practices to produce digital government forms that are fairer for everyone.

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1. Introduction

1.1 Chapter overview

Fairness has been an overriding, and often overlooked, concern in information design. *Fairness by design* is used regularly in research about algorithmic bias, data interpretation, computational systems, and machine learning. However, relatively little mention of this phrase is made by information design scholars. Likewise, discussions of fairness abound in political philosophy but there is a significant paucity of studies on how notions of fairness, justice, cooperation, and reciprocity¹ can be systematically applied to document design, particularly to digital government forms.

Establishing a viable model for fairness in the field of information design, though, first requires an examination of what fairness is. More precisely, there is a need to understand how the concept has been defined and applied across other disciplines, before applying its principles to digital government forms

¹ John Rawls describes the fairness principle as a call for participants to comply with the rules of an institution that they are transacting with, so as to facilitate a “mutually beneficial and just scheme of social cooperation” (Lyons, 2015, pp. 273–276). Such cooperation requires a degree of sacrifice in return for reaping all the benefits of the transaction. Rawls’ principles of fairness are discussed in more detail in Chapter 3, and are referred to throughout this thesis.

design. It is also necessary to briefly discuss some of the reasons why multiple government bodies around the world have adopted digital technologies.

The proliferation of internet technologies across many nations has seen a growing trend in the public sector for digital modes of governance. Along with the conveniences and cost-savings to administration, e-governments posit the benefits of *digital by default* to users. Lips, for instance, notes “governments seem to take this administrative reform opportunity of establishing digital by default very seriously” (Lips, 2014, p. 187). However, the advent of information societies introduces – and re-introduces – a swathe of problems that often result in marginalisation or exclusion of certain groups, including those who are either unable or unwilling to engage with digital environments. Likewise, the uptake of technological solutions is not guaranteed by those who possess the resources to do so. This is because of the nature of exchanges between an institution and its various parties: in the case of government forms there is the added dimension of mandatory participation, together with the threat of legal ramifications for those who fail to comply with the rules of the exchange. The rules are almost always set by the government, and exerted through the form’s design over which the government exercises near-absolute control.

Furthermore, the challenges of privacy and data protection create added complexities for cooperation and consent within digital exchanges. Clarke, for instance, refers to the terms and conditions of using Gmail, stating that users might “consent to use a Gmail account, but it is possible that they do not provide effective informed consent to the use of a Gmail account” (Clarke, 2010, p. 238). Similar problems of accountability, trust, and empowerment are applicable to digital government forms, except with the added burden of not being able to opt out of a process if the government has deemed that process mandatory for all users.

Such issues have been present long before the introduction, growth, and proliferation of digital forms. However, the increasing use of technology raises new questions, and revives old lines of enquiry, into how government-citizen exchanges can lead to fairer participation for forms users and issuers that result in all parties achieving their desired objectives from these exchanges.

1.2 Need for research

“To live effectively,” wrote Wiener on the topic of cybernetics and society, “is to live with adequate information” (Wiener, 1954, p. 18). Wiener’s observation raises two relevant questions within the context of this thesis: (i) how much information is needed within a digital government form for it to be considered adequate? (ii) who decides what “adequate” means for everyone participating in that process?

The management of information has been a major theme in discussions on the welfare of the individual and society. Much of this information is often produced in, and exchanged through, forms. Indeed, forms are “one of the most important interactive systems used by organizations, whether as paper forms, predating the advent of computers, or as data entry screens within information systems...[and] are deeply susceptible to the political relations within organizations” (Sless, 1999, p. 136).

But forms are also influenced by relationships between an organisation and its external users. Government forms, in particular, mediate exchanges of information with an entire citizenry, most of whom are exogenous to the ministry or agency issuing the form. The scale of information being exchanged between a government and its users is also typically much larger. Technology has played an important role in facilitating the bulk of government-citizen communication through forms. But as Mulligan et al. observe, “governments, companies, and the technologists they employ are increasingly being called to task for the social consequences of the technologies they build and use” (Mulligan et al., 2019, p. 119). Indeed — as shown in later chapters — there is a tendency for technology to improve the well-being of certain groups, while simultaneously creating conditions of exclusion for others.

Mulligan et al.’s observations also tie in with Pagallo’s comment: “flow of information jeopardizes traditional assumptions of legal and political thought, by increasing the complexity of human societies” (Pagallo, 2015, p. 161). In the case of digital forms, technology is frequently implemented for the benefit of issuers, rather than users who face increasing complexity and so are impelled to put in more effort to overcome these challenges. It is therefore reasonable

to posit that the mindset and attitudes of these organisations towards their users are, to a significant extent, reflected in the design of their forms. This has become an especially relevant topic in the past decade – from 2011 to 2021 – and seen many e-governments, including Singapore’s, move away from a “Government-to-You” system towards a “Government-with-You” approach (Government Technology Agency of Singapore, 2016). The shift has compelled governments to re-evaluate what cooperation, collaboration, reciprocity, and compromise mean in digital, diverse, and oftentimes differentiated societies.

Much work on forms design has traditionally addressed these issues via user experience concerns, and their concomitant impact on typographic and graphic considerations. But such perspectives have not adequately addressed the concept of fairness as a key driver in government-citizen exchanges; nor have they articulated how the inherent needs of users correlate with issuers’ obligations and abilities to create fairer participation for all parties. This thesis seeks to fill these design gaps with a fairness model that builds on the works of Schwesinger, Waller, Sless, Jarrett, Gaffney and other researchers.²

In discussing the characteristics of government-citizen interactions through forms, Schwesinger asserts that “government forms must work for everyone, and facilitate fairness” (Schwesinger, 2017, p. 613). This statement forms the core of this research and so is frequently referred to throughout this thesis. Accordingly, the thesis is grounded in a set of five research questions:

- To what extent is design responsible for shaping the attitudes of users and issuers towards Singapore’s government documents, including digital forms?
- What does fairness mean in other disciplines, and can a definition of fairness be constructed specifically for the field of information design?
- How can Singapore’s government forms facilitate fairness for everyone?
- To what extent do digital tools influence fairness in government forms?
- How can the concept of fairness be used in a qualitative framework to inform the design of Singapore’s digital government forms?

² Chapter 3 conducts a literature review of the works of document scholars and researchers. Chapter 5 examines scholarship of fairness in other disciplines – including law, political philosophy, and economics – to determine possible intersections with information design.

1.3 Scope of research

The process of answering these research questions begins in Chapter 2, which discusses the role of administration in modern Singapore, examining its past governance and current status as a developed nation with an advanced digital infrastructure. The chapter looks specifically at how digital government forms are produced in Singapore, and examines the extent of fairness present for users and issuers. As such, the discussions in this chapter offer reasons why Singapore is an ideal case for evaluating fairness in digital government forms.

Chapter 3 reviews past and current literature on documents and forms. These works are evaluated for their relevance and limitations with respect to the role of fairness in designing paper and digital government forms. Chapter 4 focuses this evaluation through analysing two digital government forms: Singapore's immigration arrival card and health declaration, i.e. the SG Arrival Card, and the public contact tracing app, *TraceTogether*. In doing so, Chapter 4 reveals certain gaps in these forms, thus establishing a framework containing a set of 11 criteria against which fairness can be assessed.

These gaps and criteria are addressed in Chapter 5, which discusses how fairness has been defined, understood, and used in other disciplines. Chapter 5 concludes with a formal definition of fairness that is suited to information design contexts, thereby laying the foundations of a model for fairness in designing digital government forms. Chapter 6 uses the assessments and findings from the case studies and framework respectively, to construct a qualitative fairness model. The model shows how digital government forms can facilitate fairer design practices for all participants by balancing user experiences against issuer exigencies. The model achieves this by plotting effort needed to create and complete a form, against design opportunities provided to help users achieve form completion. This relationship is explained in a series of graphs to visually identify the best possible scenarios for fairness in digital government forms. Chapter 7 concludes the thesis by revisiting the research questions, and proposes potential avenues for using the fairness model as a quantitative tool that integrates with machine learning. Future research may therefore be used to examine the feasibility of a quantitative

model in producing measurable data points that track the health and extent of fairness in Singapore's digital government forms.

The chapters in this thesis attempt to construct a holistic and workable fairness model that is applicable and useful to e-government regimes. The model is a result of researching and testing digital government forms in Singapore created between 2011 and 2021. While digital forms are used in many countries, there are four key reasons for choosing Singapore as a basis for the case studies in this thesis:

- The nation has one of the highest literacy rates in the world.³ However, a significant portion of its residents suffers from digital exclusion owing to their inability or reluctance to adopt digital devices and smart technology.
- E-government has gone through several iterations in the decade between 2011 and 2021 and is presently at a stage where digital is the default mode of communication between the state and its citizens. This has resulted in the proliferation of digital forms for virtually every type of government service, from registering a new business and making a police report, to reserving public barbecue pits and paying for street parking.
- The government has relied on information and communication technology (ICT) heavily to stem the spread of COVID-19 through digital forms which manage immigration, and track the population's internal movements. This has led to concerns of privacy, accessibility to smart phones, knowledge of other languages, and the marginalisation of certain groups, i.e. the elderly and low-income migrant workers.
- The app which uses forms to trace public movements during COVID-19 has so far not been made mandatory for citizens to download; this created a unique scenario around how the notions of cooperation, reciprocity, and compromise have been mediated between a traditionally paternalistic government⁴ and its citizens during a national – and global – health crisis.

³ Literacy rates in Singapore in 2019 were estimated at 97%. (World Bank and UNESCO Institute for Statistics, 2021) Data available at <https://data.worldbank.org/indicator/SE.ADT.LITR.ZS>

⁴ Singapore's hierarchical and often paternalistic socio-political structure is discussed in greater detail in Chapter 2, along with additional reasons for why Singapore was chosen as a case study.

1.4 Methodology and limitations

The thesis investigates the process of fairness in digital government forms by analysing prevailing interpretations of fairness across subject areas, and also examines paper and digital forms to determine where concerns of fairness have traditionally been centred. The methodologies used in the thesis, and particularly in the case studies, are interpretative and autoethnographic.

I conducted field research in Singapore on the digital forms that have been analysed in Chapter 4. Part of this research included using these forms in real-world and test-case scenarios to assess the benefits and limitations across a range of user scenarios. “By its very nature, autoethnography is both process and product” (Campbell, 2015, p. 96). The process of using the forms revealed many design gaps which have been included for analysis in this thesis. These gaps were specifically identified against criteria that highlighted unfair conditions for less advantaged users. This approach formulated a structure within which to analyse frequently used digital government forms, and offer correctives where feasible. In effect, the product of this autoethnographic method is the fairness model.

However, the thesis does not attempt to offer an overly comprehensive list of gaps in forms design for every user type. Instead, gaps were identified when they specifically tended to affect users with limited abilities and access, which issuers ought to have provided. Hence, the research uses the “Ought vs Can” fairness approach, discussed in Chapter 5, to frame the interpretative and autoethnographic insights gathered from my field studies. Additionally, the thesis focuses on the design of digital government forms in Singapore. It is therefore impossible to assert whether the findings from the research apply equally to paper or digital forms produced in other countries with varying access to advanced ICTs. The analysis in Chapter 4 takes steps to mitigate this issue by examining analogous forms produced by GOV.UK. But this examination is comparative, and ultimately concentrates on design issues around digital forms produced in Singapore.

The analysis of digital forms was conducted on an iMac with a 21½-inch screen, and an iPhone with a 5½-inch screen. This thesis acknowledges that

such technology may not be readily available to users in emerging economies or with constrained access to comparable infrastructures. Accordingly, these two devices were used to simulate legacy operating systems in order to assess how the forms performed on older computers and unsupported browsers. Findings from these assessments provided limited but useful insights about the issues that less advantaged users encounter when interacting with the two digital government forms.

Another constraint was caused by COVID-19 restrictions in Singapore. I was unable to gather insights from forms issuers – other than brief informal conversations over email – given the limitations on interactions and travel. Insufficient access to forms issuers is problematic under typical conditions; but COVID-19 exacerbated this issue and so the research relied on works done by forms scholars and designers, discussed in Chapter 3, alongside literature published on Singapore's government websites and archives. The quality of these works and repositories was adequate so that an interpretative method was deemed to be reliable. Additionally, the fairness model is grounded on:

- (i) scholarly work around participant behaviours and design challenges that have remained largely consistent in Singapore's digital forms from 2011 to 2021 – as is the case of Singapore's immigration forms.
- (ii) new and hitherto unseen modes of government-citizen exchanges, as in the case of *TraceTogether*, the COVID-19 tracing form. This warranted an autoethnographic approach that revealed fairness concerns about digital government forms in real-time. The interpretative and autoethnographic methodologies used in the thesis therefore proved useful in providing the framework for this research and its outcomes.

The next chapter will provide an overview of governance in Singapore. The chapter will briefly examine the administrative foundations of the island, and the factors and events that have led to and shaped its current governance and policies. Attention will be given particularly to e-government, along with examples of digital state documents that have mediated a complex array of government-citizen exchanges from 2011 to 2021.

2. Government administration in modern Singapore

2.1 Chapter overview

This chapter discusses the origins and current operations of administration in Singapore, and presents reasons for why Singapore is an ideal case study for the thesis' research objectives. Accordingly, the chapter attempts to answer three core questions: (i) How did administration in its current form develop in Singapore? (ii) What are some problems that continue to hinder effective e-government? (iii) How is the government planning to overcome such problems through fairer digital forms design, particularly against the backdrop of the global health pandemic?

A conspectus of Singapore's establishment is useful for understanding its current disposition. Consequently, this chapter provides an overview of the country's colonial history and geographic location as factors that continue to influence present-day public policies. Importantly, the chapter looks at how administration has evolved in response to multiculturalism, use of languages, migration policies, and the problems of social exclusion. These are discussed in relation to Singapore's digital government strategies, and form the basis for why the country is an ideal case to meet the objectives of this research. The

chapter thus ties in with the literature review and case studies in Chapters 3 and 4, respectively, to answer the thesis' primary research questions.

The chapter begins with a discussion of Singapore's current government and political structure. The discussion then moves to a brief review of British administration in Singapore. Colonisation brought hitherto unseen challenges and benefits to the island. Many of these have endured into the current era. Thus, the chapter provides insights into the origins of these issues, and the concomitant impact on past administrative regimes. Accordingly, Singapore's modern founders, after the country gained independence in 1965, concerned themselves with balancing these pros and cons to create political, social and economic stability. This in turn affected how government-citizen relationships developed as Singapore grew from a cast-away island to a commercial power.

The chapter then discusses the persistence of multiethnic problems in Singapore, within the context of English literacy. This opens up the discussion about the adoption of digital technologies and the implementation of *Smart Nation*, an e-government initiative to modernise public services with ICT⁵. The chapter looks at the government's intention to become a holistic ICT service provider to citizens, and the specific steps it has taken to make this possible. Ideas of trust, cooperation, reciprocity, and collaboration are thus explored within the context of digitalised government-citizen exchanges, focusing on the needs of Singapore's elderly, and low-income migrant labour population.

Chapter 2 concludes with an in-depth discussion on how e-government is affecting the digital divide, and to what extent are citizens – particularly the less advantaged groups – being included in and excluded from *Smart Nation* initiatives. This is relevant during the COVID-19 pandemic, whereby Singapore is relying on ICT to encourage government-citizen cooperation and trust. The focus of this discussion is thus kept on socio-political matters of language, clarity, technological know-how, and participation through Rawlsian notions of fairness. This discourse forms the basis for Chapter 5, which investigates specific instances of such issues through an analysis of two digital forms.

⁵ Information Communication Technology (ICT) is used in a number of ways. Within the context of this thesis, ICT refers to infrastructure that facilitates electronic and digital communication, much of which has seen an expansion under the *Smart Nation* initiative.

2.2 Overview of Singapore

“Singapore has no history! Singapore’s history begins now!” (Turnbull, 2009, p. 1). This is what historian and former Malayan Civil Service Officer Constance Mary Turnbull recorded of the new government’s rally, following the island’s independence from Malaysia on 9 August 1965. Henceforth, Singapore would plot her path forward into the future and “reject past history as irrelevant” (Turnbull, 2009, p. 1) But along its journey from English colony to commercial superpower, the small Southeast Asian nation, at the southern tip of the Malay peninsula, has integrated the miscellaneous strands of its past into its present administrative systems.

Singapore currently operates a parliamentary democracy, modelled in part on a British-styled judiciary, public civil service, and post-secondary education policies. The country’s military is similar to the armed forces of Commonwealth states, both in hierarchy and nomenclature. But unlike the United Kingdom, Singapore operates a single legislative body. Since gaining independence, Singapore has experienced substantial degrees of progress, namely in technology and finance – which have surpassed several regional and global contemporaries. Mobile penetration rates in 2014, for instance, were 148.2%, with more than 7.8 million 3G and 4G mobile subscriptions (Lin et al., 2016, p. 335). Consequently, the island is home to the headquarters of several multinational companies and is considered a tax haven, much like Switzerland, for international billionaires (Sanandaji, 2014, p. 333).

As such, Singapore’s high digital adoption rate corresponds with digital infrastructures that are embedded into everyday services for citizens and residents. This has led to the implementation of an integrated e-government administration since 2014, under the country’s *Smart Nation* initiative. Tung and Rieck cite three reasons for e-government’s proliferation in Singapore:

First, e-Government maturity is high; in fact, Singapore has ranked second in the world in terms of e-Government maturity. Second, Singapore’s population is highly computer literate...Third, Singapore’s government is comparably proactive in managing its economy, resulting in a high degree

of interaction between the government and business organizations (Tung & Rieck, 2005, pp. 419–420).

These achievements are key to Singapore's success with digital initiatives, and largely attributable to key administrative responsibilities being confined to a relatively small governing coterie. As of 31 December 2020, Singapore's public service comprises 16 ministries that have oversight of more than 50 statutory boards, and 153,000 public service officers (Careers@Gov, 2021). Ministers and members of parliament, however, retain core decision-making powers, with the prime minister situated at the top of the hierarchy. The prime minister's office is responsible for Singapore's digital government services and agencies that provide them, thus highlighting the centrality of *Smart Nation*.

As such, the applications of e-government in Singapore invite discussions on administrative trends and offer a corrective to some of the opinions around the nation's strict political management systems. In an article on participation and policymaking in Singapore, Ho urges a re-examination of views which allege that these top-down administrative approaches marginalise its citizens:

In Singapore, any discussion of citizen participation inevitably is linked to state domination of and administrative control over the city-state's fragmented and underdeveloped civil society. It is the general view among observers of Singapore that the well-established, top-down hierarchical arrangements in the system of government give prominence to Singapore's political and administrative leadership and make the citizens and civic groups relatively inconsequential when it comes to governmental and policy matters...However, I believe the issue is much more complicated than what has been generally reported and deserves greater scrutiny (Leong, 2000, p. 438).

Such dogmatic assertions have been the topic of debates between the government and its critics. However, scholars like Bellows have posited that the top-down approach is a key factor in not only maintaining civic stability, but also in forming a participative environment for users. Within the context of e-government, discussions of documents and policies considered in this research reveal greater proactive attempts by the government from 2011 onwards, to include its citizenry in administration and public engagement.

To better understand the rationale behind some of Singapore's digital policies, it is necessary to briefly explore the administration of its colonial past, which continues to exert an influence over present decisions. Current issues such as multiple languages, foreign migration, information flows, and social exclusion are rooted in the island's history and geography. A conspectus of prior governance offers insight into some of the attitudes and assumptions that have endured and impacted digital government forms from 2011 to 2021. In addition, Singapore is a multilingual country, with four distinct languages and several migrant tongues that constitute the local population.⁶ This leads to the question of producing public documents, including digital forms, in multiple languages; however, relatively high English literacy rates means much of government-citizen exchange tends to be conducted in English. This results in forms that are predominantly set in English, with varying levels of support for the other languages.⁷ This issue is expounded on in Section 2.3.1, which examines the role of English as the nation's administrative lingua franca, and the government's efforts over recent decades to reinvigorate and preserve the use of Mandarin, Malay, and Tamil across Singapore's diverse communities. These efforts are also being carried over to Singapore's growing number of economic migrants and long-term visitors, which constitutes a significant proportion of the island's population.⁸

Yet, despite this diversity, there are relatively high levels of trust in the government, coupled with the administration's intention to be of service to its citizenry, rather than continuing with a top-down approach that characterised much of the country's patriarchal style of governance from 1965 to the 1990s. The issues of trust, and government-as-a-service are discussed in Section 2.4. These factors collectively contributed to Singapore's responses to the health pandemic, which saw digital forms at the forefront of the nation's efforts to manage COVID-19, thus making Singapore an ideal case study for this thesis.

⁶ Table 2.1 lists the ethnic population distribution and literacy rates in Singapore.

⁷ Chapter 4 examines the predominance of English in Singapore's digital government forms alongside technology and bias concerns, to ascertain how fairness can be implemented in design.

⁸ Net migration in 2021 was estimated to be 426 per 1000 population, a significant percentage even during the pandemic when travel was restricted. (Source: Migration Policy Institute, 2021).

Singapore data sheet	
Land area (square kilometres)	
Land area	728.3 Km ²
Population (units in '000)	
Total population	5.5436
Resident population	3.99
Age groups (units in '000)	
Below 20 years old	782.1
20–64 years old	2565.7
65 years old and above	639.0
Median age	41.8 years
Ethnic composition (units in %)	
Chinese	74.3%
Malay	13.4%
Indian	9%
Others	3.2%
Literacy rate (units in %)	
English literacy	97.5%
Official languages/scripts	
English	Latin
Malay	Latin
Mandarin	Chinese
Tamil	Brahmi

Table 2.1: Overview of Singapore's land area, population, age, ethnic composition, literacy, and official languages. (Source: Department of Statistics Singapore, 2021).

2.3 Enduring influences of colonial administration

On the afternoon of 6 February 1819, the East India Company (EIC) hoisted the Union Jack on the island of Singapore. The event marked the schemes of Sir Stamford Raffles, an ambitious Company man eager on uprooting Dutch authority in Malaya. Not a formal plenipotentiary of the Company, Raffles nonetheless took it within his own remit to swiftly and secretly facilitate transfer of power over the island from the Sultanate of Riau-Johor to the north, to the Sultan's older brother whom he installed as the local ruler. Raffles then concluded an agreement — composed in both, English and Malay — with all parties, which gave the EIC basic trading rights on Singapore.

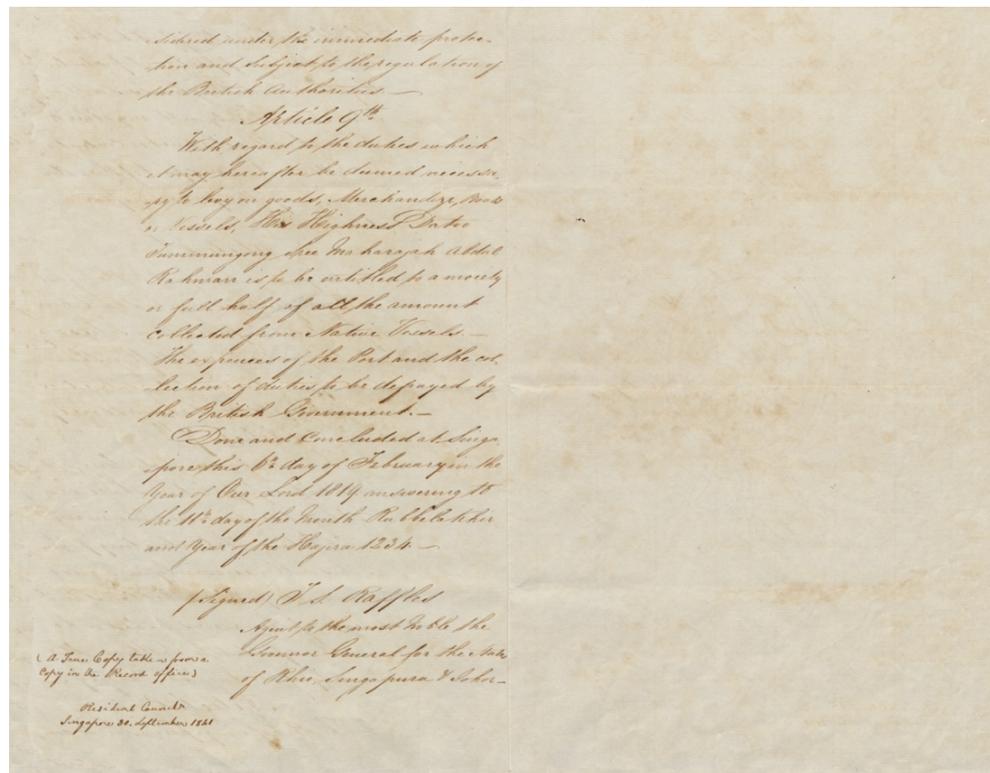


Figure 2.1: Pages 7 and 8 of a record showing the 1819 Treaty signed by Stamford Raffles and Singapore's local Malay chiefs. This record is a scribal copy, made in 1841, of the original 1819 Treaty composed in both English and Malay. In the treaty, Raffles refers to Singapore as Singapura, the Malay name for the island. The treaty gave the East India Company basic rights to setup and trade on the island, and established the foundation for future treaties and greater colonial control of Singapore. Image reproduced and used with permission from National Archives of Singapore.

The island itself, however, shows up on early fourteenth century Chinese navigation charts: records point to the harbour of Longyamen – the alleged junction where the waters of the East and West met (Ptak, 1995, p. 55). While the charts were based on the supposition the world possessed only two oceans, they do emphasise the strategic value of the island's location, which drew such intense interest from future migrants, empires, emissaries, and administrators. Temasek, as Singapore was then known, was already a trading post of the Majapahit Empire and home to the Orang Laut – the indigene population of nomadic seafaring gypsies who inhabited the island as well as the surrounding areas (Mulliner & The-Mulliner, 1991, p. 112).

Of relevance to this discussion are early Chinese accounts that highlight Temasek as a place where the Orang Laut and the Chinese dwelt side by side. Colless' historical investigations into Southeast Asia reveal that these ancient records appear to indicate some of the earliest known Chinese communities living in Malaya (Colless, 1969, pp. 6–7). Administrative documents, including forms, would have no doubt existed in Singapore prior to 1819. However, their relevance to government forms in this thesis is limited for two reasons:

First, it has been estimated that the number of inhabitants in Singapore in 1819 was around 1000 (Turnbull, 2009, p. 25), the majority of which were the Orang Laut. This is in stark contrast to the first census taken by the EIC in Singapore five years later, which recorded a total of 10,683 residents, including 74 Europeans, 16 Armenians, 15 Arabs, 4,580 Malays, 3,317 Chinese, 756 Indians and 1,925 Bugis (Buckley, 1902, p. 154). The island's populace rapidly increased in subsequent years as commercial growth became the animus for local, regional, and transoceanic migration. This fast-expanding multicultural landscape, which materialised only after 1819, is far more akin to the current political and social terrain in Singapore, along with concomitant government policies designed to mediate present-day interactions across the country's diverse and deep-rooted communities.

Second, the character and magnitude of administrative challenges which Singapore encountered as a colony differed profoundly from the issues it faced prior to the EIC's arrival. The political historian Jaya Kathirithamby-

Wells, for instance, has stated that “when Singapore was founded in 1819 there did not exist for its administration any tradition of a separate civil service” (Kathirithamby-Wells, 1969, p. 48). After the treaties of 1819 and 1824, migration and mercantilism multiplied, which in turn spawned new demand for civic growth. The influx of settlers effected swathes of novel undertakings: farming, engineering, road and tram works, urban planning, commercial and legal infrastructures, and public utilities. These activities necessitated modes of administration that were hitherto absent, and prompted a slew of political, social, economic, and military initiatives as the government began to operate, for the first time, under a British-styled civil service. This mode of governance has moulded successive administrative regimes – including the present-day Singapore Civil Service – to a greater extent than any prior to 1819. Thus, public documents created after this year have had a far greater influence on the design of forms produced by the Singapore government between 2011 to 2021.

The mix of multiculturalism, a strategic geographic location, British-styled administration and judiciary, and the influx of global migrants together made for a potent brew of administrative issues. This mix continues to drive present-day public policies, while also serving as an economic engine for the island. As such, the design of Singapore’s government documents not only reflects the population’s multiethnic composition, but also responds to its present economic, security, and information needs and assumptions.⁹

The exchange of information has been a defining quality of Singapore’s growth since the earliest days of colonisation. In his treatise of nineteenth-century Singapore, Harper writes about Southeast Asian diasporas that were marked by “the flows of information” (Harper, 1997, p. 263). Harper portrays the island as a key cross-cultural enclave for goods, services, commodities, technology, ideas, and languages. In other words, Singapore was a vital and vibrant administrative node which facilitated complex exchanges, much as it continues to do today:

⁹ These are among the key reasons for why the case studies in Chapter 4 analyse immigration and contact tracing forms.

From the moment of its foundation, Singapore became a central locus of a number of overlapping diasporic worlds and was intersected by a series of information regimes. By the end of the nineteenth century, the island was a regional focus of an integrated system of international trade and a concomitant revolution in communications: of print, steam, even the electronic remittance of money by telegraph. This was central to Singapore's strategic and economic function within the British empire (Harper, 1997, p. 264).

A lot has changed for present-day Singapore in terms of political stability, social cohesion, technological progress, and national priorities. Yet, the past continues to exert its influence over the city-state's current government organisations and administrative observances. Quah points out that "as a former British colony it is not surprising...Singapore has political and administrative institutions patterned on the British prototype" (Quah, 1996, p. 15). But equally crucial, as Quah has noted, is that "while the British imprint on the Singapore Civil Service (SCS) is still obvious, the influence of the local environment on the SCS has been more significant especially after the advent of the [People's Action Party] PAP government in June 1959," (Quah, 1996, p. 15) following Singapore's move towards self-governance.

Both, Harper's and Quah's insights highlight the cumulative impact that Singapore's colonial histories and post-colonial activities have had on every sphere of government administration, including the design of government documents. Administration, governance, and social policies are coterminous subjects of inquiry. Including discussions of past administrative practices provides a sharper perspective on Singapore's present-day policies. Such discussions also show the extent to which prior systems have influenced future and current government design policies up to 2021 – including decisions and reactions made in response to the COVID-19 pandemic.¹⁰

¹⁰ Chapter 4 includes a case study that analyses *Trace Together*, an app-based form issued by the government in response to COVID-19 tracing and reporting across Singapore.

2.3.1 Multiculturalism and administration

At present, Singapore has four official languages – English, Malay, Mandarin, and Tamil. While government documents, signage, and public communication artefacts are provided to some extent in each of the four languages, the overwhelming majority are in English, which is the nation’s working lingua franca. Nonetheless, the island’s lingual history has never been homogenous.

In a survey of nineteenth-century migration in port cities of Southeast Asia, Amrith alludes to the growing influx of typesetters, journalists, students, and intellectuals who “encountered each for the first time, and sought new ways to communicate across the divide of language and culture” (Amrith, 2011, p. 57). Such multifaceted interactions came to embody the island’s new hybrid communities. Singapore’s status as a migratory meeting-point for different tribes and tongues continues to this day, along with the issues that accompany a multicultural population concentrated on an island less than 730 km² in area. Velayutham describes the conditions that animated politics and multiethnic societies in Singapore, which ultimately came together as a single nation:

Because of the circumstances of the formation of Singapore, the “imagined” dimension of nationhood did not emerge smoothly. The early phase of the Singaporean nationalization project was characterized by strategies aimed at reigning in, or binding Singapore's multi-ethnic immigrant population within the boundaries of the nation-state (Velayutham, 2007, p. 20).

Immigration into colonial Singapore brought with it new challenges for the many administrative regimes, which were themselves in various states of flux. The EIC, for instance, initially governed Singapore from Penang before moving its seat of power to Singapore itself in 1830. There followed a further transfer to the Indian government in 1833. After the EIC’s abolition, in 1858, governance passed first to the Colonial Office in India, then to Whitehall in London, in 1867. Thereafter, Singapore remained under British imperial authority, save for a brief period between 1942 and 1945 when Japan occupied the island and Japanese became the official language. Singapore returned to the British at the end of World War II and was placed under the auspices of a

new Malayan Union, in 1946. During this time the island was afforded separate Crown Colony status. Singapore was eventually granted self-governance in 1959, and finally acquired sovereign status in 1965 after a contentious split from Malaysia over political, economic, and social disagreements.

Compared to the numerous administrative regimes which controlled the island after colonisation, Singapore has been governed by the same political party since 1965. According to Bellows, the success of the People's Action Party (PAP) "the world's longest-governing elected political party, is based on meritocracy, incorruptibility and effective policies" (Bellows, 2009, p. 24). Hamilton-Hart shares this assessment, noting that Singapore's "public sector has earned a reputation for efficiency and high levels of coordination" (Hamilton-Hart, 2000, p. 204). Both authors attribute this effectiveness to the government's meritocratic hiring and retention practices, as well as its adaptability to changing regional and global circumstances. However, the stability which Singapore has enjoyed since gaining independence has not been without incident; nor have past government policies been entirely effective in managing a heterogenous digital population.

The 2020 general elections in Singapore saw support for the PAP fall to some of its lowest levels since 1963, despite the party winning at the polls. Singh et al. state that the PAP's total votes dropped from 69.9 percent in 2015 to 61.2 percent in 2020. Furthermore, the authors assert that "the rise of a credible opposition has also further strengthened Singaporeans' resolve to ensure that a fair-playing field exists in the political realm" (Singh et al., 2020, pp. 15–42).

Debates surrounding fairness towards minority languages, lower income groups, and migrant workers – which came to light during the COVID-19 pandemic – have been growing louder, both in parliament and generally in society. Many of the problems around languages, class disparities, and social exclusion that occurred during Singapore's colonial period have evolved with the times and endured into the current era. These challenges offer a cross-sectional view of the state's assumptions of and attitudes towards fairness in government-citizen exchanges.

2.3.2 Languages and administration

Language occupies a central role in Singapore's identity politics, and thus has often been a source of both, unification and dispute across local communities. Recent public debates have sought to balance the economic and social value of English against the overall preservation of Singapore's multiethnic populace. In examining the roles of language, culture, and identity, Alsagoff claims that the dual roles English "as a global language as well as a local inter-ethnic lingua franca, and their subsequent associated capital, are representative of – and inextricably associated with – Singaporean macro-cultural perspectives and identities" (Alsagoff, 2010, p. 340). But while English is today a mainstay of government and society, the language's proliferation is rooted in its perceived value as a vehicle for social and economic progress.

Writing on education and multiculturalism in the later years of colonial rule, Sai quotes Chua's depiction of an "Anglophone-Asian community...with an outlook centred on British imperial identity and anchored in the use of English as its primary language" (Sai, 2013, p. 52). But this view, as Low has pointed out, stemmed from unwillingness of the colony's Malayan Civil Service to fully embrace local talent within the service (Low, 2018, p. 5).

Allen provides a reason for this: the Malayan Civil Service "had an interest in preserving the status quo, or at least in resisting any change which might imperil its own comfortable position" (Allen, 1970, p. 150). But despite this entrenchment, colonial ideologues faced a constant stream of vicissitudes within the local communities. These had to be balanced against the major global events unfolding beyond, including population booms, economic busts, expansionism, and the reality of two world wars. Each of these events shaped the concerns of Singapore's future founders in establishing a national identity. These events continue to affect current policies, which have recently taken on the added dimension of integrating recently arrived foreign workers (Yang, 2014, pp. 408–437) who have introduced their own languages and cultures into Singapore's society. This in turn has affected how public information is phrased and disseminated through government channels.

In reviewing the creation and movements of information on the back of the East India Company across its settlements, Winterbottom remarks that “in the language of the day, the forms of knowledge [which the author discusses] were classed as natural and useful” (Winterbottom, 2015, p. 1). Residents and regional migrants alike soon discovered that the price of both commerce and justice could be paid, in large part, with knowledge of English. Indeed, English literacy proved decidedly valuable for those who recognised its worth in the new order. Leimgruber’s observation on the ability of English to augment one’s social standing attests to this awakening:

From the start, [Singapore’s] native-speaker base was slim: the few British civil servants, soldiers, and businessmen were vastly outnumbered by the local Malays and the ever-increasing immigration from China. Nonetheless, the language was always perceived favourably, not least because of its connections with the ruling class and with upward mobility (Leimgruber, 2013a, p. 12).

The lure of integrating with “higher” society made learning English an attractive option to many in the settlements. But to those disadvantaged by literacy or technology limitations – and the ones who simply opted not to study the language – were compelled to accept a truth of colonial rule: “Success appeared to depend on how close one was to the newly established authorities” (Frost & Balasingamchow, 2009, p. 104). This inevitably created an atmosphere of tension among those without ties to the ruling echelons. Frost and Balasingamchow refer to the Malay and Chinese poems, which became avenues for protest against the newly minted “authorities [who] passed down decisions in a strange language, according to legal principles from an entirely different civilisation” (Frost & Balasingamchow, 2009, p. 104). However, the administrators of Singapore had to also contend with far more sinister forms of backlash. Petitions, protests, and race riots characterised large tracts of the island’s violent past. These domestic outbreaks were often the consequences of negligence or poorly executed public measures on the part of Singapore’s administrative masters.

Today, the legislative environment within Singapore is markedly different from its forerunners, and the nation has doubtless profited from the lessons of a past it once designated as immaterial. Mathews et al.'s report about the country's current approach to language, identity, and race elaborates on the advantages which fairness, inclusivity, and cross-cultural acceptance have brought to the nation:

With a multi-ethnic resident population comprising 74 per cent Chinese, 13 per cent Malays, 9 per cent Indians, and many other ethnicities, [Singapore's] embrace of multiculturalism inevitably extends to language, given the close intertwining of the latter and ethnicity. Diversity in languages is a cornerstone of Singaporean identity; it plays an integral role in shaping our uniquely multicultural identity. We are proud of our rich linguistic heritage, and the peaceful coexistence of a multitude of languages (Mathews et al., 2020, p. 5).

Whether English was ever the lingua franca of the colony is debatable. But today, English “is the language of politics, of the courts, and of education, [and thus] its status is such that non-proficient speakers are significantly disadvantaged” (Leimgruber, 2013b, p. 9). Stauth similarly recognises the importance of English as a way to unify Singapore's colonial administration: “The ways in which British rule developed a system of...multiculturalism adhere to some theoretical issues of conceptualising the modernity of Singapore within a framework of cross-cultural and interregional exchanges” (Stauth, 1992, p. 67). Additionally, Stauth's remarks on multiculturalism and interregional exchange also help explain how English came to dominate Singapore's current government administration.

Diverse groups began connecting en masse in Singapore, following the EIC treaties of 1819 and 1824. These migrant communities resided and traded under an information schema which, first and foremost, facilitated official exchanges primarily through English – not just in trade but also in schools and missions that were founded on the island. “The first English-medium school,” writes Lim, “was established in Singapore in 1834, [and] whose enrolment, while starting small, began to rise gently in accordance with [the] population” (Lim et al., 2010, p. 27). As the number of Europeans in Singapore increased, so

did the requests for teachers of English. Given the importance that Straits-born Chinese were placing on learning the language, the demand for, and supply of, English education began to intensify in the following decades.¹¹

Large numbers of immigrants landed in Singapore from regions already familiar with British rule. Arriving Indian civil service officers possessed a working knowledge of the language, as did groups from Ceylon and the Malay Archipelago. These officials took up assorted and sundry positions in the nascent civil service. After the abolition of the Company in 1858, the island came under British rule, with a modified model that saw migration and mercantilism grow to unprecedented levels. A sophisticated mode of administration was thus required, which led to the creation of the Malay Civil Service. But “as the government administration grew, there was a need for a larger English-educated clerical workforce” (Low & Hashim, 2012, p. 139). This lacuna was partially filled by the English-medium schools that were starting to spring up across the colony. Around 1867, the Government Printing Office was established and made responsible for producing reports and statistics on the progress of the Straits Settlements. Eventually, the concerns of the office were expanded to include syllabi, papers, and examination material for the island’s schools (National Archives of Singapore, 2021).

Nonetheless, school fees were prohibitively expensive so that only the wealthy could afford an education. Coupled with this was the British policy of encouraging local children to first learn their own mother tongue before seeking further education in other languages (Low & Hashim, 2012, p. 139). This had the added impact of excluding significant quantities of Chinese, Malay, and Indian children from participating in an English education system. Many of these policies were reformed only in the early twentieth century, and especially after the second world war. But it was in the mid-nineteenth century that the seeds of English were scattered across Singapore’s capitan components – a precolonial system which “divided the community into...basic groups of Malays, Chinese, Indians, and Others,” (Lim et al., 2010, p. 22) for administrative purposes.

¹¹ This policy has endured, with English today being a mandatory subject taught in most schools.

2.3.3 Survival of English into contemporary times

The English language was a mediator of commerce and education, as well as a pathway to societal esteem in the new colony. Its primacy within the ruling civil service, however, arguably made it a true instrument of power. From laws to land ownership, entertainment to export licenses, the documents that mediated these vital undertakings were based in English. Ironically, it may have been the relative inaccessibility of learning English which made it so appealing to indigene and immigrant populations in Singapore. In designating the language as an exclusive commodity, the colonial administrators, perhaps unwittingly, created a space in which the varied and disparate groups gathered under a communal ambition.

The import of English has since persisted, despite evolving shifts in its perceived social value and manner of use. It is the most widely spoken and written language in contemporary Singapore and is the default for virtually all public documents that administer the nation's multicultural communities. The thrust towards English as an official state language, intensified when the island received city status in 1951. In that decade, the City Council became a body in which all four languages, English, Malay, Mandarin, and Tamil, were permitted in council debates (Turnbull, 2009, pp. 424–425). Support for multilingual governance continued to propagate in varying degrees as Singapore moved closer towards independence. Interestingly, opposition from Singapore's more moderate leaders to communist tendencies in the 1960s also contributed to the preservation of the language. Huff provides an example of these anti-English sentiments, expressed by pro-communist business groups which supported a Chinese-speaking Nanyang University:

English education resulted in increasing taxes, laying traps, turning out fools and wasting public funds. If we do not take steps to preserve our culture now...in 40 or 50 years perhaps we shall no longer call ourselves Chinese (Huff, 1995, p. 1431).

Nonetheless, these views failed to take root and in the 1980s Nanyang University was brought under government control as the English-medium Singapore National University. Today, the impetus for identity, diversity, and

global inclusivity are vividly expressed in Singapore's government documents. Many come with additional Mandarin, Malay, or Tamil options. But virtually all are produced first and foremost in English, the nation's default workhorse.

This trend has carried over into e-government, whereby certain groups continue to be marginalised by English's dominance in digital documents and apps. However, in 2011 the government expressed a clear intention for ICT to overcome these inequalities through a collaborative approach that is service-oriented and citizen-centric.

2.4 Adoption of smart services and e-governance

Referring to Singapore's e-government initiatives, Hoe states that "a smart nation applies digital technology and data to address strategic issues through a whole-of-government approach and in collaboration with citizens" (Hoe, 2016, p. 330). Bellows and Hamilton-Hart have stated that Singapore's past successes are due to effective government policies. However, the uptake of e-government services is also due to high levels of trust in government policies.

In discussing the differences between government-citizen exchanges in Singapore and Jordan, Soon and Soh have claimed that "regulations on e-government, trust in the system...computer and Internet availability, and literacy are...barriers that impede citizens' adoption of e-government" (Soon & Soh, 2014, p. 44). These obstacles, however, are less of an issue in Singapore according to the authors, who also pointed out that "trust in government, and not trust in technology, was positively related to trust in e-government websites in Singapore" (Soon & Soh, 2014, p. 44). But while trust may be a significant factor for citizens adopting e-government services in Singapore, it is not the only reason for its proliferation.

Equally salient is the government's intention to be of service to its citizens. This objective was outlined in 2014 by Prime Minister Lee Hsien Loong – son of Lee Kuan Yew – with the creation of Singapore's digital government initiative, *Smart Nation*: "We envision a *Smart Nation* that is a leading economy powered by digital innovation, and a world-class city with a government that gives our citizens the best home possible and responds to different and changing needs" (Smart Nation Singapore, 2020).

The introduction of government as a service was outlined in 2011, when Singapore launched the fourth version of its e-government master plans, titled *eGov 2015*. Whereas previous master plans for digitalisation focused on early computerisation efforts and replacing paper-based practices with digital tools, *eGov 2015* strongly emphasised collaboration as its primary objective. In laying out its mission, the master plan stated it would:

shift the delivery of Government e-services from a top-down “Government-to-You” system to a “Government-with-You” approach. This approach encourages greater co-creation and interaction between the Government, citizens and private sector to create better solutions for the country and its people (Government Technology Agency of Singapore, 2016).

The state’s latest intention to position digital government as a collaborative exchange has strong parallels to Rawls’ notion of cooperation and compromise between all parties in a transaction, thereby contributing to the usefulness of Singapore as a case study on fairness in digital government forms design. Likewise, the plan puts people first, linking the idea of users to clients within a service environment. Chapter 3 discusses Sarangi and Slembrouck’s view of application forms being information-seeking documents, whereas explanations act as information-providing documents. However, the authors also examine the “role behaviour” of participants within a process, referring to users as clients, and issuers as representatives (Sarangi & Slembrouck, 1996, pp. 61–86). In doing so, the authors frame relationships between citizens and bureaucrats as a service exchange. This is reflected in Singapore’s information and communication technology (ICT) strategies.

The prioritising of cooperation in e-government interactions is needed for the state to realise its intended goal of a digital environment in which “citizens and businesses can look forward to better and more citizen-centric services” (Government Technology Agency, 2016). Nevertheless, the impetus to provide a collaborative administrative system has also animated the discourse around user experience gaps in government forms. This discourse has highlighted the complexities of designing smart services fairly for both, a multiethnic society and for a wider global community on which Singapore’s economy relies so heavily.

Smart Nation and the Government Technology Agency (GovTech) have sought to offer Singaporeans greater control over their interactions and dealings with public offices. The idea of government as a service, rather than just a supplier, has led to a renegotiation of relationships between the bureaucracy and the citizenry. This gentler mode of accessible governance has

led to the creation of several public digital applications to facilitate everyday activities. Such applications include *TraceTogether* to monitor COVID-19 outbreaks; *Parking.sg* to pay for street and public parking charges on a mobile phone; *Police@SG* to contact the police on a variety of matters; and *LifeSG* to provide citizens access to any ministry or public service. But perhaps the most important of all these apps is *SingPass*, a digital portal through which nearly all digital government-citizen exchanges take place.¹²

Singapore Personal Access (*SingPass*) is a national digital identity service for Singapore residents to use government services. Every resident is issued a unique *SingPass* login credential with which they can access more than 460 government agencies, and over 1700 digital services (Government Technology Agency, 2021). *SingPass* can be accessed via a government dedicated website or through the *SingPass* app. Once logged in, users can access a wide variety of services, from checking their vaccine status and applying for visas for overseas family members, to registering a business and booking public barbecue pits.

SingPass was launched in March 2003 and has since become the central hub through which most government-citizen transactions are facilitated. And although not mandatory, residents are encouraged to apply for a *SingPass*. Foreigners holding long-term employment visas in Singapore are considered residents and are therefore eligible for a *SingPass* account.

Each of these apps — including *SingPass* — requires an internet-enabled smart phone, as well as basic English and digital skills. In the case of countries like Singapore, higher literacy rates among the population means users will be able to call upon a wider repertoire of digital abilities when conducting online exchanges. Moreover, these abilities are augmented by smart phones and apps that further decrease cognitive loading and facilitate smoother transactions.

But the increasing need for technology, English, and digital literacy, poses a problem for minority groups. In Singapore, these comprise namely of non-English speakers, and migrants from lower income bands who are either unfamiliar with or unwilling to use costly devices. These groups risk being

¹² In 2016, the Ministry of Finance and the Infocomm Media Development Authority reported that 3.3 million users were registered with *SingPass*. (Ministry of Finance, Singapore & Infocomm Media Development Authority of Singapore, 2016, p. 1)

excluded from full involvement in e-government environments.¹³ While the government does make provisions for such users, there is still a significant gap which contributes to the digital divide. The establishment and proliferation of this divide has been explored by researchers, including Azhar who gives an account of technology's proliferation from the 1970s onwards, noting that nations with access to advanced digital infrastructures initially did contribute to borderless globalisation. However, Azar asserts that subsequent increases in inequality witnessed in present-day societies and documents stem from such "exponential technologies [which] both create the rationale for more borders and provide the tools to build them" (Azhar, 2021, pp. 168–169). These borders do not only exist between countries but also within local populations. In effect, many technological features and design assumptions – embedded into digital government forms by issuers – risk excluding users who are unable to participate according to the rules of the exchange laid down by those issuers. This problem is analysed in Chapter 5, with some correctives offered in Chapter 6.

2.4.1 Assumptions of English literacy

Three quarters of Singapore's population is Chinese. This has, on occasion, led to disparities in the production of not only government documents, but also public signage and information media that uses only English and Mandarin, but not Malay and Tamil. But given the population distribution, it can be argued that the prevalence of English and Mandarin in public communication is not a decision stemming from formal exclusionary tendencies by the government, but instead from assumptions of language literacy among the majority.

A survey by Chong and Seilhamer in 2014 asked 50 respondents of Malay heritage to pick the language that best defined them as Singaporeans. 58% picked English; 12% picked Malay; and 30% picked Singlish, an English-based creole (Chong & Seilhamer, 2014, pp. 363–377). The overwhelming choice for

¹³ Chapter 4 analyses such instances in government forms. Chapter 6 identifies the merits of the fairness model as a means to providing optimal participation for all users, specifically the least advantaged users.

English is summed up by Ang and Stratton's discourse on the contrariety between Western and Asian perceptions about Singapore: "Language has always occupied a special place of importance in the politics of national homogenisation in the modern nation-state" (Ang & Stratton, 2018, p. 77).

As in Singapore's colonial past, Chinese, Malay, and Indian communities have continued to learn and regard English as the nation's lingua franca (Department of Statistics Singapore, 2000). For these reasons, government services produced solely in English are not necessarily a reflection of public policy, but are instead premised on high levels of literacy among the population. But the production of government forms in just one language does raise issues of fairness, owing to the probability of exclusion and side-lining specific groups of explicit and implicit users across a variety of circumstances. Two case studies of government forms, in Chapter 4, highlight the extent of language assumptions, bias, and the concomitant problems with clarity. These issues are presented alongside challenges of digital literacy and technology.

It is likely this bias¹⁴ stems from the fact that English is the country's lingua franca and also the de facto language of Singapore's public services. But there is also a more subtle layer of bias affecting the form's design, and this has to do with elevating the position of English over the other official languages. This can occur for a number of reasons, but Schiffman's observations are particularly pertinent in this case. Researching government approaches to languages in Singapore, Schiffman stated in 2003 that there was "a national language policy that emphasized English education but benignly promoted the maintenance of three other languages" (Schiffman, 2003, p. 107). The author also highlights the issue of subtractive bilingualism, whereby English has superseded Tamil, even within Singapore's Tamil communities, and as a result Tamil has slowly been "subtracted from the equation" (Schiffman, 2003, p. 106). Such diglossic challenges have been the topic of intense focus from scholars, and from governments themselves.

A related study in 2010 of language status in schools and wider society went further in claiming that English and Mandarin enjoy a more exalted

¹⁴ Implicit bias may be a major cause of such assumptions. The issue is discussed in Chapter 4.

status over Malay and Tamil, and that “English is a form of economic capital as it can help a person obtain a good job” (De Costa, 2010, p. 223). This certainly seems to be the case for most employment requirements in Singapore, given that English is also the language of business in a highly internationalised city-state. It is not surprising then that Singapore positions itself as a global hub with a capable English-literate workforce. But perhaps the strongest evidence for prioritising English comes from a speech given by Lee Kuan Yew, in which the country’s modern founder stated:

The value of a language is its usefulness, not just in Singapore, but also in the wider world... English is the key language for our people to make a living...[and] Singapore’s multi-racial peoples will never be united if we had used Mandarin as our common language. All non-Chinese, 25% of Singaporeans, will be disadvantaged. The result will be endless strife...We made the right decision to use English as our common language. We also retained the teaching of mother tongues (Lee, 2009).

Moreover, Lee emphasised the significance of English at Singapore’s Speak Mandarin Campaign, thereby affirming the language’s centrality to the government’s policies. In doing so, Lee set a clear precedent for the future of Singapore’s public communication style, reflected in a single statement by then Deputy Prime Minister Teo Chee Hean on the importance of English to the country’s economic growth: Singapore needs “to be understood internationally” (Teo, 2009).

Assessed from this perspective, it is evident why partiality has been shown by issuers to English in government forms. But in terms of fairness in design, however, there seems to be an expectation that non-English speaking users – especially visitors from non-anglophone countries – will need to put in additional effort in order to participate fully in government exchanges.

The consequence of such biases has been an inevitable marginalisation of minority language users, manifested in Singapore’s government forms – particularly those like the arrival form which cater to a wide base of local and foreign users. This is discussed at length in the case study on Singapore’s digital immigration arrival card and health declaration form, in Chapter 4.

2.4.2 Access to digital literacy for less advantaged groups

The 1990s witnessed declining use of Tamil in Singapore, which Saravanan claimed was due to its low social status and associations with poverty and lack of social and political influence (Saravanan, 1994, pp. 82–83). Saravanan’s observations pointed to a disturbing trend of social marginalisation for minority language users, despite Tamil being an official state language. Interestingly, Saravanan also posited another reason: the formal ways in which the language was used in the media and taught in schools made Tamil unappealing for use as an everyday language (Saravanan, 1994, p. 87). It is important to note that while such factors contribute to a language’s waning usage, they do not justify the peripheralisation of minority tongues in public communication. The onslaught of COVID-19 across every community and class in Singapore brought this issue to the fore of public policy.¹⁵

The magnitude of the pandemic in a country of less than six million compelled the government to reach out uniformly across all ethnicities. Public health communication in particular took centerstage, with the introduction of apps like *Trace Together* which track entry into public spaces and venues, and inform users of potential exposure. Because the government needed to connect with every group, from everyday citizens to temporary migrant workers, it was crucial the app – which only works on smart phones – catered to the widest possible user base, and accounted for users with little to no information literacy. Among these least advantaged users are the elderly with lower uptake of digital apps, and young migrant labourers with lower incomes and limited access to subsidised healthcare.

The rapid proliferation of digitalisation in Singapore across virtually all areas of society has compelled many elderly users to learn digital skills. In response, the government has introduced community-based programmes, titled *Seniors Go Digital*. These programmes cover a variety of topics on coding, learning popular chat applications, and using the government’s vast array of digital tools” (Infocomm Development Authority of Singapore, 2020).

¹⁵ The demotion of Tamil, Mandarin, and Malay, relative to English, is highlighted in the case study of Singapore’s digital immigration arrival card and health declaration, discussed in Chapter 4.

Seniors Go Digital has become crucial to the welfare of the elderly, particularly in the wake of the pandemic which has led to restrictions on public gatherings and entry into venues.

Researching the adoption of digital technologies by senior citizens in Singapore, Perdana and Mokhtar have found that the elderly are more inclined to participate in electronic processes so long as there are perceived benefits, positive social influence from peers, and a reduction in overall effort when weighed against the cost of devices and cognitive loading (Perdana & Mokhtar, 2021, pp. 1–11). Interestingly, the authors based their research and models on social exchange theory, citing expectations of “reciprocal benefits such as trust, affection, social rewards, or other intangible considerations for actions” (Perdana & Mokhtar, 2021, p. 2).

Notions of reciprocity and trust are echoed in Rawls’ theory of fairness. Perdana and Mokhtar’s study also confirms the importance of cooperation towards a mutually beneficial outcome. While their research shows more needs to be done to help the 900,000 elderly, implementation and uptake of the training programmes demonstrates the role of fairness in mediating effective government–citizen exchanges.¹⁶ This notion extends equally to foreign workers in the country.

Singapore’s strong reliance on migrant workers to build and maintain its infrastructure is evident in the city’s population statistics. In December 2016, migrant workers constituted approximately one-fifth of the country’s entire population (Ang et al., 2020, p. 540). While the island has always attracted talent from around Southeast Asia, recent surges included immigrants from South Asia whose native languages are mainly Hindi or Bengali. This was one of the groups in Singapore that was severely affected by the pandemic. The compact dormitories, with shared facilities, rapidly became spaces for substantial transmission of COVID-19, leading to one of the city’s severest quarantine crackdowns. The calamity raised several questions about the treatment and living conditions that migrant workers endure, and impelled Singaporeans to reflect on the nation’s attitude towards daily-wage labourers

¹⁶ This is reflected in the fairness model for digital government forms in Chapter 6.

compared to salaried and business immigrants. Reporting on the plight of Singapore's migrant workers, Ang et al. capture the myriad difficulties such groups experience with healthcare:

Migrants all over the world face various challenges as they transit and adapt to their receiving countries. Among these challenges are barriers to healthcare, which may be accentuated by cultural, language and socioeconomic factors, which may also vary depending on the healthcare policy and provisions in the receiving country (Ang et al., 2020, p. 542).

Stringent public health measures eventually contained the spread in dormitories. Migrant labourers were also included in the nation's COVID-19 vaccination programme and were among the first groups to begin receiving inoculations. However, the government also took additional steps to connect with affected groups at a grassroots level. A message from the Minister for Communications and Information (MCI) was filmed in Tamil, with Bengali subtitles, and sent to migrant workers via WhatsApp. In a newspaper article, Wong described the MCI's actions as having "caused public attention to focus on the conditions in the dorms and whether more could be done to help the workers" (Wong, 2020). To its credit, GovTech has noticed and plugged the literacy gaps in *TraceTogether*: in addition to English, Mandarin, Malay, and Tamil, the app recently began offering options for languages commonly used in Singapore's migrant communities including Hindi, Bengali, and Thai.

In considering the myriad challenges which labourers and low-income immigrants have historically encountered in Singapore, it can be argued that the government's recent inclusive stance towards migrant workers and other minority groups might be flowing more out of a desire to curb COVID-19 rather than a genuine social concern for temporary residents. But regardless of intention – which is difficult to ascertain without a further investigation that extends beyond the scope of this thesis – it is evident that inclusive initiatives reduce usability bias in government documents. *TraceTogether*, for instance, demonstrate a clear focus towards less advantaged users. This is a primary criterion for fairness. Given also that *TraceTogether* is required for a variety of activities following pandemic restrictions, it is interesting to note

that downloading the app has not been made mandatory. Users who choose to install the app need to first give their consent for the app to begin tracking and tracing. Consequently, the incorporation of minority languages impels cooperation from these groups that might otherwise remain unaware of or uninvolved in mainstream norms.

The notion of cooperation is pivotal to the transactions between willing parties looking to benefit from the proceedings. But government forms tend to occupy a controversial position within fair cooperative exchanges, since the obligatory nature of government-citizen exchanges — e.g. declaring taxes, or changing marriage status — calls into question how much willingness is actually present from a citizen's viewpoint.

Writing on the nature of legal and social contracts, Sandel notes that “no actual social contract or constitutional convention, however representative, is guaranteed to produce fair terms of social cooperation” (Sandel, 2009, p. 143). However, despite the negative outcome for some parties, Sandel does caution against breaches: “To recognise contracts do not confer fairness on the terms they produce doesn't mean we should violate our agreements whenever we please” (Sandel, 2009, p. 143). Cooperation and obligation can therefore exist in congruence or contradiction with each other. However, both notions are present in government forms to some degree; a user may thus be obligated to complete an immigration form but might not desire to cooperate with the terms of the exchange. Likewise, downloading and using a contact tracing app may not be compulsory but users may cooperate on their own accord.

In the case of *TraceTogether*, users are under no obligation to download the app and register their details. However, most of the island's venues — from banks and clinics to government offices, restaurants, and malls — require that users have *TraceTogether* as a condition of entry. The alternatives are a token, identification cards and papers, and accompanying medical records; however, these may or may not be accepted by the venue.

In light of these circumstances, it can be argued that there is little choice for users to download the app, and most do so out of convenience rather than cooperation. But for many migrant workers living in faraway dormitories,

accessing downtown malls may be less of a priority. Likewise, those willing to remain at home or carry paper identification may find little benefit in using digital tracking services. However, it is in the government's interest that all residents have the app installed since it makes tracking and tracing easier for the issuers whose institutional purpose for *TraceTogether* is different from that of users looking simply to gain entry into public spaces and be notified of potential exposure to COVID-19.

But despite the differences in purpose, favouring cooperation instead of forcing obligation facilitates exchange environments in which users feel more likely to be treated fairly. The provision of design opportunities, which results in the reduction of effort and the improvement of user predicament, is at the nexus of the fairness model: adding minority languages in the *TraceTogether* app improves opportunities for participation from disenfranchised groups that otherwise would be unable to partake fully in Singapore's national healthcare provisions. Keeping the focus on cooperation over obligation then enhances perceptions of inclusivity and fairer user experiences. Moreover, an analysis of *TraceTogether* in Chapter 4 reveals a proactive endeavour by the government to enhance perceptions of inclusivity and user experiences through words, images, emoticons, and animations.

It remains to be seen whether Singapore's form issuers will broaden the base of government documents to permanently include newer minorities, as *TraceTogether* has done. Current initiatives, like those driven by GovTech and the Ministry of Communications and Information, point towards such a move. Interestingly, the ambit of designing government documents is not centralised in Singapore, despite its relatively small size and concentrated leadership. This raises questions about the extent to which individual government offices may exercise independent oversight for producing their own "fairly designed" forms and documents. Given the advanced state of Singapore's ICT and digital literacy rates – discussed in previous sections – coupled with the extent of decentralised design within government ministries and agencies, few political systems offer as much scope for assessing fairness gaps in the design of digital government forms, especially those issued in response to the health pandemic.

2.4.3 Document design and production

Government forms in Singapore are produced by their respective owners, i.e., ministries, agencies, and sub-offices with internal working groups. As a result, there exists a multitude of forms with varying layouts, typographies, colours, and modalities. Unlike integrated visual systems such as those on GOV.UK and government.nl, decentralisation creates strong recognition for discrete public entities. But this is at the expense of a single holistic identity for the Singapore Government.

Such design differences do not necessarily prevent documents from being effectively used. But there are user experience issues, since separate ministries and agencies will each have their own idea of how best to serve customers. User expectations thus vary across services, producing an inconsistent overall brand impression, even if individual interactions are positive. Figures 2.2 and 2.3 on the following pages show digital feedback forms for two government offices: the Ministry of Manpower (MOM), and the Immigration & Checkpoints Authority (ICA). Both organisations deal with immigration-related matters and often work closely on related issues such as business visits and work rights for foreigners in Singapore.

A Singapore Government Agency Website

 MINISTRY OF
MANPOWER

Feedback form

You can send feedback or enquiries about passes, employment practices, workplace safety and health and general feedback.

* refers to mandatory fields

1 What do you want to give feedback or enquire on?

- Work passes
- Employment practices
- Workplace safety and health
- Employment agencies
- Foreign workforce management
- General Feedback

[Continue](#) 1 of 4

[Report vulnerability](#) [Privacy](#) [Terms of use](#) [Contact us](#)

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Last updated: 5 December 2021

Figure 2.2: Ministry of Manpower (MOM) online form for providing general feedback, available at <https://service2.mom.gov.sg/efeedback/Forms/efeedback.aspx>. Image reproduced under the Ministry of Manpower's (MOM) terms of use, available at <https://www.mom.gov.sg/terms-of-use>.

A Singapore Government Agency Website



MyICA Home

Feedback

Notes : All fields are compulsory unless otherwise stated.

Others

Details

Enter Details here

Salutation Name

Please Select Enter your Name

Please tick if you wish to provide your ID type and ID number.

Please tick if you would like a reply from us.

(Accepts only JPG, JPEG, PNG, GIF and PDF; Maximum 5 MB)

I'm not a robot  reCAPTCHA
Privacy - Terms

Immigration & Checkpoints Authority

[Report Vulnerability](#) [Privacy Statement](#) [Terms of Use](#)

© 2021, Government of Singapore.
Last updated on 4 December 2021.
This website is optimised for IE version 10, 11, Firefox, Chrome, Safari.

Figure 2.3: Immigration & Checkpoints Authority online form for providing general feedback, available at <https://eservices.ica.gov.sg/feedbackothers>. Image reproduced with permission from Immigration and Checkpoints Authority (ICA).

A cursory comparison of both forms reveals distinct visual treatments for each government agency. In the case of the ICA feedback form, the design is more straightforward since all fields are contained on a single page. This is not the case for the MOM, whereby the feedback form requires users to make a selection about a topic, via a choice of radio button options. The MOM form is spread over four sections, leading users along a paginated journey. Likewise, the colours, choice of typeface, and tone of voice differ significantly between two forms that essentially ask the same questions. These distinctions apply across all the government ministries in Singapore.¹⁷ Figures 2.4 and 2.5 on the following page, show the landing pages of the Immigration and Checkpoints Authority, and the Government Technology Agency's contact tracing application, *TraceTogether*. The forms from both agencies are analysed for fairness concerns in design, in Chapter 4.

¹⁷ The lack of a unifying identity may not necessarily entail an absence of integration behind the scenes. To assess the level of integration within Singapore's e-government system, I submitted an enquiry meant for the Ministry of Manpower (MOM) to the Immigration and Checkpoints Authority (ICA). My message was nonetheless processed and I received a correct reply to my query from the ICA. It was therefore evident that both institutions were to some extent linked up behind the scenes despite being two separate entities. While it was not possible to repeat this test across ministries, the result of this experiment revealed the presence of an e-administration that was, observably to some extent, integrated in the backend, even though each office has adopted its own brand identity. These back-of-house relationships make Singapore a unique place in which to study how government-citizen exchanges are facilitated through digital forms.

A Singapore Government Agency Website

ICA
Securing Our Borders,
Safeguarding Our Home

Who We Are ▾ News & Publications ▾ Careers ▾ 🔍

MyICA

Home > Entering and Departing > Entry Requirements > SG Arrival Card with Electronic Health Declaration

Additional Border Control Measures are in place due to COVID-19.
Visit the [SafeTravel Website](#) for more information.

SG Arrival Card with Electronic Health Declaration

Submit the SG Arrival Card with electronic Health Declaration At the Immigration Counter Check If You Need an Entry Visa Electronic Health Declaration

The SG Arrival Card with electronic Health Declaration ("SG Arrival Card") facilitates the submission of personal information, trip details and health declaration by all travellers seeking entry into Singapore.

Please note that the **SG Arrival Card is not a visa**. Click [here](#) for more information about entry and visa requirements.

Submit the SG Arrival Card with electronic Health Declaration [Submit Online](#)

Things to note when submitting the SG Arrival Card:

- Submit your SG Arrival Card **within three (3) days prior to the date of arrival** in Singapore. This is to avoid unnecessary delays during immigration clearance.
- Submit your SG Arrival Card via <https://eservices.ica.gov.sg/sgarrivalcard/> or through the official **"SG Arrival Card"** mobile application that can be downloaded for free from either the [App Store](#) (iOS) or [Google Play](#) (Android). Beware of potential phishing sites if you choose to submit the SG Arrival Card through unofficial channels.
- Submission via the official SG Arrival Card e-Service is free of charge.** ICA does not support or endorse services of commercial entities who provide assistance in submitting the SG Arrival Card at a fee. Please [click here](#) for more information.

Ask Jamie @ ICA / MHA
Type your question ...

Figure 2.4: Landing page for the digital arrival card and health declaration form. All travellers, including Singapore residents, are required to complete and submit this form prior to entering Singapore. Image reproduced with permission from Immigration and Checkpoints Authority (ICA).

A Singapore Government Agency Website

We are aware that there are fake websites redirecting to tracetogogether.gov.sg. Please ensure that your browser is at tracetogogether.gov.sg for all pages on this website. ✕

Resources ▾ Data Privacy TraceTogether Token

**Trace Together,
safer together**

Join over 90% of people in Singapore in stopping the spread of COVID-19 through community-driven contact tracing

Download on the App Store | GET IT ON Google Play | Download on the AppGallery

Figure 2.5: Landing page for *Trace Together*. This page informs potential users about what the app is, how it works, and from where it can be downloaded. Image reproduced with permission from Government Technology Agency (GovTech).

As with Singapore's digital forms, the differences in design extend to websites and online portals. While the ICA has a wordier and more functional look with fewer images, *TraceTogether* adopts a friendlier, community-oriented stance. Moreover, both services are used in tandem by visitors arriving in Singapore. But while the differences in visual identity may communicate a disparate design sense, it is the quality of the forms produced by individual agencies that is of concern. As Chapter 4 will show, there are considerable gaps in the design of Singapore's immigration and contacting tracing forms.

These gaps are a result of assumptions and decisions that have been made without reference to a unified design framework. Especially pertinent are the inconsistencies that directly impact fairness for explicit and implicit users. This problem makes Singapore a unique case since the integration of public services behind the scenes has traditionally not been reflected in the visual presentation of the government's digital documents. However, there are signs that this is slowly changing as Singapore moves towards a more holistic and open system of e-governance.

2.4.4 Towards a more open e-government

In the period from 2011 to 2021, the thrust to digitise public documents culminated in efforts to consolidate the government's digital identity. This has led to streamlining the production of government forms through a service titled *FormSG* created by GovTech. The agency is responsible for transforming the delivery of Government Digital Services [and] building *Smart Nation* Infrastructure (Government Technology Agency of Singapore, 2020). GovTech's form application, *FormSG*, is working to become the new default in providing customised online forms for all ministries and agencies. This service is currently optional for government employees but is fast gaining acceptance, evident in growing numbers of online forms created and deployed across multiple government websites. On 10 March 2020, *FormSG* reported 24,124 forms had been deployed and 10,042,759 forms submitted. As of 25 November 2021, 324,820 forms have been deployed and 138,473,953 forms submitted

(Government Technology Agency of Singapore, 2020). The marked difference in these figures indicates significant uptake of the service.

Currently, the ability to create digital forms on *FormSG* is restricted to government personnel, but the design of every form can be customised to match the identity of individual agencies and offices. However, restricting use of the service narrows accountability to each issuer, and thus establishes clearer ownership, as discussed in Chapter 3. Moreover, digital interactions with the government were revised in May 2019 with Singapore's parliament mandating all data collection methods meet Instruction Manual 8 (IM8) Standards, a document which outlines "government policies, standards, regulations, and codes of practice for IT security...for government agencies to comply with" (Government of Singapore, 2016).

FormSG has stated its application complies with IM8 codes of practice and is likely to see greater uptake of its service by forms owners.¹⁸ This ties in with Singapore's *eGov 2105* master plans that promote collaboration and openness with its citizens. These steps show the government's willingness to make its electronic processes more accountable, while also creating an electronic administration system that balances the needs of users across diverse backgrounds and circumstances.

The development of e-government in Singapore is in many ways reflected in Millard's model of ICT and government. Millard's focus is on the evolution of governance and public administration in Europe; but the four stages of digital government development are largely applicable to Singapore. Figure 2.6 on the following page shows Millard's four waves of e-government evolution.

¹⁸ However, these personnel are still reliant on the rules and environment of *FormSG* as the tool of creation, which blurs lines between owner and author; should a form fail in its treatment of fairness, it is unclear who is responsible, the issuing ministry or *FormSG*. Lack of accountability thus casts a problematic shadow over user-issuer relationships.

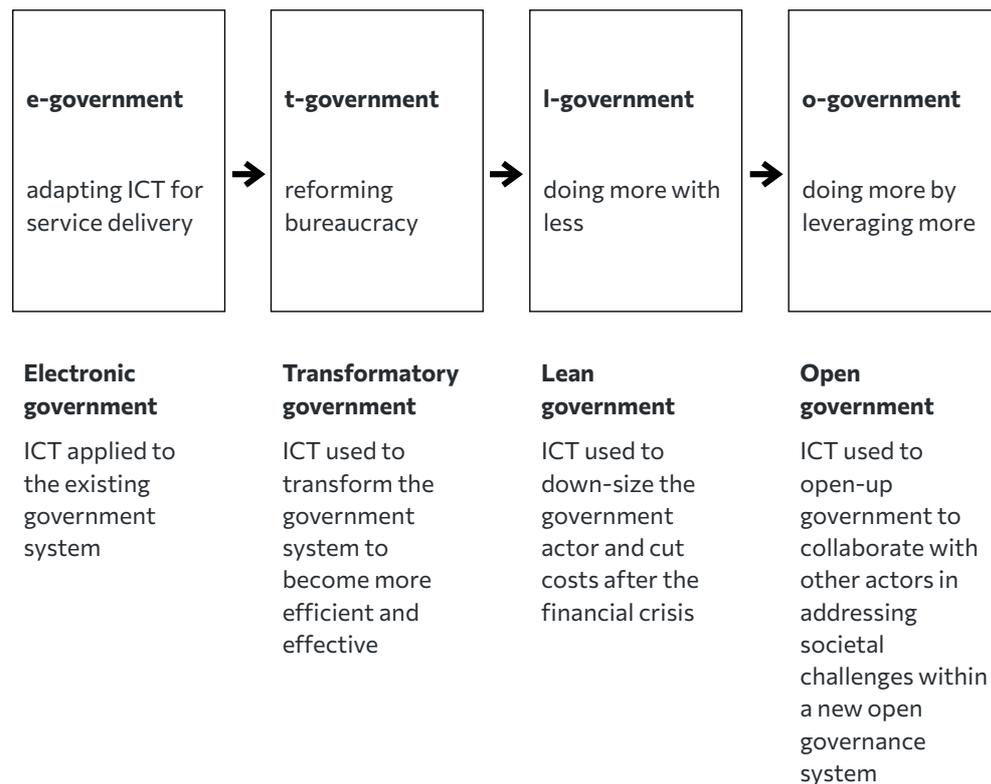


Figure 2.6: Millard's four waves of e-government evolution (Millard, 2017, p. 6).

The first two waves of Millard's model, e-government and t-government, were present in Singapore's early efforts to computerise its systems in the 1980s. GovTech describes this phase as "primarily simple processes that would improve efficiency, such as automating work functions and reducing paperwork" (Government Technology Agency of Singapore, 2016). The third and fourth waves took root in Singapore following the release of the *eGAP 2015* master plan in 2011. The impetus behind open government not only includes making datasets available for public use, but also "to animate citizens, startups, and other stakeholders to reuse the data" (Mainka et al., 2015, p. 200). However, as Millard proposes, participation in such processes requires trust in order for there to be collaboration.

2.4.5 Public responses to COVID-19

Much of the discussion in this chapter has focused on policies that frame e-government as a service provider working with citizens and businesses. But the pandemic brought the issues of openness, confidence, and cooperation to the fore. Wong and Jensen write about the perceptions that Singapore's local and foreign residents harbour towards the government, and how this correlates with feelings of safety and personal risk over COVID-19. While there were variances in how different groups felt about the government's response, the authors claim the government enjoyed high levels of trust among most people in Singapore (Wong & Jensen, 2020, p. 1026). Foreigners in particular "considered their risk of exposure to be very low because they felt that the government has been transparent; they considered the authorities to be highly competent and effective; and they had strong confidence in the healthcare system" (Wong & Jensen, 2020, p. 1026). On the other hand, local Singaporeans surveyed felt the information was confusing at times and that more could be done to gain clarity and reduce anxiety, despite trusting the government's advice and measures. Interestingly though, in terms of complying with local restrictions, Wong and Jensen state that local residents had been more likely to respond to the government's guidance whereas foreigners "expressed less inclination to comply even after the partial lockdown was announced" (Wong & Jensen, 2020, p. 1026).

The notion of compliance and cooperation with the government is thus a critical factor in determining the efficacy of government policies. It can be argued that while confusion and anxiety levels were high in Singaporeans, the proclivity to cooperate with government guidance stemmed from having families – including young children – that needed to be kept safe. In contrast, the foreign population polled by Wong and Jensen were largely single with no dependents.

This highlights the issues around mutual benefit and reciprocity. Chapter 5 discusses these Rawlsian notions: users entering into an exchange with the government expect that the transaction will result in a desired goal. This expectation leads users to give up some of their privileges in order to facilitate

an outcome. But the level of cooperation needed to achieve this exchange is directly proportional to trust in the system.

This is pertinent to apps such as *SingPass* and *TraceTogether* which are at the forefront of Singapore e-government strategies. *TraceTogether* is a direct result of Singapore's digital open government initiative to bring citizens and government into a working collaboration in order to contain the spread of COVID-19. Likewise, GovTech has stated it will begin using artificial intelligence and large datasets to a greater extent¹⁹ “to extract data-driven insights and build smart platforms that help improve the delivery of citizen-centric services and ultimately support government policy outcomes” (Government Technology Agency of Singapore, 2021). But as much of the scholarship in this area has shown, the adoption of smart services, and the success of policy outcomes, are ultimately contingent on how much citizens are willing to trust that the government will treat them fairly. In order to sufficiently address this query, a more comprehensive analysis is needed for frequently-used digital government forms in Singapore. This analysis is conducted in Chapter 4.

¹⁹ In March 2017 the Singapore Central Bank, together with the Monetary Authority of Singapore (MAS) completed a pilot programme using the private Ethereum Blockchain and distributed ledger technology (DLT) for payments and securities (Stead, 2021, p. 1). However, the use of emerging technologies brings its own challenges to users who are either unable or unwilling to adopt these technologies in the mainstream. As such, the negative impacts of new digital tools on less advantaged users, within the context of fairness in design, can significantly increase the digital divide and lead to even greater social exclusion. This problem – and its potential solutions – are collectively detailed in the fairness model, in Chapter 6.

2.5 Chapter conclusion

This chapter discussed the history and current administration of government in Singapore. The purpose was to provide an overview of the country's history, and offer insights into how Singapore's past continues to affect its present-day policies. These policies affect how the government communicates with citizens and foreigners in the country, and deals with its political, economic, and social challenges. The discussions showed many of these challenges were similar to those which Singapore's colonial and early independence governors encountered and subsequently responded to. Accordingly, the patterns of past administration provided a useful lens through which to observe the rationale of current policy-makers. Indeed, the problems of language, migration, and social exclusion have continued to affect Singapore's e-governance from 2011 to 2021. The onslaught of COVID-19 brought many of these to the fore of public discourse, including the role of ICT in stemming the spread through government-citizen cooperation.

Based on the discussions here, and in other chapters, I have argued that the mentality of any government is communicated through its administrative behaviours. Such actions expose the fundamental attitudes and assumptions held by a government towards its people. These qualities are often disclosed through the design decisions in documents which mediate government-citizen interactions. This is because administration is frequently a legatee of political, economic, and social changes that occur in response to its successes and failures. Accordingly, the lure of digitalisation of public services does not guarantee the efficacy of government-citizen interactions. To this end the chapter examined the development of Singapore's *Smart Nation* initiative, and the adoption of ICT by the government as a means to fostering stronger government-citizen relationships.

Interestingly, much of the scholarship around ICT in Singapore discussed the benefits of cooperative approaches within which these relationships ought to occur. Indeed, the government itself has professed a clear intention to foster collaboration in the next phase of its digital strategy. These discussions link to Rawlsian ideas in Chapter 5 that propound the need for

cooperation within any government-citizen exchange despite the imbalance of power.

However, as the history of Singapore has shown, administrators cannot implement communication tools and policies without also acknowledging the diverse cross-sectional needs of all its citizens. This requires an understanding of what makes users more likely to cooperate in an exchange, based on their individual needs from that exchange. Among these needs, the chapter showed that trust was a significant factor. High trust levels in the government have led to greater adoption of digital services by vast swathes of the population. But issues of digital exclusion and the marginalisation of lower-income groups and the elderly are a problem. This exclusion stems from a number of sources such as language, digital literacy, clarity of expressions, and technological know-how. While these concepts have been broadly addressed by design scholars,²⁰ their application to Singapore's case studies places the country in a unique position: on one hand, the country enjoys high levels of education and digital literacy. However, this creates a significant divide between users with greater access to these skills and those who either lack the resources or are unwilling to adopt digital technologies.

But given Singapore's relatively small population and prosperous economic position, the government is strategically placed to establish fairer conditions for participation across all types of users. This is important considering the prominence given to digital tools to manage virtually all aspects of governance, from immigration to contact tracing. Furthermore, digital government forms are markers of the state's current attitudes towards its citizens. An analysis of these forms is thus crucial in revealing issuers' mindsets towards fairness, participation, and trust.

The next chapter reviews the literature on documents, and concentrates on forms. The chapter explores the various definitions assigned to document genres by information design researchers, and investigates the impact of document design on government-citizen exchanges. The chapter further

²⁰ Chapter 3 reviews the literature on documents and forms, which also include notions of clarity, literacy, and technology.

unpacks discussions around the five research questions, and links these to scholarship on fairness in cognate disciplines which are analysed in Chapter 5.

Additionally, Chapter 3 feeds into the case studies – in Chapter 4 – that show how the government can use its advantaged position to create fairer conditions for digital forms users. A conspectus of administration therefore offers an introduction to the literature selected for review in Chapter 3, and also context for the analyses in the case studies. Accordingly, this chapter lays the groundwork for three key concerns: (i) how fairness is evaluated in the design of digital government forms in Singapore; (ii) what some of the design issues are with Singapore's digital forms that help or hinder the facilitation of fairness for all users; (iii) how emphasis on fairness in digital government forms changes when greater levels of cooperation, compromise, reciprocity, and mutual benefit are needed by the government of its citizens and visitors.

To answer these concerns, Chapter 4 conducts an analysis of two of Singapore's more frequently used digital government forms: the immigration arrival and health declaration card, and the national contact tracing and entry management app. The forms in the case studies also address the government's response to the COVID-19 pandemic, and its subsequent attempts to get buy-in from users across the country. Moreover, the pandemic, in many ways, reflects the sudden and often dramatic ordeals of the past that beleaguered the administrators of this island for over two hundred years. Likewise, current government responses – analysed through its digital forms – are an indicator of how far the country has progressed in harmonising fairness across a diverse and digitally divided citizenry. As such, a review of the literature on documents and forms, in the next chapter, is useful for understanding the wider concerns of design within paper and digital forms, and ultimately how these concerns fit specifically into the context of fairness in the design of Singapore's digital government forms issued during the health pandemic.

3. An evaluative review of the literature on documents and forms

3.1 Chapter overview

This chapter reviews the literature on documents in general, and on forms in particular, in order to: (i) assess past and current approaches to document design; (ii) address the gaps when applying these approaches to electronic forms and digital environments; and (iii) enquire after the wider societal concerns in which these documents operate. Since forms are specific types of documents, the chapter begins with a set of three criteria for choosing the works reviewed; the chapter then enquires into the current notions of what documents are, and their roles as social contracts between issuers and users. In doing so, the chapter also discusses various theories and practices posited by information designers to foster meaning in user-issuer relationships.

Next, the chapter moves to forms specifically, exploring past and current definitions, functions, and expectations of this document genre as mediators of information exchanges. The review focuses on works around defining what a form is, and the concomitant impact on societal well-being, empowerment, and trust that arise from participation within a co-authored environment. The chapter also examines the effectiveness of these varying ideas and agendas in

providing a suitable definition of forms, and their participatory implications in both paper and digital environments.

The chapter then reviews the literature on digital forms in the context of e-government administration. Because there already exists a generally well-defined consensus on what forms are, focus is given more to the differences in perceptions and functions of digital forms over their paper counterparts. This section of the chapter also reviews the discourse on contractual obligations, and the capacity of digital forms to clarify or confuse users. Since fairness in information design is a major element of this thesis, the chapter also reviews some of the discussions about how usability, well-being, and empowerment cohere with philosophies and ideas around fairness.

These discussions are subsequently used in later chapters to assess gaps in design for government digital forms in Singapore. The chapter concludes with a brief discussion of the reviewed literature and asks how “good” design can be benchmarked against a unified framework – one that fuses myriad interpretations of usability, transactions, and trust, to the notion of fairness.

3.1.1 Criteria for selecting reviewed resources

The resources selected for review in this chapter are based on three criteria relevant to the research objectives of this thesis: (i) scholars and authors who have written extensively in the subject area of forms, i.e. definitions, uses, materiality, and their functions as instruments of transactions. Beyond this, the chosen works examine forms through the lens of discourse analysis and meaning-making, which are essential for obtaining a deeper appreciation of digital forms as texts with communicative capacities and socio-political exchanges; (ii) works including government policy documents, which focus on government forms design as well as forms produced in larger organisations. In addition to public document design, these works enquire after the nature of obligatory interactions, the nature of bureaucratic exchanges, and the impact of power imbalances on user-issuer relationships. This is relevant to the thesis’ aims to examine how design shapes attitudes towards documents in general, and digital government forms in particular; and (iii) resources that have drawn

connections between forms design and fairness, i.e. usability, participation, and trust: central areas for furthering understanding and applications of fairness in the design of digital government forms. Accordingly, this criteria extends to relevant authorship on paper forms design, and how some of the key issues identified have been transported to digital domains – specifically to digital government forms published online directly without a paper analogue.

To this last criteria I have also added a select number of scholars from the fields of law and social theory. This is because their research and case studies on contracts, consent, and participation scrutinise forms from legal, linguistic, and socio-political standpoints. Consequently, these notions have informed relevant research in information design; the cognate insights provide a useful complement to understand some of the relevant research conducted by information designers on how digital government forms could be designed with fairer participation for all parties involved in an information exchange. Collectively, these criteria frame the selection of resources reviewed within the context of this thesis' goals.

3.2 Documents as social constructs and contracts

In attempting to define what makes an encounter bureaucratic, Sarangi and Slembrouck have suggested that “bureaucracy is a type of event, a particular kind of encounter or contact situation, as this is how it is experienced by social subjects” (Sarangi & Slembrouck, 1996, p. 9). The authors’ 1996 monograph on language in bureaucratic environments studies how the evolving demands of citizens is necessitating changes in the way institutions communicate and negotiate social control. This experience of communication does not occur in isolation, but is instead contextualised by the people and artefacts involved in that exchange. When such bureaucratic exchanges involve forms that are set within typographical environments, the way in which that form is experienced by its users and issuers characterises it as an instrument of bureaucracy for its participants. It is useful to examine the communicative experience of forms, and how its design affects such exchanges within socio-political discourses.

In a treatise on the use of typographic elements in varying environments, Kinross proposed that “the reproduction and distribution of texts is part of the life-blood of social-critical dialogue” (Kinross, 1994, p. 24). Kinross’ critical study on typography spans several areas of cultural and philosophical enquiry, several of which exceed the scope of this thesis. But of relevance is Kinross’ overarching call to question the putative definitions of design and imagined ideas of documents as merely containers and carriers of data. The discussions that follow in this chapter highlight themes common among information design scholars reviewed in this chapter – namely that (i) bureaucratic documents communicate more than the data they carry, and (ii) that they reveal the issuing authorities’ aims and attitudes inherent within information exchange environments that influence and are influenced by user experiences.

Investigating these areas of enquiry offers the opportunity to propose amendments and alternatives to dominant, yet poorly conceived practices involving document functions, authorial intentions, and usability concerns. Within these discussions there is also the question of disambiguation of meaning for users – especially within environments of tension – such as government forms which threaten severe penalties for user errors despite

being poorly designed. The amelioration of user experiences is therefore of significant consideration when defining and discussing documents within the context of information design.

3.2.1 Notions of documents in information design

Are information documents more than carriers and containers of data? This is not a question easily asked, let alone answered. Past ideas and definitions of what constitutes a document offer varying interpretations. In a protracted study of how public documents are read, Holland and Redish remarked that “documents have pragmatic contexts and immediate consequences that the more traditionally studied texts may not have...[and that] documents usually require immediate action rather than long-term memory storage²¹” (Holland & Redish, 1981, p. 205). In the same study, Holland and Redish also proposed to distinguish public documents from other types of texts by highlighting that public documents, including forms, require functional reading, i.e. reading for purpose, versus simply reading for pleasure (Holland & Redish, 1981, p. 205). As a corollary to this difference, and rooted in research done in the Document Design Center from 1978 onwards, Felker, Redish, and Peterson subsequently proposed a model in 1984 that sought prepared authors to create documents that highlighted their informative essence. Describing their model, the authors noted that all information documents are:

written to inform a particular audience about something and to help the reader decide whether and how to act [and that] informative documents are not designed primarily to entertain, to be aesthetically pleasing, or to be newsworthy (Felker et al., 1984, p. 44).

This ties in with the notion of comprehension and response needed from users of information documents, including government forms, and also further emphasises the significance of forms design to aid participants in successfully completing bureaucratic processes / transactions. Holland and Redish’s, and

²¹ The notion of urgency is a relevant characteristic within the environment of government forms, which compel quick comprehension and response; the context of urgency is discussed in Section 3.2.4.

Felker et al.'s approaches appeared to designate a document's essence to bureaucratic performance, legal strictures, and instructions to readers or users. But in discussing these matters, Felker et al. made a salient observation: "writers of many bureaucratic, legal, and military documents seldom meet the needs of their audiences" (Felker et al., 1984, p. 45). Is this still the case in the present era, and for digital forms in particular? That documents are expected to meet user needs is a foregone conclusion; yet it is the repeated failure to achieve this criterion which drives further discourse and experimentation into how documents are designed, and what is expected of their performance as facilitators of information exchanges between issuers and users.

3.2.1.1 Expectations and performance

Waller is a prominent scholar of information design whose research into and production of government forms from the 1980s onwards provided widely-used frameworks for designing public documents. One of Waller's overarching approaches to improving document comprehension is the simplification of design, language, literacy, and genre. In a recent paper on the effects of poor information design, Waller summed up the problems of document failures in a single statement: "poor documents are typified by long convoluted sentences, technical or jargon-ridden vocabulary, dense and unstructured typography, a lack of focus and unclear reading paths" (Waller, 2018, p. 145). This statement focuses on the challenges of language and literacy, issues that have featured in the works of several design scholars discussed throughout this chapter.

In a 1997 paper questioning what a document is, Buckland consolidates multiple views to explain the meaning of the term, and circumscribe the limits of these explanations to the boundaries of information societies. Buckland's selection of scholars for inclusion in the paper reflects the varying approaches from each about what constitutes a document: Duyvis refers to documents as expressions of human thought minus any illogicality. (Donker Duyvis, as cited in Buckland, 1997, p. 806); Briet, meanwhile, calls attention to the "physical or conceptual phenomenon of an object"; (Suzanne Briet, as cited in Buckland, 1997, p. 806); Ranganathan opts for a more prescriptive approach that assays

documents as recordings of thought processes needed for transmission (S.R. Ranganathan, as cited in Buckland, 1997, p. 807); and Otlet frames documents as material objects themselves, which contain graphic or written records (Paul Otlet, as cited in Buckland, 1997, p. 807). Each of these researchers adopts a stance that fits with their individual agendas around design and meaning-making. But the most striking position comes from Buckland's own comments – drawn from these differing perspectives – which emphasise “meaning as a social construct typically based on the viewer's perception of the significance and evidential character of documents” (Buckland, 1997, p. 807). If documents are socially constructed artefacts, as Buckland calls them, then it is reasonable to assume that they also embody the mentality of their creators, and reflect the attitudes of the socio-political landscapes in which they operate. Such an assumption ties Duyvis' and Ranganathan's attribution of documents as expressions and recorders of human thought, with Briet's and Otlet's views of documents as physically and materially formed objects.

3.2.1.2 Usability and meaning-making

Otlet's position is particularly useful in its treatment of documents as visible carriers and as intrinsic signifiers of knowledge owing to the influences of materiality on meaning-making processes; this is relevant when considering paper and digital forms media, discussed in Section 3.2.6. In his influential work in 1934 on information science, *Traité de Documentation*, Otlet offers the following interpretation of documents as material objects. The original quote is in French, with an English translation provided below.²²

Le document écrit ou graphique est la représentation des choses matérielles ou des images intellectuelles et abstraites des choses. Les choses matérielles elles-mêmes (objets) peuvent être tenues pour documents lorsqu'elles sont érigées comme éléments sensibles, directs, d'études, ou de preuves d'une démonstration.

²² The translation into English was done by the author of the thesis. While the translated quote was verified using a translation service, it is the essence of the content that is pertinent to this discussion.

The written or graphic document is the representation of material things or intellectual and abstract images of things. Material things themselves (objects) can be held to be documents when they are [offered] as sensitive, direct, study, or proof of a demonstration (Otlet, 1934, p. 217).

Otlet's views of documents as representational artefacts give credence to the assumption that such documents are mimetic of their makers' mindsets and dispositions. In other words, the construction of any document can never be fully independent of the issuing organisation's attitudes – intentional or unrealised – towards their stakeholders. But can document users realistically escape the prejudices of design, reading, and action from issuers? What if an author's intentions, no matter how well-reasoned, results in bias towards certain users – for example by limiting usability or ignoring certain minority groups? To what extent then should issuers factor user consent into the design and issuance of documents that compel a response or other action?

In a book chapter on the roles and responsibilities of authors to design usable texts, Orna stated that “a useable text is one that allows a successful transaction to take place between user and maker” and that any deficiencies in a user's knowledge about that text is fulfilled through the structuring of that knowledge by the text's maker (Orna, 1984, p. 20). This approach places the onus on document makers or issuers to put users at ease, although this too depends, as Orna suggests, on the users' familiarity with the text: if the subject area is well-known to readers (e.g. trade, technical, or hobby magazines), then writers expend less effort, but if the topic is unfamiliar or unknown then more work is needed by the writer to clarify the contents and their meaning (Orna, 1984, p. 29). Greater familiarity of a text may lead to better comprehension for users, and reveal a more empathetic disposition by the text's authors towards their readers, as previously suggested by Otlet. However, if a given text or its genre is unfamiliar to a user, then the usability of that document decreases.

This issue is compounded when that text has added requirements for users to act on its contents or provide consent – as is often the case with government forms and related documents with legal implications. In such cases, usability covers not only language, writing style, and genre familiarity,

but extends to the contractual nature of the document itself. Such texts hold legal power over users, but are organised in typographic formats that may be alien to unaccustomed users. This affects the relationship that exists between issuers and users to facilitate informed participation and consent.

3.2.1.3 Familiarity and consent

Waddams, a researcher of contract law and consent, argues for a judicial review of unreasonable contracts so as to protect disadvantaged users from unreasonably designed documents issued en masse by large institutions. In his 2019 book on the sanctity of contracts, Waddams' cites a key case study on usability in contractual documents; this case study extends to Orna's above-mentioned concerns of placing readers in new or unfamiliar settings. The case of *Rudder v. Microsoft Corporation*, over the obscurity of certain terms which were presented in a digital format, underscored some of the problems around ignoring familiarity in the design of electronic documents and contracts. The above-mentioned case occurred in 1999, when such issues affecting digital documents were relatively new and unfamiliar concepts. Commenting on the abstruse nature of the forms highlighted in such cases, Waddams stated that:

In cases of standard form contracts (paper or electronic), there is usually a general assent to a transaction of a particular kind, and an assent to certain prominent terms (notably the price), but no real assent to every particular clause that may be included in the supplier's form (Waddams, 2019, p. 94).

This observation highlights the links between knowledge, familiarity, and consent, which are instrumental in delivering greater usability and also a fairer overall experience for forms users. Employing obscure language, coupled with sub-optimal typographic settings, e.g. deliberately small font sizes or colours with lower contrast such as light grey text on white backgrounds to confuse users, can subtract from the overall usability and justness of an information exchange. Such issues are examined in greater detail in the case studies in Chapter 4, which includes the need for users consent to consent to the terms of the digital government forms issued for immigration and tracking purposes.

In their book on electronic commerce and internet law in Canada, the legal scholars Scassa and Deturbide refer to the “unconscionability” of these cases, citing Canada’s Supreme Court’s statement²³ “that such clauses can be ignored if there is a ‘strong cause’ to do so: that is, if a social, moral, or economic reason exists” (Scassa & Deturbide, 2004, p. 13). It is interesting to deliberate which category, social, moral, or economic, the authors’ reference unconscionable design might be consigned to, and is discussed in Chapter 5. Nonetheless, if documents are social constructs that users are expected to comply with, and even trust with their details and consent, then it is not excessive to demand that the graphic and typographic qualities of such documents be subjected to the conditions and criteria of fairness principles.

This train of thought is shared by Waddams, who questions the feasibility of having users read through the terms and conditions of a website before each instance of use (Waddams, 2019, p. 98). This is a reasonable query, and one that extends the debate of whether documents — in addition to being carriers of information — should remain confined to materiality or expressions of authorial thought. The applicability of this enquiry to digital environments is equally pertinent and is discussed in Section 3.2.5 alongside the literature on digital and application-based forms.

So far, the disambiguation of meaning, and clarification of intentions and actions for documents have been approached namely via design efforts that concentrate on usability. But focusing on these efforts alone is insufficient when dealing with the more abstract concepts of consent, compliance, and

²³The Rudder v. Microsoft Corp. case (8 October 1999 Ontario Superior Court of Justice, Winkler J. No 3778) in Canada was a class-action law suite brought against Microsoft Corp.’s MSN services. The case brought to light so-called problems with layout in electronic contracts, which allegedly made understanding the terms difficult. Rudder argued that a specific clause on how subscribers’ credit cards would be charged was not made clear to users. Judge Winkler ultimately ruled in favour of Microsoft Corp., stating *inter alia* that a click-wrap system — whereby the user clicks on a button to agree to or reject the terms — was adequately in place and that the system should thus be afforded the same sanctity as paper agreements (Scassa, T., & Deturbide, M. E., 2004). The case, however, was significant in highlighting differences between paper and digital documents. It also raised questions about the potential for document designers to exploit digital document layouts in ways that might cause a user to tire of reading, or perhaps even dampen awareness of certain terms with the intention of tricking users into clicking their consent. Such practices, whether deliberately or unconsciously conducted, are the subject of fairness in design.

social power dynamics. Furthermore, forms are especially susceptible to such issues, given the co-authorial nature of the exchanges they facilitate. These issues are reviewed in Section 3.2.4 of this chapter. Therefore, it is important to connect prior understandings of communication and meaning to matters of usability, well-being, trust, and empowerment. Section 3.2.2 reviews these concerns in relation to some of the research on how information documents mediate meaning, along with questions of literacy, trust, and the dynamics of power that are immanent in information exchanges.

3.2.2 Literacy, trust, and power concerns in documents

An investigation into how various objects of information can be reimagined as facilitators of social meaning invites further enquiry into what a document is in the first place. In a 1985 paper on framing usability as a criterion for written information, Wright suggested that usability is a cognitive process employed in understanding documents, and links usability to the miscellaneous thinking processes that occur when a user encounters a document. (Wright, 1980, pp. 183–185). This paper was part of a larger series on visible language examining *inter alia* the propensity of semantic and visual arrangements of language to directly influence a user's ability to make sense of an information document and subsequently determine a course of action.

Wright's view of linking usability with cognitive processes is reflected in cases involving a document's language and literacy considerations; this is the subject of analysis in the case studies. A review of the research conducted into language and literacy in government forms is therefore necessary in order to gain a better understanding of how these factors have affected the design of previous paper and current digital forms.

3.2.2.1 Language and literacy

A report on the state of income tax forms was commissioned in 1978 by the United States General Accounting Office to specifically address usability concerns. This report contained a detailed account of how the Internal Revenue Service (IRS) could work with graphic designers and document

experts to build tax forms that better addressed user needs. Focusing on readability as a criterion for usability, the report revealed that an estimated “22 percent of American adults read at or below the eighth grade level” (Comptroller General of the United States, 1978, p. 9). Table 3.1 below shows the sections of the form which were tested against reading levels, along with the corresponding users who were most affected by the forms’ language:

Section	Reading level of section	Taxpayers most affected
General instructions	10th grade	All
Filing status	9th grade	All
Earned income credit	10th grade	Low income
Scheduled R instructions	11th grade	Elderly
Scheduled RP instructions	12th grade	Elderly

Table 3.1: Sections of a 1040 tax form tested against reading levels and affected taxpayers. Data retrieved from the US General Accounting Office Report 1978. (Comptroller General of the United States, 1978, p. 9).

The results in Table 3.1 above showed readability was a primary concern for taxpayers, which in turn highlighted some of the social disparities present in American communities. Quoting an earlier study on ethnicity and education in the United States, the report also noted that:

Disadvantaged minorities probably have similar problems. A 1975 report issued by the Educational Commission of the States indicated that blacks [sic] have lower educational levels than average and do not read as well as whites [sic]. The report also said that in reading tests using income tax materials, blacks [sic] scored lower than whites [sic] (Comptroller General of the United States, 1978, p. 11).

Following a similar thread of enquiry — in a 2011 paper on the criteria for what makes a document effective — Waller observes that, “any form that has to be filled in by the entire population (with the full spectrum of literacy levels)

will have an error rate of at least 10–15%, rising to much higher figures in the case of longer or more complex forms” (Waller, 2011, p. 28). Waller notes that in any environment, forms will typically contain errors in filling, and that such errors are often a result of insufficient clarity and communication routes, even in well-designed forms. It follows that poorly designed forms will invariably carry a more significant percentage of errors. Yet penalties for such errors are nearly always borne by the form’s users, especially those with relatively lower literacy rates and reading abilities, e.g. those cited in Table 3.1, and who need added support.

That the language in the United States tax form needed to be simplified was a significant driver of the recommendations; but the report also factored graphic and typographic considerations into its investigations, declaring that readability could be enhanced through improved knowledge of spacing, colour, and type sizes to aid in comprehension (Comptroller General of the United States, 1978, p. 35). The findings from the report reinforce Wright’s view, mentioned earlier, i.e. understanding documents requires complex cognitive processes. It also highlights the idea of documents being more than just carriers of content, since they bear additional social and socialised prejudices towards their users. These prejudices are often evinced in the skewed language and visual devices employed, which increase the risk of favouring certain users over others. Usability therefore extends to concerns of meaningful social inclusion, i.e. through clarity of language, and the quality of relationships forged between issuers and users, with varying or even limited knowledge of bureaucratic procedures, operating within unequal environments of power.

The report additionally stated that the United States tax system was based on “voluntary compliance and self-assessment” (Comptroller General of the United States, 1978, p. 2). The idea of voluntary compliance is particularly relevant in discussions about fairness in forms and other documents, since it raises questions about power and consent in government-citizen interactions. Works on the contractual obligations in forms are reviewed in Section 3.2.5. In producing this report, the General Accounting Office noted that the ultimate way to design improved tax forms would be to simplify tax law. But while this

may be true, the government can still make tax forms clearer and that this needs to be done (Comptroller General of the United States, 1978, p. i).

The language used in a document is an example of how words carry more than their semantic meaning, since levels of understanding can differ greatly between users on account of their education and exposure to bureaucratic terminology. In a 2012 paper citing the need to improve graphical literacy for both users and issuers, Waller expounded on the notion of functional literacy, noting the term “refers to the ability to use documents to achieve purposes and solve problems” (Waller, 2012, p. 241). This observation reflects Holland Redish’s concept of functional reading for public documents. It also broadly ties in with the earlier concerns of the 1978 United States tax report in solving the problems of comprehension for users with limited literacy skills. The report proposed that this goal can be achieved, among other things, through simplified language to boost clarity. To this end, the report cited examples of complex terms – together with their simplified counterparts – shown in Table 3.2 on the following page. This notion of simplicity is central also to Waller’s work, discussed previously in this chapter, and is an overarching consideration for framing clarity and literacy as criteria for a model to identify fairness gaps in the design of digital government forms.²⁴

²⁴ The notions of clarity and literacy, together with technology, comprise key criteria for the fairness model discussed in Chapter 6, especially for the most disadvantaged users of a forms process. The works of Waller and the United States tax report, among other authors, are key contributors for gaining a finer understanding of these notions, and how they relate to the development and application of the fairness model.

Unfamiliar words	Substitution
Qualifies	Makes you able
Retained	Kept
Entire	All
Student dependent	Student you support
Premiums	Costs
Deceased	Dead
Spouse	Husband or wife
Exclusively	Only
Elect	Choose

Table 3.2: Rewritten sections of the 1040 tax form instructions using familiar words and phrases. Data retrieved from the US General Accounting Office Report 1978. (Comptroller General of the United States, 1978, p. 13).

By identifying a list of complex words with simplified matching terms, the report does make a generous attempt to create more user-friendliness in tax forms to reduce some of the cognitive burdens on users. However, in a 1985 book chapter on writing within non-academic environments, Redish et al. observed that when writing specifically for information documents, “short, active sentences and common, everyday words are not enough to make a document useful. If readers can't find the information they need, the well-written sentences may go unfound and unread (Redish et al., 1985, p. 129). This observation points to the limitations of simplified language as the primary or sole recourse for producing more usable documents. Returning to the notions of literacy and familiarity, the problem is exacerbated in contractual situations where forms play a significant role.

In a 2016 study on the processes to simplify contracts for a large-scale construction project in Canada, Waller et al. proposed contract literacy as a term that meant “familiarity with the processes and documentation used by

large corporations” (Waller et al., 2016, p. 7). This study showed that everyday users tended to be unfamiliar with bureaucratic terminologies and processes, especially those documents produced by legal agents, and therefore lacked sufficient contract literacy. This creates challenges for usability, since legalese brings its own set of obstacles — exemplified by Waddams, and Scassa and Deturbide in the case of *Rudder v. Microsoft Corporation*. To overcome this issue, Waller et al. suggested approaching contracts as user guides, complete with visual markers and graphical aids to boost comprehension (Waller et al., 2016, pp. 3–11). This approach, according to the authors, focused on greater clarity for users unfamiliar with contracts through visual drivers. Interestingly, the authors noted that while innovative to its particular project and context, contract simplification is not new (Waller et al., 2016, p. 2). Indeed, as the next section shows, research into simplification and clarity have tended to go hand-in-hand, leading to document design approaches that have emphasised trust, well-being, and empowerment for parties of an information exchange.

3.2.2.2 Trust, well-being, and empowerment

In 1981, the American Institutes for Research announced the realisation of *Guidelines for Document Designers*. The publication, authored by Felker, Holland, and Redish et al., lists several techniques for organising and laying out documents, principles of graphic and typographic systems, and methods for constructing sentences that are clear and easy to understand. The publication also includes a brief research section at the end of each chapter to support that chapter’s claims. In the chapter on informative headings, for example, the authors discuss how imprecise headings might lead to confusion, and that readers still prefer to see headings on documents such as warranties, even if the heading has little effect on comprehension of the contents (Felker et al., 1981, pp. 19–20).

Much of the publication is rooted in similar principles of design research, which have since been refined by document scholars reviewed so far in this chapter. Nonetheless, the publication makes a single poignant, albeit passing, statement on the impact of documents on social experiences: “Public

documents are critical because they frequently affect our well-being in many ways” (Felker et al., 1981, p. 1). A complete reading of *Guidelines for Document Designers* leads to the assumption this statement is the publication’s *raison d’être*. Yet there is little exposition on how user “well-being” is affected, or what could constitute well-being beyond a broad sense of providing greater comprehension and clarity. The concept is given more prominence, and is better articulated in future versions of analogous publications. Accordingly, a succinct comparison of past and present government guidelines on document design is useful in plotting the development of well-being as a central concern of greater usability and user experience in information documents.

A comparable government publication on this topic – titled *Research-Based Web Design and Usability Guidelines* – was published in 2006 by the Department of Health and Human Services, United States Government. In a similar vein to *Guidelines for Document Designers*, the newer web-oriented publication provided instructions on usability and web-friendly formats, and offered updated advice on user assisted technologies for online documents, including forms (United States Department of Health and Human Services & United States General Services Administration, 2006, p. 23). The term “well-being” does not appear in this document. But the foreword by then DHSS Secretary Michael O. Leavitt, contains an analogous observation:

Record numbers of citizens are accessing government sites 24 hours a day to find information and services that will improve their daily lives. This makes it all the more essential that the Federal government deliver Web technologies that enable and empower citizens (Michael O. Leavitt, as cited in United States Department of Health and Human Services & United States General Services Administration, 2006, p. ii).

Leavitt leaves little doubt regarding the impetus for, and attempts by, designers to empower users and enhance usability in government-citizen communication. Clearly, such guidance and advice demonstrate a need to go beyond the view that documents are simply containers of data. The volume of research and scale of results that have contributed to this endeavour further attest to the centrality of improving user experiences. However, as with “well-

being”, there is immanent vagueness in terms such as “improve” or “empower,” when analysed in the context of usability. These nebulous descriptions risk exposing their meaning to highly customised – and conflicting interpretations – when employed in disparate design agendas. Researching the effectiveness of printed instructions, in a 2004 chapter on visual information for everyday use, Wright captures the nuanced differences between quality and usability:

Designers are under pressure from both peers and clients to create products having ‘quality’. This is a slippery slope [since] it refers to features traditionally seen as denoting high standards of production and presentation....As professions develop so do views of what is right, or safe, or feasible; and these views may ignore usability. Shifting the focus from ‘quality’ to ‘usability’ raises new questions (Wright, 2004, pp. 49–50).

Wright focuses on the dual notions of quality and usability, noting that both are equally important in the production of good design, and thus both need to be equally addressed for printed matter to be effective. Much of the work reviewed has focused on usability. But quality, as Wright attests in the chapter on printed instructions, is an evolving concept linked to constantly changing views of what constitutes quality in the wake of new technologies and attitudes (Wright, 2004, p. 50). This viewpoint is reflected in Jarrett and Gaffney’s seminal book on government forms design in the United Kingdom, produced in 2009. In this work, Jarrett and Gaffney adopt a more prescriptive stance on usability and quality, asserting that usability means ease of use, (Jarrett & Gaffney, 2009, p. 4) and that the quality of information one gathers depends on the quality of the relationships that exist between issuers and users (Jarrett & Gaffney, 2009, p. 12). In doing so, Jarrett and Gaffney not only take up Wright’s emphasis on usability and quality as necessary determinants of effective documents, but go further in focusing on the relationships that are revealed through usability and quality concerns immanent in documents.

Additionally, Jarrett and Gaffney’s take on forms locates the burdens of user-issuer relationships squarely on issuers, by claiming that forms inherit their credibility from the issuing organisation (Jarrett & Gaffney, 2009, p. 20).

This claim of issuers needing to bear absolute responsibility for the usability of forms and the quality of user-issuer relationships is not new. In 2007, Barnett adopted a similar outlook in a report – produced by the United States Internal Revenue Service (IRS) in 1980 – in which the author writes about how poor forms design causes mistrust by users of the form’s issuing organisation.

Commenting on this report, Barnett observed that “many form fillers do not trust the organisations that own the forms” (Barnett, 2007, p. 11). Trust in user-issuer relationships – according to Barnett, as well as Jarett and Gaffney – influences and is influenced by both, the quality and usability of the form in question. Interestingly, the IRS themselves acknowledged this issue in the report, claiming that “the American people simply do not believe that the IRS, or other government institutions, are on their side...[thus] these feelings adversely affect their attitudes toward the whole tax filling process, and the tax forms in particular” (Internal Revenue Service, as cited in Barnett, 2007, p. 11). What might some design projects that focus on trust, well-being, and empowerment around issues of usability and quality look like? How do these factors lead to fairer participation in forms environments? And is it fair to make issuers fully responsible for the quality of relationships in government forms? Works on these matters are discussed next in Section 3.2.3.

3.2.3 Participation and fairness concerns in documents

Following the events of the Sandy Hook Elementary School shooting in 2012, Cairo examines visualisation of information and queries the need for ethics in visual design, in a chapter on moral visualisations from *Information Design: Research and Practice*. In this chapter, Cairo weighs up the pros and cons of a case study of a newspaper that published an interactive map revealing the locations of handgun owners in the United States. Moreover, this map was distributed in the aftermath of the Sandy Hook Elementary School shooting and so caused outrage among the community (Cairo, 2017, pp. 161–162). Well-being, in this case study, refers to privacy concerns, as well as the purported lack of sensitivity to victims of the shooting and to law-abiding gun owners – both of whom use such interactive maps. This ties in with the question of

whether issuers, like the newspaper, ought to bear absolute responsibility for its relationships with users who either supported or criticised its publication.

Cairo's work advances the notion of morality in designing more ethical user experiences as a prominent criterion of information documents. The work also reveals the subjective nature of the themes and treatments around the cognate notions of morality, well-being, and fairness: in the incident of the map showing locations of gun-owners, Cairo asks if the newspaper made an acceptable decision, given that "this dataset could have been available to any private citizen through a Freedom of Information Act (FOIA) request?" (Cairo, 2017, p. 162). This raises the question of whether organisations are guilty of unfairness if they choose to design documents that violate a cross-section of user expectations. Is it possible to design a public document without raising issues of bias or exclusion for some users? Does "usability" in document design contain inherent bias as a result of its vulnerabilities to personalised agendas? And ultimately, can an approach to document design exist that is fair to every user as well as the issuing organisation?

Taking into account the works reviewed in Sections 3.2.2 and 3.2.3, I argue that the long-proposed approaches to usability in document design are sound, but so far do not account sufficiently for fairness concerns. This poses complications at a policy level for public documents that, in theory, ought to meet the needs of every possible user while also avoiding bias towards specific groups. In other words, as Sen notes in his 2009 book on the ideas of justice²⁵, fairness in society approximates to an insistence for impartiality (Sen, 2009, p. 54). Sen's view on fairness and impartiality is grounded in the earlier works of Rawls, which form the bedrock principles of fairness within the scope of this thesis. Fairness and its attendant values are raised in conversations around document design – mentioned namely by Schwesinger, and alluded to in the works of Waller, Wright, and Cairo. However, a formalised approach is still needed, i.e. one that integrates Rawlsian notions of fairness with user and issuer concerns in the design of information exchange documents.

²⁵ Amartya Sen's work, *Ideas of Justice*, is a commentary and criticism of the works of John Rawls. As such, Sen's work provides useful insights on the issues of fairness and bias in social exchanges, which link with the discourse of fairness in design, discussed in Chapter 5.

But while a lexical expression of fairness in the context of information design is necessary²⁶, a catch-all term is neither feasible nor useful. Instead, this thesis posits the requirement for an overarching approach – one which treats usability, and its concomitant subjects of well-being, empowerment, and trust, as central factors in a model that locates fairness at the heart of designing government-citizen communications. Such an approach would account also for user and issuer obligations in equal parts. A review of the definitions of forms, and reflection on the works of prominent forms design researchers, is useful for advancing this discourse. It is also worth mentioning that forms, perhaps more than any other document genre, offer the best vantage point from which to understand the mindsets and prejudices that underpin issuer-user relationships. This is because forms, as generally viewed by information design scholars, are co-authored documents. Whereas a letter or a poster may be deemed to have fulfilled its role once it has been posted, a form, on the other hand, mandates action directly upon the document itself.²⁷

²⁶ Various notions of fairness are discussed in Chapter 5. A lexicon of terms appropriate for document design contexts are thus identified, developed, and applied in Chapter 6, which proposes a model for fairness in designing digital government forms.

²⁷ There is some room for debate over whether a credit card statement, bill, notice, or a subpoena bearing a recipient's name can be considered a form. If so, then it may be argued that a recipient (user) does not need to always act upon a form itself in every instance, since such forms already contain pre-filled details. Furthermore, mandatory pop-up boxes on websites, asking users to accept or reject services, are examples of micro-documents that collect user information in other ways apart from forms, e.g. through phone surveys, website cookies, and digital apps that gather user data. Finally, health agencies sending letters or SMSes for citizens to attend vaccination appointments are yet more examples of documents requiring users to respond (in the case of SMS by replying to the message). Should these also be considered forms, since a response is required? I would answer no. Any document classed as a form will be unable to fulfil its functional requirements if its users refrain from entering their data, regardless of when that data was provided. In the case of pop-ups and messages, users are generally not required to enter details, or have already provided portions of their information on a previous occasion, either via a form or other communication channels. I further posit that in the case of SMSes and letters, such correspondence is usually part of a response to an earlier or an ongoing application rather than a new forms process. Therefore, unlike SMS, mass letters, and cookie pop-ups – which are static in the sense their creation and deployment is enough to meet their documental purposes – a form entails a specific type of activated response – voluntary or coerced but never unintentional – from its users within the form environment. This expectation of behaviour is pivotal in defining what a form is, and how forms differ from other document genres with similar interactions, formalities, and characteristics.

Participation in forms is essential for issuers and users, since both parties need to actively cooperate within the form's environment so as to satisfy its functional requirements. It follows then that forms can be characterised by their inherent tendency to transform users from passive recipients to active participants in information exchanges. This transformation has typically been mediated by the expectations implicit since the advent of paper forms, and reflects the power dynamics which have occurred between issuers and users. Accordingly, a review on the works focusing specifically on the definitions, deliberations, and debates surrounding forms is necessary²⁸, and is discussed in Section 3.2.4.

3.2.4 Definitions, deliberations, and debates concerning forms

In Schwesinger's comprehensive compendium on forms in 2010, the author refers to these documents as "frameworks for communication, comprised of texts and graphics, and including fixed and variable pieces of information" (Schwesinger, 2010, p. 35). Viewing a form as a framework situates the document as an epistemological construct of socio-political exchanges. The purpose of any form is to record "everything undertaken by an authority....This is the only way in which knowledge of contracts...and so on can be made independent of changes in personnel" (Schwesinger, 2010, p. 36).

The separation of knowledge from its creators and users is an interesting approach to understanding what a form is. This is because while all documents perform some degree of knowledge capture and transfer, forms are unique in that they require active participation from issuers and users in order for the process to be considered as completed. As a result, the necessary duality of authorship has raised certain challenges for information design researchers since (i) co-authorship of forms does not imply equal power, especially under conditions where exemption from participation is not an option; and (ii) the

²⁸ Fairness is a well-defined concept, with an extensive vocabulary. The concept is grounded in subject areas capable of not only contextualising notions of well-being, trust, empowerment, and impartiality, but also integrating their broader information design concerns with motivations around fairness. This integration is the subject of Chapter 5.

contractual nature of forms can carry severe legal ramifications for user errors, irrespective of design.

This is more problematic in government forms over those produced for other social institutions. Schwesinger makes this distinction apparent in his observations on forms used in business or e-commerce versus those produced by government institutions: “in contrast to the other prototypical settings for forms (customer and company, employee and employer, business to business), is that users cannot opt out” (Schwesinger, 2017, p. 613). This complication is compounded when considering Agar’s 2003 book on the computerisation of government bureaucracies. Agar’s work surveys exchanges between the state and its citizens, and the objects of government that mediate such exchanges. Here, Agar notes that “perhaps the most commonplace encounter between citizen and state is the filling out of a standardized form” (Agar, 2003, p. 2). This claim ties in with Schwesinger’s view of forms as highly commonplace mediators of government-citizen administration (Schwesinger, 2010, p. 30). Since forms are ubiquitous documents of administration, they are also equally vulnerable to varied agendas. An administrative perspective of forms becomes a useful starting point in clarifying what forms mean in the context of essence and operational capacities.

3.2.4.1 Administrative perspectives and uses

In 2017, the Century Code of the State Government of North Dakota, United States of America, designated a form as “any document designed to record information, and containing blank spaces and which may contain headings, captions, boxes or other printed or written devices to guide the entry and interpretation of the information” (North Dakota Information Technology Department, 2017). Jarrett and Gaffney adopt a similar stance in their earlier mentioned book, stating simply that forms are pages with boxes – fields, radio options, checkboxes – that are filled, and that most people recognise a form when they see one (Jarrett & Gaffney, 2009, p. 5). In asking why users dislike filling forms, Jarrett and Gaffney point to their “relationship, conversation, and appearance layers theory” summarised in Table 3.3 on the following page.

Layers	Explanation
Relationship	[exists] between the organization that is asking the questions and the person who is answering.
Conversation	comes from the questions that [a form] asks, any other instructions, and the way the form is arranged into topics.
Appearance	the way that [the form] looks: the arrangement of text, input areas such as fields and graphics, and the use of color [sic].

Table 3.3: Jarrett and Gaffney’s three-layer relationship-conversation-appearance theory of forms (Jarrett & Gaffney, 2009, p. 6).

The first two layers of the theory i.e. relationship and conversation, draw attention to a form’s social aspects. These layers focus on building trust and accounting for how users perceive the form as an instrument of information exchange. The last layer deals more with graphic and typographic elements of a form. However, the authors are careful to note that these layers are not distinct but fluid in their treatment of designing a good form, and that each works collaboratively with the other two. In effect, this theory summarises the communicative qualities of forms by highlighting the visual and semantic elements that impart meaning to users. It also reinforces the ability of design to enhance, diminish, and altogether change the meaning of a document’s contents through graphical and linguistic modifications. In effect, this theory reflects prior notions and interpretations of forms posited by Frohlich, Sless, Waller and others, which are reviewed later in this chapter.

The descriptions of forms by the North Dakotan State Government, and by Jarrett and Gaffney, point to the identifying elements of what makes a form a form. However, Jarrett and Gaffney’s version transfers much of the onus of identifying a form directly to the user. Indeed, recognition of a document by its typographical characteristics is at the core of genre analysis. Writing about what makes a good document, Waller noted that “each genre triggers strong expectations about how it will be organised, and how to read it” (Waller, 2011, p. 18). However, the rules governing document organisation and reading are

not established solely by issuers but are also shaped by the communities in which the documents operate. Writing on the topic of genre analysis in 1990, Swales examines the influence of rhetoric and discourse on societies looking to connect and communicate through language, and how genre texts respond to reading and writing strategies employed among senders and receivers.

Swales referred to discourse communities as “socio-rhetorical networks that form in order to work towards sets of common goals” (Swales, 1990, p. 9) Swales also noted that “established members of these discourse communities possess familiarity with particular genres that are used in the communicative furtherance of those sets of goals” (Swales, 1990, p. 9). Swales’ genre analysis focused on the linguistic aspects of communication; this is taken up by Waller in a 2012 paper on graphic literacies in which the author comments on the need for appropriate reading and writing strategies for particular document genres (Waller, 2012, pp. 8–10). Familiarity with the norms of a genre is key to providing a suitable definition of the documents within that genre. The norms around documents, discussed so far, highlight the significance of relationships between issuers and users – relationships built on shared meaning around that document’s expectations and functions.

3.2.4.2 Meaning and meaningful relationships

In a book chapter in 1999 on designing through dialogue, Mackenzie-Taylor notes that “meaning only becomes a reality when a person engages with the printed words – meaning is brought into being by the interaction between the reader and the document” (Mackenzie-Taylor, 1999, pp. 177–178). Mackenzie-Taylor’s work on visual design looked at the arrangement of tables and graphs, which explored how a dialogic approach can lead to better meaning-making for document users. This conversational approach is central to virtually every document genre, and has been echoed by Jarrett and Gaffney in the design of government forms. Mackenzie-Taylor, and Jarrett and Gaffney emphasise the need for dialogue as a means of understanding: (i) the document’s contents; (ii) the issuer’s intentions in creating and arranging the contents; and (iii) the context in which users interpret and accordingly act on the issuer’s intentions.

Wilson and Sperber's 1995 *Relevance Theory* highlights the importance of "understanding" in information environments. While much of the theory focuses on utterances, linguistics, and pragmatics, the following observation overlaps with how linguistic understanding is achieved in information design:

Understanding is achieved when the communicative intention is fulfilled – that is, when the audience recognises the informative intention. (Whether the informative intention itself is fulfilled depends on how much the audience trusts the communicator. There is a gap between understanding and believing. For understanding to be achieved, the informative intention must be recognised, but it does not have to be fulfilled.) (Wilson & Sperber, 2006, p. 611).

Wilson and Sperber observed that intention and trust are both catalysts for understanding, specifically reasoning that the relationships in information environments between issuers and users do not exist in isolation, but occur within contextualised settings that are, as Swales also observes, shaped by the perceptions of the members of that group. This view was proposed earlier by Sless, a notable forms designer and scholar. In researching and evaluating the design of forms for large financial institutions in 1999, Sless highlighted the importance of context, outlined by Wilson and Sperber, categorically stating that "information design is first and foremost concerned with solving practical problems within and through a specific cultural and historical context" and that "it is impossible to consider forms in any depth without acknowledging that they are instruments of social control" (Sless, 1999, p. 136). Sless' view of how forms mediate relationships in large organisations accurately captures the nature of information relationships embodied within forms. Indeed, the functional notion of forms as problem-solving texts is balanced with the need to understand the power that forms wield in information exchanges. To enable this balance, Sless proposes that interactions between issuers and users ought to be treated as conversations in form-filling tasks (Sless, 1999, p. 136), rather than as a monologue or an afterthought.

Sless' take of forms as artefacts of conversations ties in with Jarrett and Gaffney's conversation layer in Table 3.1. Interestingly, this point adopted by

Sless, and Jarrett and Gaffney was mentioned in the earlier works of Frohlich's, specifically in a 1986 paper examining form-filling behaviour. Frohlich's paper reviewed the behaviour of users filling out a claims form, commenting on the general principles governing the peculiarities of this process. Of the principles listed, Frohlich highlights the importance of conversational exchanges despite the static nature of paper forms (Frohlich, 1986, p. 43). The repeated impetus to approach forms as artefacts of conversations is therefore a central concern for designers in reimagining forms as mediators of fairer relationships issuers and users. This is especially pertinent given the participative nature of forms as urgent and actionable exchanges that occur in a co-authorial context.

3.2.4.3 Urgency and action in forms

Frohlich, Sless, and Jarrett and Gaffney's concept of forms as dialogic objects is legitimate. The negotiation of relationships and inequalities in power are vital characteristics of most forms, but especially so of government-citizen communication where there are little-to-no alternatives to forms that are poorly created, or which exploit their monopoly position. The query-response sequence that exists between issuers and users attests to the imbalance of power: issuers are responsible for formulating a form's content, and so hold greater control over the direction and quality of the conversation. Forms that abuse this authority tend to generate negative consequences for users.

Holland and Redish have raised the topic of immediateness i.e., urgency of action that users need to take, rather than committing the information to long-term memory (Holland & Redish, 1981, p. 205). Orna took this issue further in 1984, investigating the miscellaneous circumstances under which users are compelled to act. Citing examinations as an example, the author writes of tense environments under which instructions are read, and that "many official forms are approached by those who have to fill them in with feelings of anxiety or even acute distress" (Orna, 1984, p. 29). Agar offers a similar case from the early twentieth century of how "in the United Kingdom, as in many other countries, individuals and firms were legally compelled to complete census forms. However, this capacity was often not granted" (Agar,

2003, pp. 75–76). While forms are characterised by their urgency for action, ambiguous design systems have exacerbated the negative effects of such form-filling activities conducted under pressure. These badly designed forms, according to Sless, reflect the relationship between issuers and users that can be described as “messy, unfair, and, in the main, serves the interest of the state or business, not the citizen or consumer” (Sless, 1999, p. 149). This is a critical and common concern since public forms can, and often are, employed as a state-sponsored means of coercion that can undermine rather than augment information exchanges. What do efforts to define and design forms that augment exchanges entail?

The notion of capacity in relation to form-filling activities offers some insight: Jarrett and Gaffney note that while users can recognise forms by their appearance, and accordingly figure out how they are meant to act on it, they still do not like to fill in forms (Jarrett & Gaffney, 2009, p. 5). Recognising that a document is a form by its visual appearance takes some of the pressure off forms designers. But helping users determine how to act on the form, i.e. its requirements, warrants more than mere recognition and form-filling activities, especially in instances of complex forms that threaten penalties for incorrect submissions.

The *quality* of a user’s response, along with the *impetus* to provide this response, are just as significant as the response itself. Jarrett and Gaffney, Mckenzie-Taylor, Sless, and Frohlich’s conversational approach thus takes precedence in defining and designing a form that is genuinely “worthwhile”. Schwesinger extends this line of reasoning by asking, “even if...we recognize a form when we see one, how do we define what a form is?” (Schwesinger, 2017, p. 607), In answering this question, the author mentions that documents need to meet two criteria to be considered forms:

A form is a means for two-way communication [and] a form includes a fixed part (e.g. questions and prompts) and a variable part (e.g. check boxes and blank input fields) (Schwesinger, 2017, p. 607).

By defining a form as any document which satisfies the second condition, i.e. a fixed and a variable part, Schwesinger's position is more aligned to that of the North Dakotan state government. Emphasis is placed on how fields, boxes, and buttons direct conversations between issuers and users. However, the author's first condition of forms as "means for two-way communication" (Schwesinger, 2017, p. 607) ties in with Sless' view that forms are mediators of conversations, while reinforcing the importance of issuer-user relationships and interpretation of meaning in co-authored environments. This view is also echoed by Rogers whose 1999 visual information design book chapter on writing bills as artefacts of conversations, states that "meaning is generated not only from the substance of an expression but also its manner of delivery" (Rogers, 1999, p. 169). Similar to Mackenzie-Taylor, Rogers' work considers conversations and typographical elements as delivery mechanisms for greater meaning-making. Both are responsible for forms facilitating fairer exchanges between issuers and users. Furthermore, these exchanges are especially interesting when considering the power dynamics that exist between parties.

3.2.4.4 Dynamics of power

Schwesinger raises a poignant concern on the topic of government-citizen interactions by declaring that "government forms must work for everyone, and facilitate fairness" (Schwesinger, 2017, p. 613).²⁹ Both, Schwesinger and Sless not only define forms as socio-political artefacts of power, but also locate the nature of this power within the wider context of fairness. And while neither goes beyond a cursory discussion of how fairness fits into forms design, their respective definitions of what forms are, and how they should be treated, provide the stimulus for this thesis' interrogation of fairness in design.

To understand how fairness fits with the design of government forms, it is worthwhile to review Jansen and Steehouder's 2001 work on reading and writing public documents in the Netherlands. Taking a functional approach to government forms, Jansen and Steehouder's book chapter identifies three key

²⁹ This quote forms the basis of this research and has thus been repeated throughout the thesis.

aspects: legal, data transactions, and public relations (Jansen & Steehouder, 2001, p. 13). The authors describe each of these as follows:

[Legal function:] forms are important instruments in the implementation of rules and regulations that apply to the individual situation of citizens....Since such procedures have important legal aspects, forms serve – to a certain extent – as legal instruments...[with] legally adequate wording (Jansen & Steehouder, 2001, p. 13).

[Data transaction function:] forms transfer data from one entity to another...between individual citizens and the government. It is in the interest of both parties that this transfer is effective...and efficient (Jansen & Steehouder, 2001, p. 13).

[Public relations function:] government organizations realize...that their functioning depends to a large extent on the cooperation of the public. They also...recognize that their forms can be quite effective (or detrimental) in establishing goodwill (Jansen & Steehouder, 2001, p. 14).

Much like Sless and Schwesinger, Jansen and Steehouder underscore the importance of the socio-political propositions of forms vis-à-vis their more operational responsibilities in carrying and transmitting data between issuers and users. The dialogic aspect of forms features in most discussions around what forms are and how they behave. Additionally, there is emphasis on the need for this dialogue to serve the interests of both parties, i.e., issuers and users. This emphasis is important since it combines varying agendas – that either focused on the monopolistic powers of the issuers, or solely on the needs of the users – into a single, coherent goal of augmenting experiences fairly for everyone involved.

Such an approach to defining forms does not always imply redistribution of power. Instead, issuers and users collectively acknowledge the cooperative nature of forms, which can either help or hinder the exchanges between senders and receivers. How these boundaries are negotiated is contingent on the quality of relationships between the issuing organisations and their users, i.e., how much consideration is given to well-being, empowerment, trust, and

goodwill. These attributes appear repeatedly alongside a form's functional properties and so need to feature more prominently in future conversations around forms. An updated understanding of forms must then account for the evolving social demands and political dynamics of the state, as well as for new technologies and communication tasks required to facilitate government-citizen exchanges. This understanding is advanced by an overview of past research conducted on paper forms design, together with key insights that may be applied to more recent digital forms.

3.2.5 Historical overview of research on paper forms design

In a 2017 lecture commenting on forms as channels for recording agreements, the forms scholar, Twyman, describes how parties transacting with one another in medieval times might divide in half an object such as a stick; each party would retain one half as evidence of the transaction, and the unique crack between the two pieces would serve to verify the legitimacy of that transaction (Twyman, 2017). In the same lecture, the author notes that paper eventually came to replace twigs, whereby the sheet would be torn along a perforated edge, thus serving the same purpose (Twyman, 2017). Twyman's research into early forms design, along with the works reviewed in this section, show that the functions of data collection and record-keeping went hand-in-hand with co-authorship, cooperation, trust, and well-being.

The standardisation of paper forms, exemplified by French tax forms in the 1790s and British census forms in the 1830s, stemmed from the growth in population statistics which mandated more efficient methods to communicate with the authorities (Agar, 2003, p. 2); it was also due to the onset of printing and typesetting technologies that enabled the efficient production of ready-made tables, different type sizes, vertical and horizontal rules, and margins for explanatory notes (Schwesinger, 2010, p. 58). The standard paper form, with its familiar complement of field boxes, questions, and columns is a precursor to the format of digital forms, albeit with key differences that are discussed in the conclusion of this section. Nevertheless, the importance of participation — co-authorship, cooperation, trust, and well-being — is present throughout.

Repeated emphasis on these qualities by authors and scholars highlights a core requirement to design forms that mediated accuracy and legitimacy alongside information and data management. Indeed, in his 2010 compendium of forms, Schwesinger described the management of information as a leading cause of the proliferation of paper forms, from the mid-nineteenth century onwards, which in turn led to their evolving design (Schwesinger, 2010, p. 60). The need for a form to manage information accurately and efficiently has persisted through the evolution of its materiality, from wood to paper to code, and is reflected in the design of paper forms over the last 200 years.

It is beneficial then to discuss some of the prominent works on paper forms design to: (i) review how research relating to size, terminology, and some common typographic factors affected the purpose and functions of paper forms; and (ii) identify some of the issues carried over from paper forms, as direct predecessors, to the design of their digital counterparts.³⁰

3.2.5.1 Dimension, comprehension, and well-being in paper forms

In a 1962 publication on the effective design of paper forms for government departments in the United Kingdom, Her Majesty's Stationery Office (HMSO) proposed "office forms should be well designed so as to require the minimum effort on the part of those who have to complete or use them—whether civil servants or members of the public" (Her Majesty's Stationery Office, 1962, p. 9). The notion of effort is central to the fairness model, described in Chapter 6, which balances effort needed by all parties, against the design opportunities afforded in order for users to complete the form. Managing the effort required to fill in a paper form is contingent on several design considerations, not least the concerns of dimension and layout in this media.

In the same publication, the HMSO observed that the efficacy of a form depended heavily on its layout, which in turn was affected by the paper form's dimensions (Her Majesty's Stationery Office, 1962, p. 9). The fixed dimensions of the medium meant that paper forms needed to conform to set widths and

³⁰ These issues are subsequently analysed in the context of the case studies on Singapore's digital government forms, discussed next in Chapter 4.

heights, which accordingly determined the sizes of fields, text, margins, and white space. A reduction in type size, for instance, meant more text could be placed on a single page, but would also lead to legibility problems for users.

In paper forms this dilemma is exacerbated by the fixed size of the medium; a piece of paper has finite dimensions, which limits the amount of information that can be fitted onto a single sheet. Digital forms have the advantage of not being confined to fixed sizes; accordingly, the Service Manual for GOV.UK notes that both form formats have benefits, and so advises against simply uploading a paper form online. Instead, the manual suggests digital forms designers “start by splitting the form across multiple pages with each page containing just one thing” (GOV.UK, 2018). The Service Manual thus highlights some of the key differences between paper and digital forms design, discussed next in Section 3.2.6. However, the recommendation to split every question / section across single pages is a distinct advantage of digital media. In paper forms, the problem is both economic – given the cost of additional sheets and printing, and ergonomic – the fixed sizes of sheets do not respond to varying lengths of questions, explanations and fields.

This issue is exacerbated in more complex paper forms – i.e. public forms involving several pages of content – and is the topic of Waller’s 1984 paper on designing government forms. In this paper, Waller expounded on the design process of a Supplementary Benefits form for the Department of Health and Social Security (DHSS) in a case study of how a government paper form is produced. The prototype paper form was 16.5cm by 20.4cm – a little larger than half the area of a standard A4 page³¹ – with eight pages triple folded into a concertina (Waller, 1984, pp. 37–38). While the relatively smaller size of the form could be overcome by printing more pages, the case study found that the limited space meant columns-widths were inconsistent, which subsequently broke the reading path for users; similarly, excess gaps between fields resulted in wasted space, while the relatively high number of pages made the form difficult to fold into its intended three-column concertina (Waller, 1984, pp.

³¹ The dimensions of an A4 page referred to is 21cm by 29.7cm, making the A4 page 1.85 times larger than Waller’s prototype form for the DHSS.

44–45). This form was eventually discarded in favour of a prototype that was double the size of the original.

The decision to move to a bigger paper size ties in to the HMSO's general recommendations for designing paper forms: "a form should be drawn on a sheet of paper large enough to leave an outer margin for notes to the printer" (Her Majesty's Stationery Office, 1962, p. 112). While the term "large enough" is ambiguous, the results of Waller's 1984 case study confirmed the validity of the HMSO's view towards providing sufficient space and adequate text sizes to accommodate comprehension and usability. Such a move also implied a greater respect for the user's position in such power exchanges.

In the same year, this general sentiment was expressed in a book chapter by Miller, an information designer and scholar, on the transaction structures and format in form design. Reflecting on the design concerns in paper forms, Miller alluded to the quality of the text – along with the paper it is printed on, and the attention paid to typography – as a means of belittling the role of users while concurrently highlighting the superior position of issuers (Miller, 1984, p. 536). This point is given validity in Frohlich's influential work on the organisation of form-filling behaviour, mentioned in Section 3.2.4.2, whereby the author comments that forms design research has focused more on "the manifest content of form material than to the selective use of that material by form-fillers" (Frohlich, 1986, p. 43). Enlarging the size of a paper form not only augmented the form's overall capabilities to communicate more clearly; the resulting improvements also increased the general level of well-being for users involved in the exchange. Waller confirms these improvements, to an extent, in his case study, observing that users of the prototype complained over unclear questions with little to no explanations or routing, which led to confusion and users skipping over sections.

The inability of users to perform reading sequences pointed to problems with public paper forms design from the 1970s onwards. Returning to Holland and Redish, the authors proposed that public documents needed to facilitate functional reading, i.e. users ought to be able to understand and consistently apply the meaning derived from forms (Holland & Redish, 1981, pp. 205–209).

Changing the dimension of the form, in Waller's case study, led to a re-thinking of the form's overall organisation and layout, with subsequent improvements in legibility for users (Waller, 1984, p. 55). Some of the issues with legibility and comprehension related to the fixity of paper forms have been overcome, to an extent, with the dynamic nature of responsive digital forms design, discussed in Section 3.2.6 and analysed in the thesis' case study. However, size by itself is insufficient in providing adequate levels of clarity for users. The terminology used in forms, specifically government forms with legal power, has often been an obstacle in facilitating clarity, trust, and meaningful communication.

3.2.5.2 Terminology in paper forms

Writing on the general language employed in forms, in his 2010 compendium, Schwesinger claimed that "the language of many forms is filled with specialist terms...characterised by long sentences and a lack of courtesy" (Schwesinger, 2010, p. 44). The absence of manners in forms is typically characterised by the dense terminology and use of legalese. One reason given for such terminology comes from Neutelings and Maat's 2001 research on the trustworthiness of public and policy documents in the Netherlands. In their chapter, the authors noted that document producers will use every linguistic means necessary to persuade readers of the producers' viewpoint, thereby setting issuers and users against each other. Overcoming this obstacle "requires a certain degree of cooperation" (Neutelings & Maat, 2001, p. 234). The notion of cooperation is another central tenet of the fairness model, discussed in Chapter 6.

Designing forms that expedite cooperation through considered words and phrases was also taken up in 1962 by the HMSO. In this publication, the HMSO raised the significance of co-authorship and cooperation, stating that cooperation is better achieved in public forms when they employ polite but meaningful wording (Her Majesty's Stationery Office, 1962, p. 21). The HMSO gives examples of such terms in forms: "Words such as 'should' and 'must' can cause difficulty; the word 'should' may suggest that a requirement is desirable but not essential, while the word 'must' can seem unduly officious" (Her Majesty's Stationery Office, 1962, p. 21). Interestingly, this practice is evident

in some Singapore government paper forms that were produced in the 1960s and 1970s, shown in Figure 3.1 below.

telecoms		TELECOMMUNICATION AUTHORITY OF SINGAPORE		TELEGRAM FORM	
FOR OFFICIAL USE					
No.: FC 7476	Charge: \$8/80	Pilot Line	RSSE	No. of Words Chargeable	
No. of Words:	Date and Time: 12/8/78 1545	Instructions to be Signalled:			
<p>Sender is kindly requested to write or type in the space below. Notice: In the absence of any indication to the contrary it will be assumed that this telegram is to be charged at full rate and treated accordingly. Please write name and address of addressee in Capital Letters.</p>					
Class and Address:					
VENKATACHALAM					
D-7 CRESTATE					
ARUVANKADU - PIN 643202					
NILGIRIS TAMIL NADU INDIA					
DO NOT PROCEED LETTER FOLLOWS					
APPASAMY					
<p>I request that the above telegram may be forwarded subject to the Conditions printed on the back of this form by which I agree to be bound. (Details below are not to be telegraphed.)</p>					
Sender's Signature:	Sender's Name and Address:	Deposit Holder No.	Telephone No.		
	G. APPASAMY 22 SUFFALO ROAD SINGAPORE.				

Figure 3.1: A standard form to send telegrams, issued by the former Telecommunication Authority of Singapore, 1978. There are “polite” instructions given in English throughout the form, though the main message field could be filled in any language. Image reproduced with permission from Deepa Vijayan – Private Family Collection.

In Figure 3.1 above, the “Sender is kindly requested to write or type in the space below” (Telecommunication Authority of Singapore, 1978). Such use of language ties in with the HMSO’s guidance for public forms produced in the United Kingdom. As mentioned in Chapter 2, Singapore was a colony of the British since 1819. As such, the nation’s civil service – which is responsible for Singapore’s administration, and was modelled along British lines – maintained prior imperial practices in the years following full independence in 1965. It is not surprising, therefore, to find instances of government paper forms made that era which conform to the principles advocated by the HMSO, one of them being the way questions and prompts are phrased.³²

³² The language used in Singapore’s newer digital forms, discussed in the case study in Chapter 4, is different from that observed in the country’s older paper forms. The case studies and findings focus on analysing the language and structure of the two digital government forms.

The practice of considered terminology to reduce undue stress links to Twyman's discussions about the significance of wording, in his 2017 lecture on paper forms design, whereby the scholar noted that the structure of language determines how one fills in a form (Twyman, 2017). Indeed, the terminology – together with sentence lengths, font sizes, and the placement of questions and prompts – in any form, paper or digital, determine how users respond to the form's demands³³, discussed in previous sections of this chapter. However, research into the design of paper forms has shown that structuring plays as vital a role as terminology in aiding better design for users and issuers.

3.2.5.3 Structure and behaviour in paper forms

Returning to Rogers' work on the need for documents to facilitate useful conversations between writers and readers, the author claims that when users write, the fixity of print tends to lull users into states of complacency, which lead to the neglect of context and therefore understanding (Rogers, 1999, pp. 165–166). To overcome such issues, Rogers suggested that the contents of a form be organised in a deductive structure: information contained in the upper levels of the hierarchy ought to provide context for the reader as they move towards the lower levels, where abstraction gives way to specificity (Rogers, 1999, pp. 167–168). This proposal for the organisation of information came from Rogers' research in the early 1990s on how customers in Australia could better understand their electricity bills. The case study offers useful insights on how structuring and hierarchy have facilitated better organisation and flow of content; however, Frohlich's and Sless' work on form-filling behaviour offer more nuanced views of the benefits to users through the omission of errors.

Frohlich was able to observe form-filling participants in Waller's 1984 case study of the Supplementary Benefits form for the DHSS. Following this observation, Frohlich published his 1986 paper on the organisation of form-filling behaviour in which the author lists several conversational principles that determine the quality of a user's experience. Of relevance to this discussion is

³³ Jarrett and Gaffney's three-layer relationship emphasises the need for issuers to take into account the conversation layer when producing a form, discussed in Table 3.3.

the principle of Least Reading Effort: i.e., users put in effort to read only that which appears essential to complete the form process (Frohlich, 1986, p. 55). In other words, users may be involved in a conversational exchange, desired by Frohlich, Waller, and Jarrett and Gaffney, but the quality of the conversation is minimal in that users want it to end as soon as possible. This leads to users missing out on sections that are applicable but do not appear to be, owing to failures in design of the form. In this case, Rogers' above-mentioned deductive structure is relatively limited in its ability to mitigate form completion errors. Sless, however, proposed an alternative method to design conversations upon examining the effects of user behaviours for the Australian Tax Office (ATO).

Citing the ATO's example in a book chapter reviewing his works on forms design, Sless pointed to the benefits of having users respond to every question on a form, rather than giving them the ability to skip sections (Sless, 1999, pp. 137–140). The findings of this pilot study in 1986 revealed a sequencing and routing method that shifted form-filling behaviour away from scanning topics, towards a serialised decision-making process which can only be completed if a particular question is read. This led to a typographical restructuring, whereby headings were given less importance than the question numbers, which were bolded for emphasis (Sless, 1999, pp. 139–140).

The figure displays two versions of an insurance proposal form. The left version is the original 'Capita Financial Group Proposal for Insurance' form, which is a complex, multi-sectioned document with various fields and tables. The right version is Sless' redesigned version, which is a more structured form with numbered questions (1-15) and routing instructions (e.g., 'Go to 4', 'Go to 16'). The redesigned form uses bolded question numbers and clear routing paths to guide the user through the information required.

Figure 3.2: Original form for Capita (left) and Sless' redesigned version (right) with routing and bolded question numbers. Image copyright © 1989 Capita. Source (Sless, 2018, p. 129).

Because details of the Australian Tax Office project were classified at the time of production, the forms shown here are for *Capita*, which Sless designed to demonstrate the directed method of sequencing and routing for ATO form users. In a journal article in 1990 on information design methods for measuring errors, costs, and iterative design testing process for the insurance industry – a cognate field of tax collection – Fisher and Sless stated that their above-mentioned approach significantly reduced completion errors in insurance forms – in one case by 97.2% (Fisher & Sless, 1990, p. 108). The authors work in both cases examined paper forms. However, their approach to restructuring forms – by shifting from topic-based form-filling to a directed approach, i.e. focusing on every question or section – is echoed in the 2018 Service Manual from GOV.UK, which encourages designers to use one full webpage per section. Interestingly, the Service Manual also calls on web forms designers to “use ‘branching’ questions so people only have to answer questions that are relevant to them” (GOV.UK, 2018). Branching, in web forms, uses conditional logic to route users to relevant sections through a series of Yes/No questions, a process seeded in the design of the ATO form shown in Figure 3.3 below.

<p>8 Do you receive a Service Pension, Income Support Supplement or Veteran Payment from the Department of Veterans' Affairs?</p> <p>No <input type="checkbox"/> Go to next question</p> <p>Yes <input type="checkbox"/>  You cannot get a Commonwealth Seniors Health Card.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> <p>You need to complete this form if you have a partner and your partner is also claiming a Commonwealth Seniors Health Card.</p> <p>If your Veterans' Affairs payment will be cancelled soon, do not lodge this claim until after the cancellation date.</p> <p>▶ Go to 10</p> </div>	<p>8 Do you receive a Service Pension, Income Support Supplement or Veteran Payment from the Department of Veterans' Affairs?</p> <p>No <input type="checkbox"/> Go to next question</p> <p>Yes <input type="checkbox"/> Your Department of Veterans' Affairs Service Number</p> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> <p>Your Department of Veterans' Affairs Service Number</p> </div> <p>You cannot get a Commonwealth Seniors Health Card.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> <p>You only need to complete this form if your partner is also claiming a Commonwealth Seniors Health Card.</p> <p>If your Veterans' Affairs payment will be cancelled soon, do not lodge this claim until after the cancellation date.</p> <p>▶ Go to 10</p> </div>
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Figure 3.3: Question from an Australian digital government tax form showing Sless' design used for *Capita* in 1986. Every question is mandatory and must be responded with either a Yes or a No. Based on the choice of response, the form directs or routes the user to the next appropriate step in the process. The design of the form makes it suitable for use as a purely paper-based document, or a digitised PDF version that can be filled on a screen then either emailed, or printed out and posted. Image copyright © 2018 Australian Commonwealth Government. Source (Sless, 2018, p. 129).

The design thread from paper to digital forms tracks the implementation of practices and refinements as states moved towards e-governance and online administrative services. It also highlights some of the key differences between paper and digital media. Nonetheless, the questions of fairness in forms – paper or digital – remain, even though form features evolve with nascent technologies and changing calls on the government machine. What are some of the design issues that overlap with paper and digital forms, which contribute to fairness concerns?

3.2.5.4 Key issues overlapping paper and digital forms

A particularly noteworthy mention in the HMSO's 1962 publication deals with the process of getting accurate replies from users:

If the form is to be completed by a member of the public the dominant consideration will be to produce the right response from the person filling it up. This is not simply a question of the appropriateness of detail but of the psychological impact of the form as a whole" (Her Majesty's Stationery Office, 1962, p. 22).

Getting a "right" response involves more than just demanding answers; it extends to perceptions of the entire process, characterised in large part by the form's design. In other words, the psychological impression of such processes on participants depends on the quality of the experience provided throughout the exchange. This includes the design of typographic and graphic elements, as well as the impact these factors have on well-being, trust, cooperation, and the overall power dynamic between the user and the issuer. How might such a dynamic be fairly mediated in complex or legally-mandated forms?

Bicchieri's 2006 book on the dynamics and nature of social norms explores the structures of social exchanges and interactions. In her chapter on fairness in interactions, the author observes that "we can come to accept the most onerous tasks if we are convinced that the decision procedure was fair, and, conversely, we may reject even a profitable exchange if we feel treated unfairly" (Bicchieri, 2006, p. 100). Perceptions of fairness, in Bicchieri's view, account strongly for a user's willingness to interact in an exchange, even if the

exchange requires high cognitive load or is obligatory in nature, as is often the case in government forms. The difficulty of filling in forms — paper or digital — is thus not confined only to the medium, but includes the perceived benefits of participating in that task to achieve a desired outcome.³⁴

The review of the works on paper forms design bring to light concepts of well-being, empowerment, and trust between users and issuers. Additionally, the works highlight the significance of forms as carriers of meaningful data between issuers and users. The similarities between paper and digital forms design are vital to the objectives of this thesis, since many of the challenges encountered in digital forms design are often imported from design practices of their paper counterparts.

Among these are the problems of terminology and simplification that result in overly long explanations which affect cognitive capacity (Waller, 2011, p. 3). This is a key concern for clarity and literacy, because regardless of the medium, paper and digital forms run the paradoxical risk of complicating the forms process by attempting to provide more information for users, since simpler language often leads to lengthier sentences.

Legibility concerns in paper forms, owing to poor handwriting, may be overcome by typing into fields in a digital form. But poorly designed fields and imprecise translation — both pointed technology concerns — badly affect user responses in paper and digital forms, reducing the quality of the transaction, and potentially exposing the user to liability; (iii) forms designs that prioritise issuer exigencies over user experience, thereby creating unfair conditions for users who are compelled to participate, but are disinclined to cooperate, thus breaking Rawlsian rules of fair participation in information exchanges.³⁵ The shift from paper to digital additionally marks an increased reliance on newer technologies, and exposes participants to their shortcomings. The problem is summed up by Mulligan et al. in a 2019 symposium paper on the proliferation of new technology and its impact on fairness in social exchanges. The authors

³⁴ This ties in with Rawls' concept of cooperation, compromise, and outcome discussed in Chapter 5.

³⁵ Rawlsian notions of fairness, i.e. cooperation through reciprocity and compromise, are discussed in detail in Chapter 5.

discuss the benefits and drawbacks to implementing incipient technologies with the potential to affect bias in socio-political systems, including in the fields of criminology and justice. Referring to the use of technical artefacts in public administration, they observe that states are increasingly being held accountable by their publics for the ramifications of technologies used in socio-political settings (Mulligan et al., 2019, p. 119). Such accountability issues raise questions about the move from paper to electronic governance, and the impact on notions of well-being, empowerment, trust, and goodwill.

What are the implications for users unaccustomed to communicating in predominantly digital environments? How effectively do traditional ideas of paper forms hold up against electronic versions amidst the backdrop of newer technologies and means of interactions? And what are the consequences for compelling users to interact solely through online forms for government-citizen communication?

3.2.6 From paper to digital forms design

Revisiting Agar's work about computerisation and states of knowledge, the author makes the observation that information cannot be separated from its techniques. Put another way, there is a causal link between the contents of a document and the procedures by which it is manufactured (Agar, 2003, p. 13). The thrust towards electronic forms of government administration around the world have spawned new and reimagined ideas of the potential of documents.

These include questions of how digital forms might solve paper-based problems, and the social implications of using "smart" technology and the blockchain to enable trust and empowerment. Much effort has gone into setting up and implementing electronic forms, primarily in countries with sophisticated technical and information infrastructures, but also in several parts of the developing world. In 2012, Dell et al. presented an industry symposium paper on *mScan*, a mobile application capable of digitising paper forms. *mScan* was tested in Mozambique, focusing on the digitisation of paper vaccination forms in the country's rural communities. While the authors of the study concluded that technologies such as *mScan* were fit for the purpose,

they noted specifically that paper forms likely would continue to be used in countries around the world with less-developed infrastructures, owing to paper's well-established utility in government administration. However, such use should not detract from the benefits that digitisation offers:

Paper forms are a well-understood and trusted medium for data collection in developing communities, and the low cost and ease-of-use of paper forms suggest that paper will continue to be extensively utilized for many years to come. However, the potential benefits of digitizing data from paper forms for the purposes of statistical analysis and aggregation are significant (Dell et al., 2012, p. 1).

Dell et al.'s view that paper forms are a more familiar medium is valid. But there is no denying the prevalence of digital forms, nor its enthusiastic uptake by governments around the world. While many similarities exist between the two mediums there are also differences, both in their documental structures and in their social reception. The contractual nature of government forms in particular raises specific problems to users who are unfamiliar with digital environments. Accordingly, while Dell et al.'s research focuses on developing nations, the process of formalising the digitisation of forms is also applicable to countries with more advanced e-governments.

The United States Web Design System (USWDS) for instance lists several guidelines – many of them technical – for creating web forms. These include meeting accessibility needs via HTML controls, implementing valid markups that can be read easily by mobile devices, and using simple information hierarchies and layouts (U.S. Web Design System, 2021). Nonetheless, these guidelines are provided presumably to meet the USWDS' view of a standard web form: "A form allows users to enter information into a page" (U.S. Web Design System, 2021). This fundamental function of all forms has remained largely unchanged regardless of the medium – paper or electronic. But the methods that have been conceived in order to fulfil this function have informed the bulk of discussions around defining forms and designing their behaviours. It is therefore neither easy nor necessary to isolate the definitions of digital forms from their paper equivalents. Instead, it is far more useful to

review how prevailing notions of paper forms have been updated and adapted to online environments. This also affords opportunities to update existing definitions of paper forms – where feasible – to satisfy the practicalities of e-government terminologies and mitigate misuse.

3.2.6.1 Use and abuse of electronic forms

The advent of smart devices has intensified such discourse and fostered further debate on the transferability of paper forms to digital environments. Waddams raised the issue of assent given through signatures in paper forms, and the subsequent reassignment of this assent to clicks in electronic forms (Waddams, 2019, p. 93). The author also drew attention to the problems with inferred assent, questioning the sanctity of electronic documents with respect to enforcing terms that may be deemed as unreasonable if and when agreed to in digital environments (Waddams, 2019, p. 94).

Returning to the case of *Douez v. Facebook Inc.*, Waddams noted also that the Canadian Supreme Court ruled against Facebook Inc. due to “a consumer contract, involving a standard form, where there was, in practice, no alternative to the services provided, and where the consumer had no real choice”³⁶ (Waddams, 2019, p. 96). Situations in which a consumer is forced to comply with the terms of an electronic document with no alternative, have clear parallels with mandated government-citizen exchanges. Assent given through clicking a digital form carries implications for users, regardless of whether that user is familiar with electronic mediums. The challenges of unfamiliarity and click-driven assent in digital forms is therefore problematic for uninitiated digital forms users. However, there are intrinsic challenges with digital forms technology in attempting to replicate or replace paper versions.

³⁶ The *Douez v. Facebook Inc.* (23 June 2017, Supreme Court of Canada) case involved allegations that the latter has used Ms. Douez's name and likeness for advertising, without Ms. Douez's consent. The case revolved around the terms of use published by Facebook Inc. which users had to click in order to accept. While the case itself focused on unfair clauses in contracts, Waddams highlights many of the difficulties of navigating such electronic documents, owing in part to the layout and continuous reading flow. Waddams proceeds to state that “courts have emphasised the similarities between these electronic forms and their physical counterparts, but have often ignored their differences” (Waddams, 2019, p.99).

Sless remarks on the specific failure to carry over a “good” grammar of paper forms – initially created for a financial services company, and later for the Australian government – to software-based applications for the public:

When planning for this project, and trying to anticipate some of the contextual factors that would affect how the grammar was expressed graphically...there were just too many rules that could be violated. Getting the software to spot [violations] placed an inordinate burden on the software itself....But we learned important lessons about the limits of software programming and its use. (Sless, 2018, p. 130).

Sless’ reflection, at least in part, seems to echo the sentiments of Dell et al. regarding paper forms, whereby the latter group suggests that paper is a known, and furthermore, reliable medium but digital forms are better suited to aggregating and evaluating large sets of data. Such datasets are common in government-citizen transactions, which suggest digital forms are not only preferable but perhaps even necessary wherever the technology is feasible.

Schwesinger agrees with this assessment of digital forms up to a point, stating in his essential compendium of forms that while digital forms deliver speedier transactions and cost savings over paper counterparts, such features tend to only benefit the issuers (Schwesinger, 2010, p. 210). As such, the author cautions issuers on coercing users to adopt digital forms without first making digital forms “simpler, easier to understand and more user-friendly than paper forms” (Schwesinger, 2010, p. 210). Simplicity, ease of use, and design friendliness are qualities which are uniformly stressed, but unevenly expressed by forms designers. This is understandably due to varying agendas in different organisations. But when applied to forms – digital and paper – there does seem to be an overarching consensus over the contractual nature of such documents.

3.2.6.2 E-contracts, language, and participation

In a set of standards for forms management and design in 2011, the Inter-Ministry Forms Committee (IMFC) in British Columbia, Canada, stated that simple designs “avoid detracting from the more important fill-in data...[and]

unnecessary decoration on the form” (Inter-Ministry Forms Committee, 2011, p. 7). This point was taken up by Waller et al. in their 2016 paper stressing the need for clarity in contract, during an analogous project for British Columbia’s aboriginal communities.

Discussing the challenges of simplicity and readability, the authors also noted that comprehension is better facilitated through plain English and “by providing definitions and guidance notes” (Waller et al., 2016, p. 8) in contract documents. Interestingly, the authors stated that “whether or not it is legally watertight, the rewrite [in plain English] is more likely to be read, understood, communicated on within the contractor’s team, and acted upon” (Waller et al., 2016, p. 9). The notions of legalese and confusion are remnants of paper forms that have found their way to digital counterparts.

But the convenience of applying simplification en masse is obstructed by a key issuer exigency. In a 2019 book chapter on integrating technology with legal design principles³⁷ for e-contracts, Barton et al. point out that while such an approach emphasises understanding, it goes against a contract’s essential function, which is to “insulate the agreement against litigation attacks” (Barton et al., 2019, p. 63). This is a valid proposition: the protection of legal and binding terminologies is necessary to protect issuers and so is a significant argument against simplification efforts. This argument ties in with the legal functions of forms described by Jansen, Steehouder, Sless, and Schwesinger, i.e., forms do serve as legal instruments. Waddams’ discussions of electronic forms, in the case of *Rudder v. Microsoft Corp*, is thereby relevant. The author observes that “it cannot be doubted that electronic contracting makes it much easier, in practice, for business enterprises to include terms burdensome to users” (Waddams, 2019, p. 98). Waddams adds “electronic documents are more difficult to evaluate and parse than paper documents because the size of the document is not immediately apparent...[and] the user knows that there is no alternative to accepting the terms, because they would not be altered even if objection were made” (Waddams, 2019, p. 98).

³⁷ Legal design is discussed at length in Chapter 5 in the context of fairness. The brief mention introduces its cognate concepts of clarity and literacy as a stepping stone for the fairness model.

Given that government forms are also legal documents, and electronic document processes can be finely customised to serve issuer interests, the uptake of digital forms by public institutions is understandable. This volume may also account for the number of complaints about forms lacking clarity and empathy for users with low digital literacy skills. Returning to Waller's work on the design of government forms in 1984, the author pointed out that:

Administrative forms are an unfortunate side effect of the state's involvement in the lives of its citizens and businesses. To the civil servant they are an essential part of the administrative process. Among the general public they are caricatured as an obstacle course of gobbledegook (Waller, 1984, p. 36).

Waller's portrayal of forms – nearly forty years ago at the time of this writing – as ubiquitous and often unwieldy tools of administration is reflected in recent reflections by governments themselves. In 2020, the government of Australia published its own guidelines for simplifying the design of forms. The publication starts with the following description and observations:

Forms are everywhere. They are still the most common interaction between Australians and government, and can be a frustrating experience for the agencies and citizens involved. Designing a government form might sound simple, but it is deceptively difficult. Agencies must collect large quantities of information via simple, user-friendly, multi-channel forms while meeting legal and practical constraints. And these forms must work for diverse individuals with complex needs and circumstances. For clients, a poorly-designed form can delay or prevent their access to essential services and payments (Behavioural Economics Team of the Australian Government, 2020, p. 1).

Both Waller and the Australian government acknowledge that forms are generally held in a negative light despite their ubiquity in government-citizen exchanges. Topics of complexity, data management, and the legal strictures of communication are balanced against creating friendly, accessible experiences for users. However, these issues – to some extent – are being addressed by governments, evidenced by the various state and local initiatives. Among these

are visible efforts of designers to use smart technology for overcoming user experience problems.

In the same 2019 collection of works on designing for legal documents, which included the research of Barton et al., Corrales et al. examined the role of 'legal technologies', i.e. digital forms, smart contracts, and the Blockchain, in designing contracts that are more user friendly for users and issuers. In their chapter on legal design, Corrales et al. adopted a graphical view of contracts by describing them as "interfaces...for which information design methods and strategies can be used to simplify...[whereby one] can supplement text or code with layers of explanatory diagrams, examples, plain language translations, audio, or video" (Corrales et al., 2019, p. 8). This approach has been echoed not only by information designers like Waller, Sless, and Schwesinger, but also by legal design researchers such as Barton et al., who advocate for visual cues as a simplification method that encourages users to comply with the terms of a document (Barton et al., 2019, p. 69). Increased use of graphics and animation across state-citizen communication is not uncommon; Singapore's COVID-19 tracing form is a prime example of applying such approaches to generate fairer outcomes, discussed in Chapter 4. This case study highlights the necessity for fairness in digital forms design for all users and issuers in an unprecedented health emergency where cooperation from all parties was vital to stemming the spread of COVID-19.

3.2.6.3 E-government-citizen relationships

In its efforts to manage the spread of COVID-19, Singapore's government has introduced a slew of electronic measures. Arguably, the most visible of these is the check-in/check-out mobile application titled *Trace Together*. The tracking app works as a form in which users need to pre-enter their details then scan a QR code to access public buildings and spaces. The app and its accompanying explanatory materials utilise animated graphics and static emojis to visually communicate meaning and encourage compliance with mandatory laws for all residents in a non-threatening manner. *Trace Together* is administered by Singapore's Government Technology Agency (GovTech) which is also the

provider of the digital forms service, *FormSG*. Built entirely for government institutions and public agencies, *FormSG*'s stated mission is to replace paper forms with digital versions. Much of the discussions and analysis of *FormSG* and *TraceTogether* are in later chapters. However, it is worth briefly including one of the responses to digitisation from *FormSG*'s government client: "We have progressively moved away from paper forms and that has significantly reduced administrative efforts spent on transcribing hardcopy forms" (Sport Singapore, in Government Technology Agency of Singapore, 2020).

Sport Singapore – a statutory board under the authority of the Ministry of Culture, Community and Youth – is not alone in expressing the public sector's growing demand for electronic administration. The growing uptake of digital forms in Singapore has been attributed largely to high levels of trust between the government and its stakeholders.³⁸ In a 2012 paper on the centrality of trust to developing frameworks that facilitate e-government transactions, Lim et al. put forth Singapore's Inland Revenue Authority of Singapore (IRAS) as an example of public trust in the nation's electronic tax filing processes. In their paper, the authors observe that "through leveraging on technology to build trust between the IRAS and taxpayers, the E-Filing system has succeeded in reversing public disapproval towards the tax agency and fuelling acceptance among its target audience" (Lim et al., 2012, p. 111). It is interesting to note that the literature on paper tax forms by the IRS in the United States raised trust issues that were, according to Lim et al., also present in Singapore prior to electronic forms. That a digital tax form was able to renew trust between a government and its citizens verifies the significance that information design scholars have attached to such qualities. Lim et al.'s IRAS example reinforces the OECD's notion of trust:

Trust is not only an indicator of success; it is, more significantly, one of the ingredients that makes success – for a business or for a government – possible (Organisation for Economic Co-operation and Development, 2017, p. 4)

³⁸ Chapter 5 briefly discusses the rapid uptake of *FormSG* by the government between March 2019 to November 2021, which saw a 1278% increase in usage.

The above observation comes from a report by the Organisation for Economic Co-operation and Development in 2017, in which the OECD found that trust was a key tenet in issues as far ranging as migration, public policy, taxation, energy markets, and environmental concerns. The advent and proliferation of digital documents, including forms, to regulate these issues means the notions of trust, well-being, and empowerment are not merely beneficial for successful e-governance, but vital to its broader implementation and uptake by citizens. These notions form the bedrock of fairness, discussed in Chapter 5, and contribute to the framework for a fairness model, discussed in Chapter 6. As such, it is expedient to briefly review the discourse around fairness, and its potential integration in digital environments.

3.2.6.4 Fairness concerns in digital environments

While there is general agreement that forms must be fair to all users, it is useful to consider what fairness in digital government forms might look like within the context of Rawlsian notions of cooperation, reciprocity, and compromise applied to information design. The current literature has shown that forms can change the meaning and quality of information that is being exchanged. Larger typefaces and simplified terms – for example – enhance user experiences with forms. But what are the limits of such enhancements? And when should these enhancements be applied or removed when looking at notions of cooperation and compromise between users and issuers?

Revisiting Schwesinger, the author states that: “government forms must work for everyone, and facilitate fairness” (Schwesinger, 2017, p. 613). While this is certainly true, it also stands in stark contrast with the United States General Service Administration’s 2006 statement that, “within the constraints of available time, money, resources, it is usually impossible to design for all users” (United States Department of Health and Human Services & United States General Services Administration, 2006, p. 29). Taken together, there are obvious disparities between issuer obligations and abilities. How might design bridge this incongruence? There is also no denying the impact that current information design research has had on improving user experiences with

forms usability. To this effect, the thesis draws on existing works reviewed in this chapter to also make a nuanced distinction between different types of users, i.e. implicit and explicit users, that act upon digital government form, discussed in Chapter 5, Section 5.2.

This nuance is especially pertinent to countries such as Singapore, where (i) forms have typically been produced without much reference to a central or unified design approach digital identity; and (ii) online communication, and e-government remain indispensable facets of mainstream society. Chapter 2 explored these discussions, starting with the roots of colonial administration in 1819, and concluding with the government's recent efforts to digitise – and to a lesser extent, harmonise – government-citizen communication across all ministries and agencies. Nonetheless, digital forms remain at the centre of the country-wide initiative titled *Smart Nation*, and accordingly are well-situated to offer perspectives on fairness in government forms design policies.³⁹

At the centre of this migration from paper to digital is the preservation of fairness for all participants involved in state-citizen exchanges. The presence of paper forms as a long-established means of public communication entails a degree of familiarity – in its use and in the improvements made to paper forms design. However, the enthusiasm of governments around the world for digital services – not least for the conveniences e-government affords forms issuers – suggests wider adoption of digital services by countries like Singapore with the will and resources to implement sweeping, nation-wide initiatives.

This is not to imply that digital media is worse or better than paper. Such perceptions are driven, in large part, through the designs of a form. Revisiting McKenzie-Taylor, the author noted that meaning is made through recognition of the printed word (Mackenzie-Taylor, 1999, pp. 177–178). But recognition or understanding is facilitated when intention is realised and the process can be completed (Wilson & Sperber, 2006, p. 611). Taken from this perspective, the focus lands on whether users can glean similar degrees of comprehension and

³⁹ Chapter 5 examines various discussions around fairness in digital government forms in greater depth by enquiring and drawing links between philosophical concepts discussed, and information design concerns cited here in Chapter 3.

satisfaction from digital forms, as they have from paper counterparts, while also benefitting fairly from the specific advantages that digital design offers.

Much of the research points to efforts that improve navigation, routing, and general comprehension of a form's content. This is achieved through better document literacy, aided in part by simple language. The reviewed works thus offer avenues to further explore the related issues of well-being, empowerment, and trust in document design, and how these can be better integrated into digital forms through fairer graphic and typographic practices. The next chapter puts these notions under an analytical lens, studying two digital forms issued in Singapore during the health pandemic. The findings are linked to issues of fairness, discussed in Chapter 5, and together establish the framework for a fairness model proposed in Chapter 6.

3.3 Chapter conclusion

This chapter began by reviewing the current literature on documents within the context of information design, and discussed how documents within this genre are understood differently. This is largely due to their functional characteristics, which prioritise instructions and understanding over other modes of cognitive activity. The discussion then narrowed its focus to forms, asking why they come under the category of documents, and how they differ from other documents.

Past research into information design tends to agree that paper and digital forms encompass participative elements and so need to be designed accordingly. However, the literature also showed that designing forms to meet this purpose entailed several information and societal challenges. This led to a review of: (i) how forms are defined; and (ii) how these definitions inform their design. Many of the works reviewed pointed to concerns of usability, and the concomitant issues involved with co-authoring documents within imperfect and unequal power dynamics. These works highlighted that forms can and do operate as contractual documents, and thus carry legal complications for users who fail to act or misconstrue its contents. This led to a review of some of the major works around trust, well-being, meaning, and empowerment in government and business forms. The chapter found that the majority of forms designers have emphasised user concerns, but that the nature of these concerns has been largely contingent on each designer's individual agenda rather than any unifying frameworks.

The chapter then moved to reviewing the literature on paper and digital forms. Most of the research in this area generally agreed that digital forms were similar to their paper counterparts. However, there existed important differences which called into question matters of familiarity with electronic environments, along with the potential for organisations to exploit user inexperience through unconscionable design. This discussion on government digital forms opened further lines of enquiry into the wider environments in which they operate, i.e. electronic government, and digital government-citizen communications, together with the current gaps in research.

The assimilation of e-government with complex socio-political concepts such as meaning, power, empowerment, and trust, makes pinning down the quintessence of digital forms a challenging task. However, this complexity does not automatically imply impracticality, but instead exposes a need for deeper investigations into how such notions fit with the wider objectives of information design. The literature review thus looked beyond the field of design, at some cross-disciplinary scholarship to uncover philosophies and approaches that overlap with information design concerns. The next chapter presents two case studies of digital forms in Singapore. Chapter 5 then delves deeper into ideas of fairness in design by drawing from the fields of law, political philosophy, politics, and economics. In doing so the thesis aims to formulate a framework that assesses whether a form can be designed using principles of fairness established in other subject areas – particularly, law and political philosophy.

Both law and political philosophy are highly relevant to government forms given the contractual and authoritative nature of government-citizen transactions. This is because the negotiating capacity of forms users is often greatly diminished by the legal, executive, and monopoly powers held by governments. Trust, as Lim et al. have shown, is crucial to strengthening government-citizen relationships, and “good” design aids in this effort. But this begs the question, how much design is “good” design? The concerns of graphic and typographic design, for example – arrangement, layouts, literacy, simplification, usability, accessibility, trust, well-being, empowerment, and meaning – are consistently called upon in efforts to create good design. However, while the results of these efforts are evident, they are the product of individualised agendas which are not always transferable to other projects. Likewise, there is no single agenda offering a holistic measure of what is meant by “good” design. This creates the need for a unifying framework to answer: what constitutes “good” design, and is there a set of criteria that can be used to determine if a document qualifies as “good” design?

User experience has so far been the gold standard in determining what is “good” design. But user considerations are limited for three reasons. Firstly,

user experience tends to focus more on the user, with less consideration for exigencies that issuers face. Yet, these exigencies are critical for determining how much design is needed versus what can be given. Secondly, the term “user” in the context of forms needs to account for multiple participants acting on forms, including issuers themselves once a form has been submitted. As such, the term “user” is not confined to just one type of user but to anyone who is participating in the forms process. Thirdly, while design attempts have been effective at augmenting user experience, negative perceptions of form-filling activities endure. Fairness, however, adopts a different stance to the problem since it not only addresses functional approaches to forms design, but accounts for wider societal norms that directly and indirectly affect design decisions.

In subsequent chapters I argue that the myriad theories, practices, and measures of designing documents would benefit from a harmonised approach — even a qualitative one — that holds the various opinions and agendas of good design to a single benchmark. I posit that this unifying yardstick is fairness, and that any document which is well designed is fairly designed, for both issuers and users. Later chapters also expound on this hypothesis, demonstrating that virtually every agenda for good design can be described within the lexicon of fairness, and circumscribed within its philosophical framework. The fairness model, discussed in Chapter 6, details how this approach unites the essential — and the incidental — arguments for what makes a document's design “good”.

4. Case studies of Singapore's digital government forms

4.1 Chapter overview

This chapter conducts an analysis of two government digital forms issued in Singapore: Case study A looks at Singapore's immigration arrival card; Case study B examines the country's COVID-19 health and contact tracing form. In conducting these analyses, this chapter responds to three areas of concern:

- (i) How is fairness evaluated in the design of digital government forms?
- (ii) What are some of the design issues with Singapore's digital forms that help or hinder the facilitation of fairness for all users?
- (iii) How does emphasis on fairness in digital government forms change when greater levels of cooperation are required by the government of its citizens and visitors?

The literature in Chapter 3 showed that forms are part of a process that involves both, automated and manual inputs in order to fulfil a purpose. Hence, the roles of users and issuers remain paramount to the design of digital forms. The literature also revealed that an evaluation of fairness in digital forms has never been conducted in a dedicated and systematic framework.

This chapter seeks to address this gap by developing a formal framework in which digital forms can be analysed against fairness concerns discussed in Chapters 5 and 6. Accordingly, the first section of this chapter presents this framework and utilises three interrelated categories: literacy, clarity, and technology. Within each of these categories are functions that comprise the bulk of the framework. Each function is discussed within the case studies. But given the disparate nature of document design in Singapore, these functions are not analysed uniformly since some will apply better than others. As such, attention is given to functions that best reveal fairness concerns inherent in the digital forms.

The focus of these case studies is on digital forms in Singapore. However, in the first case study of Singapore's immigration arrival card, the older paper version is included briefly in the analysis. This is to provide readers with a sense of how public forms design has progressed since the implementation of *Smart Nation*. This discussion is useful for tracing the evolution of Singapore's online forms since it focuses on contemporary design updates that connect e-government services to twenty-first century concerns. In addition, while many of the old paper forms contained significant design deficiencies – poor type, insufficient field length, scant language options – their assembly served as the scaffolding for Singapore's digital infrastructure.⁴⁰ In some cases they also reveal the source of fairness problems that have transferred into their newer digital counterparts. Moreover, not all government forms in Singapore will have all these problems as evidenced in the second case study on Singapore's contact tracing form.

As such, the case studies collectively represent the broader design deficiencies in the country's digital forms, and reveal opportunities for a fairness model to fill these lacunae. It must be noted, however, that the gaps in Singapore's digital forms stem from a variety of causes, one of these being implicit bias. In a book chapter on the effects of implicit bias on socio-political systems, Johnson alludes to how fairness is perceived and rectified, given the

⁴⁰ The Electronic Government Action Plan (eGAP) was launched in 2000 and further formalised Singapore's push towards digitalisation. eGAP followed earlier initiatives in the mid 1980s that began computerising various government institutions.

nature of the unconscious mental state and proclivity of the human mind to make automatic assumptions (Johnson, 2020, pp. 20–21). The tendencies to allow implicit bias into systems is a dominant theme in the design processes of government forms, especially when accounting for diverse populations with multiple languages. This chapter includes a brief discussion on implicit bias and its impact on design deficiencies contained within the two case studies.

Both case studies involve government forms that are highly used by residents and visitors. Additionally, the circumstances of their use are especially relevant in light of the contemporary discussions surrounding immigration and the COVID-19 pandemic. The immediacy of both these issues to Singapore's political, economic, and social systems gives an added dimension to this analysis – not least because of the degrees of compliance enforced across all users. However, as shown in Chapter 5, compliance does not necessarily imply cooperation, a requisite quality for fairer experiences.

This makes for an interesting comparison of how fairness is achieved across different scenarios. In the first case study on Singapore's arrival card, the form is mandatory and is presented in several formats. Analysis of the form is largely confined to the web format, although the other formats are also discussed. In the second case study use of the form is optional for local residents, but strongly recommended and is presented as an app. The centrality of fairness in gaining cooperation is therefore better illustrated in the second case study, since the government not only requires compliance from citizens and visitors, but equally their cooperation in order to track and stem the spread of the virus. This raises interesting insights into how accountability and deterrence are managed within Singapore's bureaucracy.

Furthermore, the first case study focuses mainly on explicit users, whereas the second considers both, explicit and implicit users. Nonetheless, both digital forms are essential to the proper functioning of government. The case studies therefore take into consideration Singapore's increasing emphasis on digital infrastructure and literacy rates. These are important considerations in determining how these forms are perceived and used, since

“poor public service access leads to a general distrust in the political system and, as a consequence, reduced political participation” (Olabe, 2017, p. 55).

Olabe’s observations are recorded in the OECD’s 2017 report on the value of trust in political and social organisations, which offer a rationale to assess the necessity and extent of fairness in government digital forms. The chapter asks if digital forms issuers can provide the necessary opportunities to achieve fairness through design that reduces overall user effort and increases trust, while concurrently balancing issuer exigencies. I aim to answer this question in the case studies and feed the respective findings into my fairness model, which is discussed in Chapter 6.

4.1.1 Framework for analysing the case studies

The effectiveness of forms design has been evaluated against several criteria, many of which were discussed in Chapter 3: Jarrett and Gaffney, for instance, identify three factors that persuade users to answer a form’s questions: establish trust, reduce social costs, and increase rewards (Jarrett & Gaffney, 2009, pp. 20–21). Sless too writes about forms as “instruments of social control” and stresses the need to “identify all the separate voices in the conversation, and the inferences they make about other users of the form” (Sless, 1999, p. 151). Waller and Schwesinger have both pointed to the genre conventions of forms and their contractual nature as mandated exchanges overseen by a central authority. Schwesinger specifically asked the question: “even if...we recognize a form when we see one, how do we define what a form is?” (Schwesinger, 2017, p. 607).

Such descriptions and criteria provide the foundation on which my analysis framework is built. However, the focus of the framework is to identify design discrepancies that specifically affect fairness themes in government forms. These themes were addressed in Chapters 2 and 3, which collectively discussed issues of cooperation, empowerment, well-being, explicit and implicit users, cultural perceptions of government, trust, and accountability. Accordingly, any framework that analyses fairness in government forms needs to integrate these socio-political issues with design-centric approaches.

Furthermore, the results of this merger should usefully highlight design decisions that directly impact the extent of fairness present in government digital forms.

This necessitates a filtration of the several design approaches discussed so far in this thesis, in order to concentrate on those factors which have dealt most closely with fairness-related themes. Many of these share similarities in their meaning and applications, and require a framework that catalogues their functions into suitable groups. The forms discussed in the case studies are analysed against three categories: literacy, clarity, and technology. I have broadly labeled these as opportunities since they are established strategic determinants for issuers to help all parties achieve their desired outcome by: (i) reducing overall effort placed on users interacting with digital government forms; and (ii) striking a fair balance between improving user experiences and managing issuer exigencies that produce these improvements.⁴¹

It must be emphasised that the three categories are not exclusive; while it is convenient to separate them for ease of understanding, in practice their corresponding functions overlap and intersect. Therefore, not all functions will apply uniformly to every form. This is relevant to Singapore where – unlike GOV.UK or the Netherlands Government – there is no overarching design system across government ministries and agencies.⁴² The three categories⁴³, and their corresponding functions, are detailed in Table 4.1 on the following page.

⁴¹ The need to balance user experiences against issuer exigencies is central to the fairness model. The relationship between these concerns is graphed and expounded on in Chapter 6.

⁴² The relative independence given to each government ministry in Singapore to design and deploy their own documents was discussed in Chapter 2.

⁴³ The categorisation of design opportunities into literacy, clarity, and technology is based on extant design research reviewed in Chapter 3.

Literacy, Clarity, and Technology opportunities to analyse fairness in digital government forms	
Literacy opportunities	
Genre conventions	Is the document structured to look like and conform to expectations that identify it as a form? (i.e. explanations and responses, fields, icons, symbols, branding, and other elements that are conventionally familiar)
Digital literacy	Does the digital form avoid biased assumptions of access to digital tools, and does it facilitate trust and empathy in its questions, explanations, and functionality for users with low digital literacy skills?
Clarity opportunities	
Navigation	Is the visual arrangement orderly and unobtrusive, with clearly-marked sections and navigation that facilitate comprehension and efficiency?
Explanations	Does the form use simple terminology, set in legible scripts and type sizes, to clearly express what is expected of users? And are the various prompts and questions designed to facilitate accurate responses?
Language options	Does the form provide additional languages for users, and are each of these languages uniformly supported throughout?
Tone and language (tone)	Does the form address all users fairly or does it discriminate against certain groups through language, images and animations, tone of voice, and other elements that communicate bias in gender/culture?
Error-checking	Is the form part of a process that conducts automated or manual checks for incorrect entries, inform users of errors, offer helpful correctives, and make plain the consequences of deliberately supplying misleading responses?
Technology opportunities	
Device compatibility	Does the form render correctly and clearly at different screen sizes? Are new features coded for use across all major browsers and device operating systems, and is there backwards compatibility and legacy support?
Accessibility	Is the form coded with accessibility features for users with physical impediments, and are there automated or human-driven options to help with technical difficulties?
Data management	Does the form provide features to save and protect user data, and does it also warn of potential security threats such as scamming or phishing?

Table 4.1: Literacy, Clarity, and Technology opportunities for digital forms issuers to evaluate the extent of fairness in design. The functions listed under each of the three categories are used to analyse the forms in the case studies.

4.1.1.1 Literacy opportunities

Literacy opportunities collectively address how users recognise a form by its properties. Waller states that document genres “trigger strong expectations about how it will be organised, and how to read it” (Waller, 2011, 28).

Recognising that a document is a form – and not, for instance, a leaflet or flyer – sets up specific expectations of user behaviours such as entering responses to questions, attaching files, checking boxes, and submitting data.

Likewise, a set of behaviour expectations are triggered for issuers such as extracting, compiling and verifying information, and sending a response. While many of these are automated in digital forms, it is important to note that such actions expressly conform to the norms of forms, as opposed to a spreadsheet or an email. Thus, literacy concerns refer to a document’s generic properties that (i) generate recognition of that document as a form; and (ii) prompt an appropriate set of expectations and behavioural norms from users and issuers.

4.1.1.2 Clarity opportunities

Once a form has been recognised by its properties, users move on to asking what is required of them in order to complete the form-filling process. These questions are facilitated by the form’s layout and appearance, complexity of terms used, available language options, and how the form highlights and handles erroneous entries. This is covered in Jarrett and Gaffney’s three-layer relationship theory,⁴⁴ discussed in Chapter 3.

But the problem of whether every user is able to have the same quality of conversation is not adequately addressed. Clarity concerns refer to a form’s overall ability to (i) disambiguate its contents sufficiently to provide lucidity for all users; and (ii) establish an exchange environment in which users see

⁴⁴ Jarrett and Gaffney’s three-layer relationship-conversation-appearance theory of forms (Jarrett & Gaffney, 2009, p. 6). The Conversation layer comprises questions in forms, additional instructions, and the arrangement of forms by sections/topics.

themselves as cooperative, rather than reactive, participants,⁴⁵ regardless of whether the form is mandatory.

4.1.1.3 Technology opportunities

How users interact with a form's presentation layer will depend on features, as well as behind-the-scenes processes embedded into the form. Performance affects: (i) how well users are able to interact with the form; and (ii) the type and quantity of design opportunities that issuers can embed into it, e.g. device compatibility and data saving functions. This raises queries about who gains from improved performance, and whether user experience is enhanced by technical complexity.

Chapter 3, for example, mentioned claims about digital forms delivering speedier transactions and cost savings over paper counterparts but such advantages benefitted issuers, not users (Schwesinger, 2010, p. 210). Thus, technology concerns refer to a digital form's ability to process and protect user-issuer interactions fairly across a spectrum of performance issues so as to facilitate greater cooperation between all parties.

4.1.2 Bias and design deficiencies

Many factors cause forms to be viewed as unfairly designed. These include biases that arise from assumptions made by forms designers about users' literacy needs, levels of clarity built into the form, and expectations of technology. It must also be added that while the case studies in this chapter analyse the merits and defects present in Singapore's digital forms, it would be improper to assume the government is deliberately creating unfairness, or ignoring its consequences for users. Instead, I posit that any bias discussed in this chapter stems from Holroyd and Puddifoot's notion that "people who are sincere in professing a commitment to fair treatment may also have implicit

⁴⁵Chapter 5 discusses the difference between cooperation and co-ordination in fairness, whereby the former presupposes participants as part of a system that advances fair and mutual benefit for all parties involved, whereas the latter postulates an environment in which participation may be ordered or coerced by an absolute central authority (Moon, 2015, p. 157).

biases” (Holroyd and Puddifoot, 2020, p. 119). This observation is noted in a book chapter on epistemic injustices in organisations, whereby the authors note that such biases often go unnoticed due to underlying behaviour norms. In a separate chapter from the same book, Leboeuf notes how such norms and habits are acquired and communicated in many ways, stating that “to account for the automaticity and unnoticed character of implicit biases, we can think of them as sets of perceptual habits” (Leboeuf, 2020, p. 45).

Indeed, issues surrounding language options, for example, in older paper arrival forms have since been addressed in the digital version. Likewise, the addition of animations in *TraceTogether* to combat fake check-ins demonstrates the government’s efforts to secure and equalise access for everyone. Thus, while most typographical analyses of documents reveal shortcomings in their design, it is necessary to preface the case studies in this chapter with two observations: (i) there is little, if any, evidence of intentional bias on the part of Singapore’s forms designers; (ii) parties “do not always agree on what a fair distribution is, given a set of circumstances” (Bicchieri, 2006, p. 100).

At first glance these points appear to raise a dilemma: firstly, if all involved accept intentional bias is absent in an exchange, then why should there be any disagreements between parties over what is and is not fair? Secondly, what might cause these disagreements to come about? Holroyd and Puddifoot, and Leboeuf’s above-mentioned claims about implicit bias provide an answer. Any entity typically looking to cooperate in and benefit from an exchange will nonetheless bring its own interpretations, i.e. its perceptual habits, of what is fair. In such cases, even if intentional bias is not an issue, the unnoticed presence of implicit bias can nevertheless contribute to conditions of unfairness.

The difference is that intentional bias is deliberate and predetermined, whereas implicit bias is formed unconsciously. And whereas both may lead to unfairness, in the case of the latter the entities are unaware of their biases. It is therefore reasonable to assume that forms designed to be intentionally biased will also deliberately ignore fairness concerns, and so are immaterial to this

thesis. The discussions in this chapter instead concentrate on forms that prioritise fairness, but whose designs are impeded *inter alia* by implicit bias.

This is not to intimate that bias, in any form, is harmless. But “what is so dangerous about implicit bias,” states Papillon on the issue of conscious and unconscious bias, “is that it automatically seeps into a person’s affect or behavior and is outside of the full awareness of that person” (Papillon, no year). Ironically, Papillon also claims that entities who care most about fairness also tend to carry the most amount of implicit bias. This is because they are usually less willing to accept that any bias exists (Papillon, no year). Discussing the unconscious assumptions society harbours of certain races or genders for specific jobs such as valets and scientists, Basu states that “when someone forms beliefs about us in the same way we form beliefs about planets – that is, as objects to be observed and predicted – they fail to relate to us as persons” (Basu, 2020, p. 193). In other words, repeated exposure to certain observations – e.g. most hip fractures involve the elderly, or the majority of court judges in India have been males – creates stereotypical perceptions that offer a convenient and insulated worldview.

Yet, such interpretations have been justified when based on statistically valid observations: using a weather forecast as an example, Basu asserts that if the forecast reported a 90% chance of rain, it would be epistemically irrational to assume fair skies and plan an outdoor picnic (2020, p. 192). This is because meteorological services, more often than not, are proven right in the face of such high odds. Similarly, if a system were perceived to be working satisfactorily, there would be little incentive to challenge the status quo, much less invest in a full re-design. However, re-designing government to invest in its people is a professed objective of *Smart Nation*: “One way for us to grow is through sharing good ideas and best practices, exploring collaborations, and testing people-centric smart solutions within the region” (Smart Nation Singapore, 2020).

The digital forms analysed in this chapter’s case studies are products of the *Smart Nation* initiative. To achieve the aims of becoming a service oriented and people-centric administration, it is imperative that forms designers shed

as much bias as possible by “framing and relating to users as persons, not objects” (Basu, 2020, p. 193). This entails designing literacy, clarity, and technology opportunities equally for every user – to ensure all users have the same chance of completing the form successfully – without putting excessive strains on issuers. This is the basis for fairness in design, and it is in this spirit that my typographical analysis is conducted for the two case studies on Singapore’s immigration and health tracing forms. Findings from the case studies will feed into my fairness model in Chapter 6.

4.2 Case study: immigration forms

“Immigration to Singapore has always been a feature of its role in a global economy as a magnet for people seeking work...it has become a node in twenty-first-century labor flows” (Hudson, 2017, p. 38). Throughout its history, the island has been a nexus for migrants and merchants who continue to shape and share Singaporean society. This directly affects the city-state’s policies and attitudes towards immigration, which have often occupied the focus of citizen discussions and government debates. In a national address, Prime Minister Lee stated “we must address Singaporeans’ anxieties over foreign work pass holders...[and] we have to adjust our policies to manage the quality, numbers and concentrations of foreigners in Singapore. If we do this well, we can continue to welcome foreign workers and new immigrants, as we must” (Lee, 2021).

This case study analyses the design of Singapore’s digital arrival form to determine specific typographic issues that help or hinder the facilitation of fairness. Analysis is conducted against four functions listed in Table 4.1: genre conventions; language options; digital literacy; and navigation and data management. Explanations, error-checking, tone, device compatibility, and accessibility functions are integrated within the four main sections. The study then conducts a comparative analysis of similar immigration forms to examine alternate ways in which these functions are implemented within the context of fairness. The case study concludes with a summary of findings, which form the basis for the fairness model in Chapter 6.

Given the emphasis Singapore places on immigration, it is worthwhile exploring specific forms that involve residents and visitors equally. James lists a series of questions which locals and foreigners might ask of a government:

Is my country, or my class, or, more specifically, am I, being given fair terms? Asked as a question of fairness rather than of mere self-interest, the answer is implicitly about how others fare by comparison. The question then becomes, Can each country, and each of their respective classes, feel they are being treated fairly by the rules, practices, and institutions that shape their relative prospects? (James, 2012, p. 14)

These questions are an exordium to a body of work that assays fairness across global social and economic institutions. However, James' list also provides a suitable avenue to analyse the everyday exchanges between Singapore's immigration authority and the country's many visitors.⁴⁶ In 2019, the number of visitors was triple that of the entire local population, thereby highlighting the significance of immigration forms, and the issuing authority.

The Singapore Immigration and Checkpoints Authority (ICA) was created on 1 April 2003 following a merger of customs and security agencies, with the expressed objective of "meeting emerging security challenges" (Immigration & Checkpoints Authority, 2019). The ICA is tasked with immigration, border control, and protection, and so produces several forms to meet its scope of operations. This case study analyses the ICA's digital arrival form for passengers. This form was selected for its high usage by foreigners and locals. Additionally, the paper version of the arrival form was in circulation until it was phased out in 2020. Nonetheless, the recency of the paper form offers added opportunities to compare the changes between the physical format and the new online version. An analysis of Singapore's arrival forms offers salient insights into past attitudes and current assumptions of issuers towards fairness in digital government forms.

4.2.1 SG Arrival Card with Health Declaration

Filling in a passenger arrival form upon landing at a port of entry is standard practice in most countries. In Singapore, this process was facilitated by a paper form called a Disembarkation/Embarkation or D/E Card. On 27 March 2020 the paper form was phased out in favour of a digital version, termed SG Arrival Card with Health Declaration (SG Arrival Card). Since every traveller is required to make a health declaration, the new digital form is used by both, foreigners and local residents. This created significant changes in how arrivals are processed: the old D/E Card would be distributed only to foreigners on inbound vessels, and were also available at entry ports. However, the SG

⁴⁶ In 2019, Singapore received 19.1 million visitors with tourism receipts totalling S\$27.7 billion. (Source: Singapore Tourism Board, 2020, p. 2).

Arrival Card requires every traveller to complete the form online, no more than three days prior to entry. The form also requires users to first identify as either a resident or a foreigner,⁴⁷ then displays the relevant sections accordingly.

This case study focuses on the digital form version used by foreigners, instead of residents, because (i) the full gamut of questions and fields are displayed; (ii) there are no pre-populated fields; (iii) the old paper form was only meant for foreigners, thereby providing continuity for user analysis. The defunct paper D/E Card is shown in Figures 4.1 below and 4.2 on the following page, respectively.

_____ disembarkation portion _____ embarkation portion _____

Figure 4.1: Disembarkation/Embarkation Card (D/E Card) back section. Image reproduced with permission from Immigration and Checkpoints Authority (ICA).

⁴⁷ Certain travellers holding government or diplomatic documents may be exempt from this process.

<p style="text-align: center;">IMPORTANT NOTICE</p> <p>Please DO NOT remove this portion from your passport/travel document. You are required to surrender this portion to the Immigration Officer at the checkpoint at the time of your departure.</p> <ul style="list-style-type: none"> • 24-hour Link-2-SIR Tel: 1800-391-6400 • Telephone Enquiries Tel: 391-6100 • Visit our web site http://www.mha.gov.sg/sir/ <p style="text-align: center; color: red; font-weight: bold; margin-top: 20px;">WARNING DEATH FOR DRUG TRAFFICKERS UNDER SINGAPORE LAW</p> <p style="text-align: right; font-size: small;">(1)</p>	<p style="text-align: center;">REPUBLIC OF SINGAPORE</p> <p style="text-align: center;">DISEMBARKATION/EMBARKATION FORM FOR VISITORS</p> <p style="text-align: center; font-size: 1.2em; letter-spacing: 0.2em;">WELCOME TO SINGAPORE</p> <p style="text-align: center; font-size: 0.8em;">IMMIGRATION ACT (CHAPTER 133) IMMIGRATION REGULATIONS Regulation 32 (2)</p> <p style="text-align: center; font-size: 0.7em; margin-top: 20px;">THIS FORM IS ISSUED FREE OF CHARGE</p> <p style="text-align: right; font-size: small;">(2)</p>
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Figure 4.2: Disembarkation/Embarkation Card (D/E Card) front section. Image reproduced with permission from Immigration and Checkpoints Authority (ICA).

The paper form was a primary tool to register arrivals and declarations made at ports of entry. The form's two main portions were divided by a perforated edge; tearing along this line detached the disembarkation portion, which was handed to the authorities. Visitors were required to retain the embarkation portion and return this portion to the ICA on leaving Singapore. In addition to English, the card was printed in Japanese, Malay, and Mandarin.

The paper form came with a welcome message and brief set of instructions informing visitors that the embarkation portion was not to be removed from the visitor's passport. In many instances, the portion was stapled to a page in the passport and was detached by the ICA officer on the visitor's departure. Subsequent changes to ICA's policy meant visitors no longer needed to hold on to the embarkation card. The card also had a notice at the bottom informing visitors that the form was issued free of charge. But most prominent though was the warning about capital punishment for drug traffickers, printed in bold, uppercase letters set in bright red. This warning is also present in the digital form, and is displayed at the end of the process.

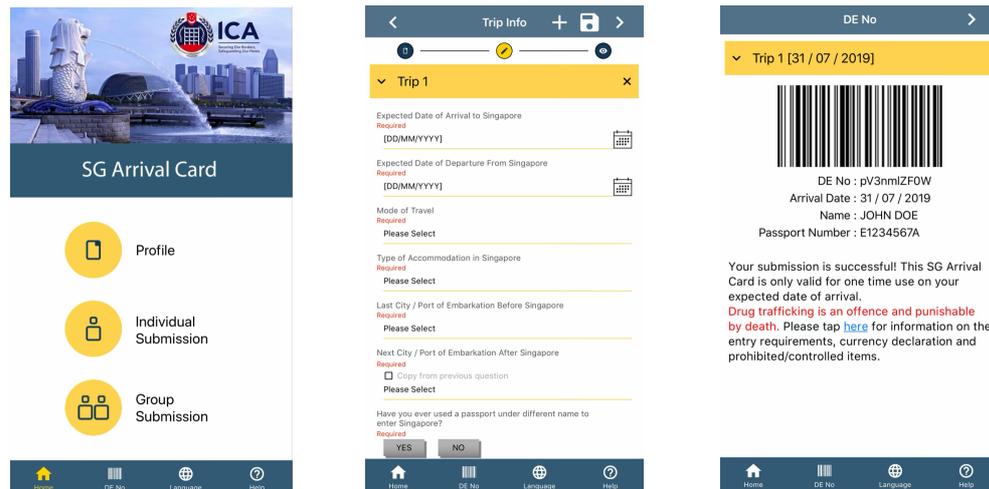


Figure 4.3: SG Arrival Card (app) showing the welcome screen (left); trip and personal particulars screen (middle); and the completion screen (right). The warning is still in red but integrates with the rest of the text. Image reproduced from the App Store with permission from Immigration and Checkpoints Authority (ICA).

The digital SG Arrival Card with Health Declaration has since replaced the paper version. The form is a product of *Smart Nation* and is therefore required to conform to certain guidelines including being people and service-oriented. The form is also available as a web page and an app. In both versions, the process performs as a service with users first having to choose whether they are residents or visitors. Depending on this selection, the relevant fields are shown. Figure 4.4 on the following page shows the web version of the form displayed to visitors.

The card in both formats is an artefact of a bureaucratic exchange that is experienced by members of a social group. The changes in the card's design and format are evidence of the evolving demands of the state and its citizens in how communication is mediated (Sarangi & Slembrouck, 1996, p. 9). These changes are also reflective of Kinross' observations, discussed in Chapter 3, which examine texts as being vital to "social-critical dialogue" and questions the existence of documents as merely containers and carriers of data (Kinross, 1994, p. 24). Indeed, the immigration form not only mediates dialogue among the state and citizens, but acts as a legal representative of the state's powers to compel action from citizens (Schwesinger, 2017, p. 613) demonstrated by the form's explanation and warning for providing misleading information.

A Singapore Government Agency Website ENGLISH

 [HOME](#) [FAQ](#)

Individual Submission

[Particulars](#) > [Trip](#) > [Preview](#) > [Submit](#)

Personal Information

Trip 1
Information

Estimated completion time: 5 to 7 mins
Mandatory fields are indicated by a red asterisk *

Personal Information

Full Name (In Passport) *
ARJUN SINGH KHARA

Passport Number * Date of Birth *

[Reset](#)

Sex * Date of Passport Expiry *

Please Select Option dd/mm/yyyy

Place of Residence *

Please Select Option

Country/Place of Birth * Nationality/Citizenship *

Please Select Option Please Select Option

Email Address *

Confirm Email Address *

Country/Region Code * Mobile Number *

+

Confirm Country/Region Code * Confirm Mobile Number *

+

[Continue](#)

Please use another internet browser to access this e-Service if you encounter slowness issue on the Safari browser.
If you encounter further problems with this e-Service, please email ICA_SGArrivalCard@ica.gov.sg with a screenshot of the error message. Please also indicate in the email subject whether you are using the web service or mobile application.

[Immigration & Checkpoints Authority](#)

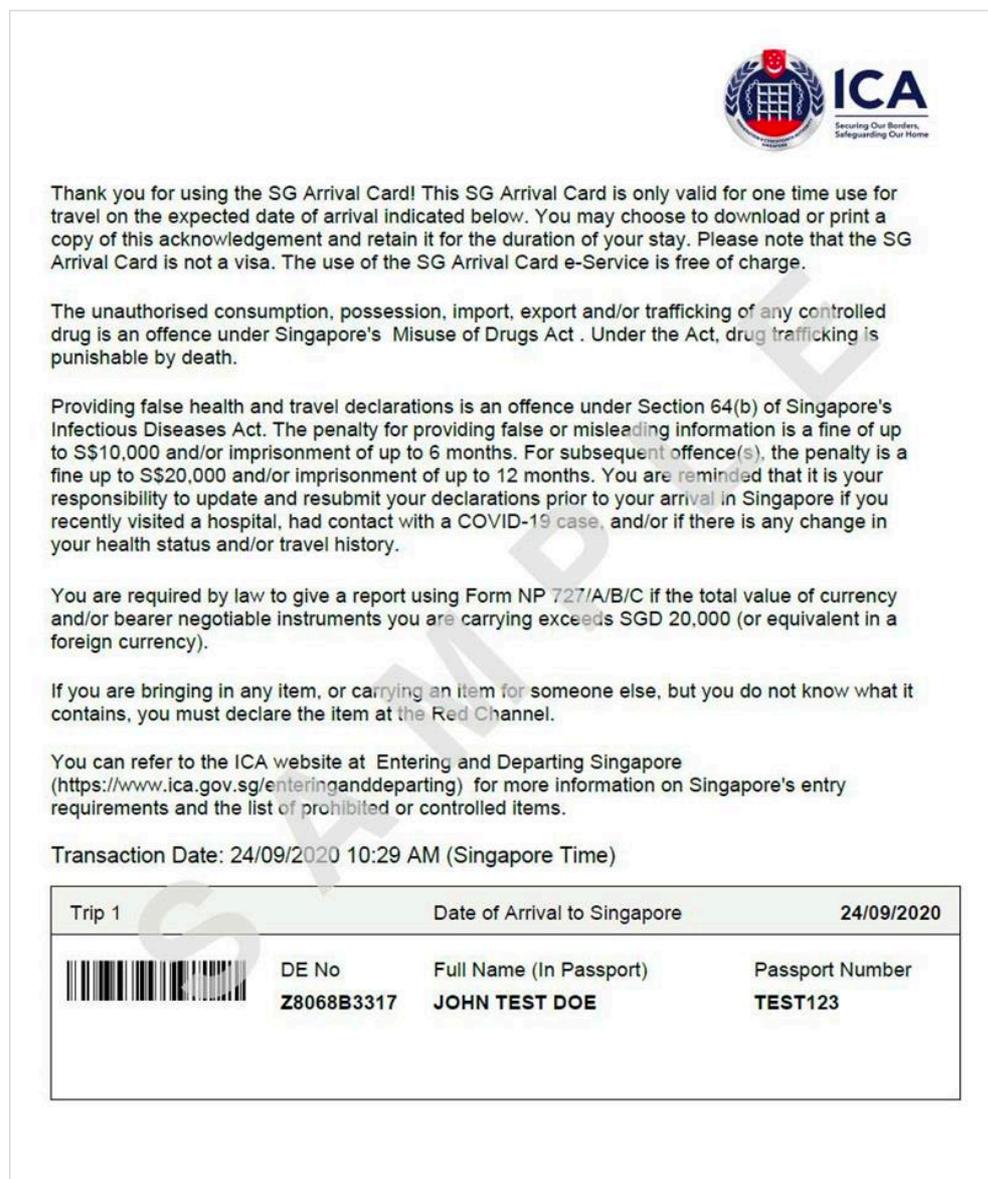
[Contact Us](#) [Rate our e-Service](#)

[Report Vulnerability](#) [Privacy](#) [Terms of Use](#)

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Figure 4.4: SG Arrival Card for foreigners, personal information section (desktop). All users need to complete and submit this form online to the ICA no later than 3 days prior to their arrival. Image reproduced with permission from Immigration and Checkpoints Authority (ICA).

Answering accurately is critical to not just registering one's arrival status, but also avoiding legal action. Penalties for providing false information in the form range from a fine of S\$10,000 and/or six months imprisonment, to hefty S\$20,000 sums and/or a year-long sentence for repeat offenders. This is emphasised at the beginning of the form and at the end: upon successfully completing the process, users are emailed a letter, shown in Figure 4.5 below.



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Securing Our Borders,
Safeguarding Our Home

Thank you for using the SG Arrival Card! This SG Arrival Card is only valid for one time use for travel on the expected date of arrival indicated below. You may choose to download or print a copy of this acknowledgement and retain it for the duration of your stay. Please note that the SG Arrival Card is not a visa. The use of the SG Arrival Card e-Service is free of charge.

The unauthorised consumption, possession, import, export and/or trafficking of any controlled drug is an offence under Singapore's Misuse of Drugs Act. Under the Act, drug trafficking is punishable by death.

Providing false health and travel declarations is an offence under Section 64(b) of Singapore's Infectious Diseases Act. The penalty for providing false or misleading information is a fine of up to S\$10,000 and/or imprisonment of up to 6 months. For subsequent offence(s), the penalty is a fine up to S\$20,000 and/or imprisonment of up to 12 months. You are reminded that it is your responsibility to update and resubmit your declarations prior to your arrival in Singapore if you recently visited a hospital, had contact with a COVID-19 case, and/or if there is any change in your health status and/or travel history.

You are required by law to give a report using Form NP 727/A/B/C if the total value of currency and/or bearer negotiable instruments you are carrying exceeds SGD 20,000 (or equivalent in a foreign currency).

If you are bringing in any item, or carrying an item for someone else, but you do not know what it contains, you must declare the item at the Red Channel.

You can refer to the ICA website at Entering and Departing Singapore (<https://www.ica.gov.sg/enteringanddeparting>) for more information on Singapore's entry requirements and the list of prohibited or controlled items.

Transaction Date: 24/09/2020 10:29 AM (Singapore Time)

Trip 1	Date of Arrival to Singapore		24/09/2020
	DE No Z8068B3317	Full Name (In Passport) JOHN TEST DOE	Passport Number TEST123

Figure 4.5: SG Arrival Card confirmation letter (desktop). Image reproduced with permission from Immigration and Checkpoints Authority (ICA).

The letter contains details of the user's disembarkation/embarkation number, their full name and passport number, date of arrival into Singapore, and a barcode which is scanned by ICA officers when the user passes through a port of entry. The letter can either be printed out or shown on a user's device.

4.2.1.1 Genre conventions

The SG Arrival Card is readily identifiable as a form. The document has recognisable properties such as fields, labels, explanations, and prompts. The colours and logo link the form with the ICA's brand elements. Likewise, the footer contains the name of the issuing authority, with a link to its website. There are additional links also to report vulnerabilities and contact the ICA. Interestingly, the overall arrangement of the web form shown in Figure 4.4 is reminiscent of paper forms, with multiple questions grouped under major sections. The effectiveness of this layout on perceptions is revisited later in the chapter in a comparative analysis with similar digital forms. However, at this point it is useful to point out that the layout is at odds with Sless' works on directed forms (Sless, 1999, pp. 137–140) which route users based on a set of mandatory questions. The comparison between the SG Arrival Card and the GOV.UK passenger locator form – which uses Sless' directed forms method – is discussed in detail later in this chapter.

Nonetheless, the SG Arrival Card is arranged into four major sections as shown by the breadcrumbs on top: Particulars; Trip; Preview; Submit. While all four sections are shown to residents and visitors, residents only have to make a health declaration, and begin by entering a national identification number. The service links this number to a national database which automatically pre-populates form fields such as name, date of birth, and address in Singapore. Such features reduce the effort needed to fill the form, since a user's cognitive capacity is limited to information in recent memory (Waller, 2011, p. 3) such as arrival dates, vessel number, and places the resident has travelled to. Residents thus enjoy appreciable advantages owing to the form's automated processes which decrease time spent filling in the form, and minimise chances of error.

This is not the case for visitors, who are required to manually interact with all sections of the form, including the additional questions not asked of residents. Compared with the paper D/E Card, the digital form also asks more questions of visitors. However, it is not so much the quantity as the type of questions that are central to this analysis. This is because the form makes certain assumptions of non-residents that are not necessarily fair in terms of literacy, clarity, and technology concerns, which add to the onerousness of the task. These assumptions compel an examination of the arrival form's design to facilitate fairness for every user in light of Bicchieri's view that even the most demanding tasks may be accepted if the procedure is viewed as fair (Bicchieri, 2006, p. 100). Is it fair to expose non-resident travellers to the every question and section of the form?

The HMSO stated, in 1962, the primary concern of a form is to gather an accurate response (Her Majesty's Stationery Office, 1962, p. 22). As the case study shows, this is the overriding impetus for the form's issuers, i.e. the ICA. However, the lack of routing and sequencing, proposed by Sless, suggests that users may tend towards the principle of Least Reading Effort (Frohlich, 1986, p. 55), given the volume of questions and declarations. As such, the case study looks at the balance between issuer needs and user experiences to analyse whether an accurate response is possible in light of the number of questions and the typographic signalling throughout the process.

Table 4.2 on the following page contains an overview of the typographic properties used in the SG Arrival Card.⁴⁸ The form was responsive across all screen sizes and filled the entire screen width when tested up to an 8000px width. However, the properties listed in Table 4.2 remained static across screen sizes. There is no functionality in the form to change font sizes, so users are forced to rely on their browser's in-built features to zoom in and out. There were also no significant visual changes to the overall page structure, other than a shift from side-by-side rows on wider screens to a columnar display on narrower ones.

⁴⁸ The web version of the form was tested on a 21.5 inch iMac, an 11 inch iPad, and a 5½ inch iPhone. Measurements were extracted using the inspector tool in a Chrome browser (desktop version 95.0.4638.69).

Main typographic properties in the SG Arrival Card with Health Declaration form					
Form Elements	Font size (em)	Letter-spacing (em)	Font weight	Font Family	Colour(s)
Title (e.g. Individual Submission)	1.25	0.05	700	Roboto	White text (#ffffff) on a dark blue background (#153854)
Breadcrumb trail (e.g. Particulars)	1.2	0.05	700	Roboto	White text (#ffffff) on a dark blue background (#153854)
Advisories (e.g. completion time)	0.8	Normal	400	Roboto	Black (#000000)
Field label* (e.g. Full Name)	1.1	Normal	400	Roboto	Dark grey (#333333)
Input (e.g. entering full name)	1	Normal	400	Roboto	Dark grey (#495057)
Asterisk (pseudo element) (denoting compulsory fields)	Inherited from label	Inherited from label	Inherited from label	Inherited from label	Red (#ee0000)
Error message (e.g. please fill in the field above)	1	Normal	400	Roboto	Red (#ff0000)
Modal pop-up box title (e.g. Please Note)	1.75	0.438	500	Roboto	White text (#ffffff) on a dark blue background (#0d2c41)
Modal pop-up box text and buttons (e.g. continue or cancel)	1	Normal	400	Roboto	White text (#ffffff) on a dark blue background (#0d2c41)
Advisory footnotes (e.g. use another browser)	0.9	Normal	400	Roboto	Grey-black (#212529)
Hyperlink in form (e.g. click here)	1.1	Normal	400	Roboto	Blue (#007bff)
Hyperlink in footer (e.g. email address of ICA)	0.9	Normal	400	Roboto italic	Blue (#007bff)

Announcement banner title (e.g. Attention)	1.5	Normal	700	Helvetica Neue	Grey-black (212529) on a pale yellow background (#ffc)
Announcement banner text (e.g. e-Service will not be available on 7 November 2021)	1.1	Normal	400	Helvetica Neue	Grey-black (212529) on a pale yellow background (#ffc)

Table 4.2: Main typographic properties of the SG Arrival Card with Health Declaration. Source: Immigration and Checkpoints Authority (ICA). Unlike GOV.UK, the ICA does not publish a comprehensive list of design templates and guidelines for its websites and forms. Consequently, the inspector tool in a Chrome browser (desktop version 95.0.4638.69) was used to extract these values. *When an error is detected, field labels take on the same colour treatment as the error message.

When viewed on a desktop, the entire form stretches to fill the width of the screen. A small amount of dynamic padding on either side maintains an equal ratio that keeps the form centred. However, the maximum number of columns is maintained at two for screen widths wider than 768px. Likewise, the form fields vary in length depending on the questions, some of which sit side-by-side. When viewed on wider screens, the fields extend as well since their lengths appear to be tied to the width of the browser window, rather than to a specified maximum measurement. On mobile screens with widths less than 768px, the layout collapses into a single column and fields condense into equal widths. This creates unwieldy blocks with poor flow and spacing, (Jarrett & Gaffney, 2009, p. 168) which tend to clutter the interface.

Figure 4.6 on the following page shows the starting sections of the SG Arrival Card form when viewed on a 5½ inch iPhone in portrait mode; the form was accessed using the Safari browser. The static font-sizes and fixed spacing around fields tends to create clutter on smaller mobile screens. This is not much of an issue on desktops and 11-inch tablets, where the font-sizes and spacing between fields is balanced against additional white space around the form. But the clutter is particularly noticeable in (i) the blue breadcrumb section; and (ii) the grey trip information panel which collapses into an expandable slider.

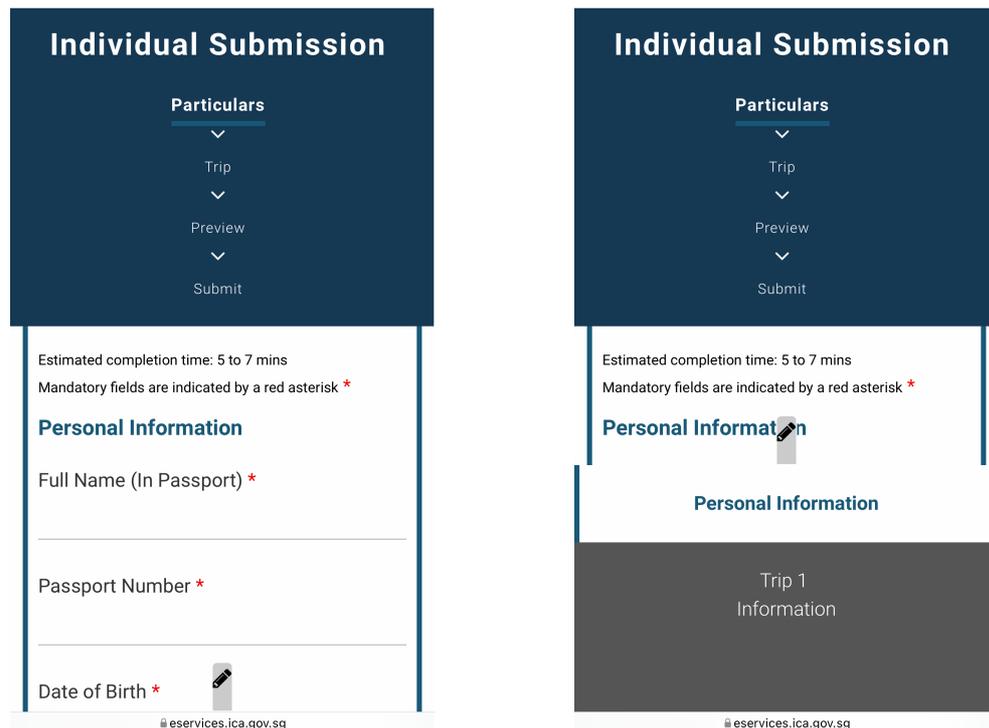


Figure 4.6: SG Arrival Card particulars section (mobile) with the trip panel hidden (left) and the same panel expanded (right) by clicking the grey pencil icon. Images reproduced with permission from Immigration and Checkpoints Authority (ICA).

The breadcrumb section, like the rest of the form, collapses into a single column, showing the user journey from top to bottom. The arrows between the titles help with this orientation, but the amount of space taken up – nearly half the screen – creates excess imposition on the form’s variable parts. Luna (Luna, 2018, p. 62) and Davies and Beeharee refer to this problem of salience, whereby the latter authors refer to the issue “as an object’s attention-seeking intrusiveness” (Davies & Beeharee, 2012, p. 1452). Salience, in this case, is also noticeable in the grey trip panel, shown in Figure 4.6 (right) which is accessed by tapping on the pencil icon.

Tapping on this icon slides the trip panel up, showing the number of trips a user has currently registered on the form. While the panel details the number of trips a visitor will be making, the pencil icon is potentially misleading since the icon conventionally signifies an editable function. This is somewhat true here, since users can tap on trips to edit details. But this is not made evident; tapping on “Trip 1 Information” itself does nothing unless additional trips, e.g.

Trip 2, have been added in the form's previous section. Furthermore, hovering over the text of "Trip 1" changes the cursor to a finger pointer indicating some form of interactivity. But no tool tips are displayed that might inform users of the icon's function: the vagueness of the pencil icon, coupled with the cursor pointer over content that does not change its state, causes further confusion in an already cluttered mobile environment (Jarrett & Gaffney, 2009, p. 168). Understanding is therefore minimised in the communicative intention of the form's designers, since users are unable to fully grasp the information that has been presented to them (Wilson & Sperber, 2006, p. 11). Furthermore, the familiarity of the icon as a tool of navigation is diluted within the historical and cultural context that it is used (Sless, 1999, p. 136), since the expectations and outcomes do not match; thus, meaning is lost in this section of the form.

Data on the types of devices used to submit the form was not available at the time of writing. However, the ICA has published guidance on applying for Singapore Citizenship; this application is made online using a form that is similar to the SG Arrival Card – in terms of appearance and questions – and is also identically branded. On the first page of the guidance is a clearly marked advisory: "You are strongly encouraged to submit your Singapore Citizenship application using a desktop" (Immigration & Checkpoints Authority, no date). This notice offers an indication of priority the ICA confers on desktops, likely for ease of use and error avoidance, but disadvantages mobile users.

Figure 4.7 on the following page shows the first page of the guidance (left) contains an advisory, in a bold weight and bright blue, recommending that applicants use a desktop. The "Review" section (right) reinforces this advisory by showing a sample of what the form looks like when rendered on a desktop: the typographic arrangement of the citizenship form in the guidance is analogous to the SG Arrival Card. In light of the prominence given to desktops, and the static nature of the form's typographical elements across all screen sizes, this case study concentrates on the desktop version of the SG Arrival Card. References to the form's mobile and app versions are made where such analysis is useful in highlighting specific points and observations.

You are strongly encouraged to submit your Singapore Citizenship application using a desktop.

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Part 5: Review

Each person has a section tab of information to be reviewed. To make changes, please select "Back to Applicant Listing to go back and make changes to the forms.

Please ensure the **mobile number**¹ and **email address**² of all adult applicants/sponsor is correct.

When you have completed reviewing the information in all the section tabs you will be able to proceed to upload documents by selecting "Next".

We recommend proceeding to the next step only when all information is in order to avoid discarding and restarting your application process.

The screenshot shows a form titled 'Particulars of Sponsor'. It contains the following fields:

- Singapore Identity Card Number (SIN): 99000000000
- Singapore Identity Card Issue Date: 10 Jun 2017
- Full Name (Including Surname / Family name): SURESH, SURESH
- Surname / Family Name: SURESH
- Other Name (For applicants):
- Sex: MALE
- Date of Birth: 01 Jun 1984
- Birth Certificate Number: 00000123123123
- Country/Place of Birth: INDIA
- Citizenship: INDIA
- Number of Other Citizenships: 0
- Race: INDIAN
- Religion: HINDU
- Occupation / Branch / Post: PROJECT MANAGER
- Address (For applicants only):
- Mobile Number: 9999999999
- Office Number:
- Email Address: SURESH@ICMIL.COM.SG

At the bottom, there are three buttons: 'Back', 'Next', and 'Next'. Red boxes and numbers highlight the 'Mobile Number' field (1), the 'Email Address' field (2), and the 'Next' button (3).

Figure 4.7: ICA guidance on using a form to apply for Singapore Citizenship online: the composite shows the first page of the guidance with the advisory (left) and a section of the form (right) on page 19 of the guidance. Images reproduced with permission from Immigration and Checkpoints Authority (ICA).

4.2.1.2 Language options

The form uses simple terms for fields, simply stating “Date of Birth”, “Sex”, and “Place of Residence”. This functional tone comes through in the field labels, which facilitate understanding and reveal an active intention to avoid dense or bureaucratic terminologies.⁴⁹ The bulk of legalese is only at the end of the form, where applicants make declarations to the comptroller of immigration, and will be discussed shortly. The SG Arrival Card service is available in all four official languages, plus Hindi and Tiếng Việt. Selecting an option from the top right-hand corner converts the service’s text into that language. However, the translation has not been applied uniformly, shown in Figures 4.8–4.10 on the following pages, whereby some text blocks remain in English.

⁴⁹ Chapter 3 discusses the United States tax report that emphasises simple language to aid readability and clarity (Comptroller General of the United States, 1978, p.i).

A Singapore Government Agency Website

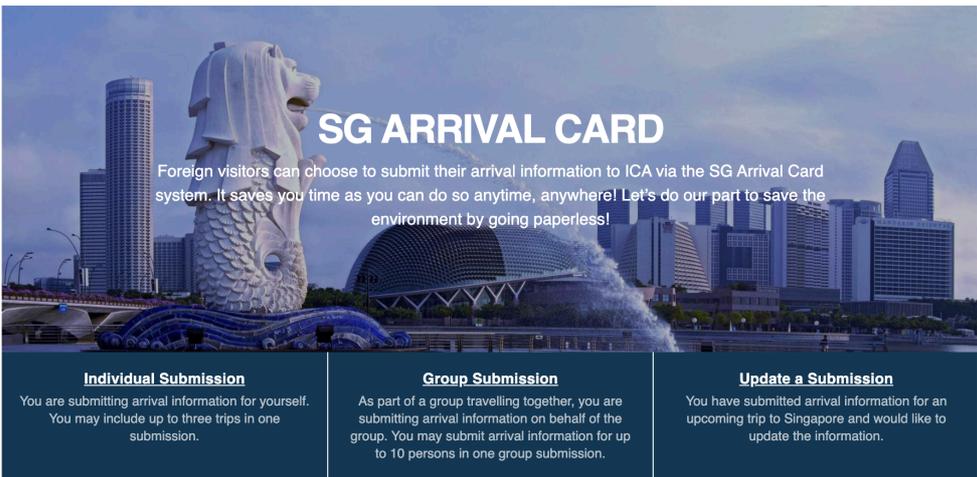

[HOME](#)
[FAQ](#)

✓ ENGLISH
 BAHASA MELAYU
 Tiếng Việt
 ភាសាខ្មែរ
 ភាសាទាប
 简体中文

Attention:

This e-Service will not be available on 7 November 2021 (Sunday) from 0001hrs to 0800hrs (Singapore Time) due to scheduled maintenance. Please plan your transaction in advance. We apologise for any inconvenience caused.

It is **not** mandatory to upload the digital Pre-Departure Test (PDT) QR code during SG Arrival Card submission. Travellers will still be able to complete the SG Arrival Card submission without uploading the PDT QR code.



Individual Submission
 You are submitting arrival information for yourself. You may include up to three trips in one submission.

Group Submission
 As part of a group travelling together, you are submitting arrival information on behalf of the group. You may submit arrival information for up to 10 persons in one group submission.

Update a Submission
 You have submitted arrival information for an upcoming trip to Singapore and would like to update the information.

Figure 4.8: SG Arrival Card start screen in English, which is the default option (desktop). Important announcements affecting the service are displayed in a yellow banner at the top of the screen. Image reproduced with permission from Immigration and Checkpoints Authority (ICA).

Translation becomes an issue when users encounter the large yellow box containing important announcements and updates for uploading digital Pre-Departure Test codes: the layout and prominence of the box, in relation to the form, affect the form's overall appearance layer (Jarrett & Gaffney, 2009, p. 6). These advisories remain in English regardless of which language option is selected. The inability of the arrival form to properly translate these messages is problematic if, as Redish et al. state, readers can't find information they need and sentences go unread (Redish et al., 1985, p. 129). The form in Figure 4.8 above displays a maintenance announcement in English, stating the service will be unavailable from 12:01 am to 8:00am on 7 November 2021 (local Singapore time). Figure 4.9 on the following page shows the same screen translated into Tamil,⁵⁰ with the announcement remaining in English.

⁵⁰ Chapter 2 discussed the issue of minority languages in Singapore, citing scholarly works on attitudes towards Tamil.

A Singapore Government Agency Website தமிழ்



🏠 முகப்புப் பக்கம்

அடிக்கடி கேட்கப்படும் கேள்விகளை பார்க்கவும்

Attention:

This e-Service will not be available on 7 November 2021 (Sunday) from 0001hrs to 0800hrs (Singapore Time) due to scheduled maintenance. Please plan your transaction in advance. We apologise for any inconvenience caused.

It is **not** mandatory to upload the digital Pre-Departure Test (PDT) QR code during SG Arrival Card submission. Travellers will still be able to complete the SG Arrival Card submission without uploading the PDT QR code.

சிங்கப்பூர் மின்னணு குடிவரவு அட்டை

வெளிநாட்டுப் பயணிகள் தங்களது வருகையின் விவரங்களை சிங்கப்பூர் மின்னணு குடிவரவு அட்டை அமைப்பின்மூலம் குடிநுழைவு, சோதனைச்சாவுகள் ஆணையத்திடம் சமர்ப்பிக்கலாம். அதனை நீங்கள் எந்த நேரத்திலும் எங்கிருந்தும் செய்யமுடியும் என்பதால் உங்கள் நேரம் மிச்சமாகும்! காலிதம் பயன்படுத்தாமல் இருப்பதன் மூலம் சுற்றுச்சூழல் பாதுகாப்பிற்கு நம் பங்களிப்பை செய்வோம்!

<p>தனிநபர் அளிப்பு</p> <p>நீங்கள் உங்களுக்கான குடிவரவுத் தகவலை அளிக்கிறீர்கள். ஒரு அளிப்பில் நீங்கள் மூன்று பயணவிவரங்கள் வரை சேர்க்கலாம்.</p>	<p>குழு அளிப்பு</p> <p>ஒன்றாகப் பயணிக்கும் ஒரு குழுவின் சார்பாக நீங்கள் குடிவரவுத் தகவல்களை அளிக்கிறீர்கள். ஒரு குழு அளிப்பில் 10 நபர்களுக்கான குடிவரவுத் தகவலை நீங்கள் அளிக்கலாம்.</p>	<p>அளிப்பைப் புதுப்பிக்கவும்</p> <p>சிங்கப்பூருக்கு இனி செய்யவிருக்கும் பயணத்திற்கான குடிவரவுத் தகவலை நீங்கள் அளித்துள்ளீர்கள். மேலும் தகவலைப் புதுப்பிக்க விரும்புகிறீர்கள்.</p>
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Figure 4.9: SG Arrival Card start screen, translated into Tamil (desktop). Important announcements in the yellow box remain in English regardless of which language option is selected. Image reproduced with permission from Immigration and Checkpoints Authority (ICA).

The visual priority of the yellow announcement box is maintained, owing to its distinct colour and use of a bold weight in the heading to draw attention. If Orna's view on topic familiarity (Orna, 1984, p. 29) is applied, it is reasonable to surmise that most users will realise the box contains important information pertinent to them. Users unable to read or easily comprehend the terminology used in the box may opt to copy-paste the contents into an offsite third-party service like Google Translate. In doing so, users place themselves in unfamiliar settings outside the form environment, which unfairly tests not just familiarity but the functional literacy (Waller, 2012, p. 241) of non-English speaking users.

Disruptions in translation inevitably affect the quality of explanations as well. In the SG Arrival Card, the explanations in the form translate coherently from one language to the next. However, the lack of consistent translation across the form threatens to obfuscate key sections and elements of the form. Incorrect submission of these sections will more than likely result in delays or

rejection of the forms process. The ICA does not publish the number of failed form submissions, but the issue of inconsistent language options and the knock-on effect on explanations is still evident, since users cannot bring a functional reading framework (Holland & Redish, 1981, pp. 205–209). Since the “first impression of a product or service has a substantial impact on the user’s attitude and relation towards the product,” (Saucken et al., 2014, p. 1337) confusion at the starting stage itself sets up negative expectations of the form-filling process. The mandatory nature of the form ties back with discussions about trust and empowerment, whereby technology ought to facilitate users’ needs, but often ends up an impediment despite an issuer’s best intentions (Felker et al., 1981, p. 1). Figures 4.10 below and 4.11 on the following page, respectively, show how the lack of a uniform translation not only ignores the announcements but directly affects the form’s elements.

The screenshot displays the ICA website interface for the SG Arrival Card. At the top, there is a navigation bar with the ICA logo and the text 'A Singapore Government Agency Website'. Below this, a 'Please Note' modal box is centered, containing an English advisory about service unavailability on 7 November 2021 and a note that PDT QR code upload is not mandatory. Below the modal, a form section titled 'व्यक्तिगत जानकारी' (Personal Information) is visible. It includes a field for 'यात्रा 1' (Journey 1) with the date '08/11/2021'. A modal pop-up box is overlaid on the form, asking 'Do you wish to proceed to change your Date of Arrival?' in Hindi. The modal has two buttons: 'हाँ' (Yes) and 'नहीं' (No). The background form also contains a 'Reset' button and a date field with '08/11/2021'.

Figure 4.10: SG Arrival Card arrival date section (desktop). Modal pop-up boxes with advisories in English but response buttons in Hindi. Image reproduced with permission from Immigration and Checkpoints Authority (ICA).

Interactive modal pop-up boxes are automatically generated along the way to advise users on next steps. In this case, even though Hindi has been selected, the advisories in the pop-up box are in English. Button responses at the bottom of the box are in Hindi, but the same logic has not been applied consistently to all buttons, which breaks the form's pattern (Jarrett & Gaffney, 2009, p. 161) thereby creating inconsistencies: text on the "Reset" button in the form is in English. Likewise, the date is shown in Arabic numerals, and there is no way to remove the box unless an option is picked, forcing users to choose under ambiguous circumstances. These issues point to a missing gestalt that ought to give sense to the visual form of a document through structure, layout, and connections (Waller & Delin, 2010, p. 8).

Personal Information

Trip 1
08/11/2021

Others

Have you ever used a passport under different name to enter Singapore? * NO

Name different from current passport *

Health Declaration

Have you travelled to Africa or South America in the 6 days prior to your arrival in Singapore? * Please Select Option

Please indicate all countries/regions that you have been in (including the country/region of embarkation) or travelled to, (excluding transit and stopover for air travel only) in the last 14 days prior to your arrival in Singapore. To illustrate, if your expected arrival date is on 15 January 2021, please indicate your travel history from 1 to 15 January 2021 (both dates inclusive). * Please Select Option

Do you have any of the following symptoms: fever, cough, runny nose, sore throat, loss of sense of smell or shortness of breath? * Please Select Option

Are you diagnosed or suspected to have COVID-19 infection in the past 14 days? * Please Select Option

Did you have contact with any case of COVID-19 in the last 7 days? * Please Select Option

Do you have any critical medical conditions (e.g. cancer, heart diseases, stroke) or do you require help to carry out your daily activities (e.g. eating, bathing, dressing) or are you prone to falls? * Please Select Option

If you are required to take COVID-19 Pre-Departure Test (PDT) under the current requirements for entry into Singapore, you may scan/upload the QR code on the digital PDT result (if available) here.
Please refer to <https://safetravel.ica.gov.sg/health/covid19-tests/pctest> for latest requirements.

Upload/Scan (Optional)

Figure 4.11: SG Arrival Card final review section in English (desktop). Image reproduced with permission from Immigration and Checkpoints Authority (ICA).

The missing gestalt issue is amplified in the form's health declaration section. Figure 4.11 above shows the list of health declaration questions, in English, that users must answer. The text in the questions and the buttons are all in English. However, this is not the case when the same section is translated into Hindi – or any other language – shown in Figure 4.12 below.

व्यक्तिगत जानकारी
स्वास्थ्य घोषणा

यात्रा 1
08/11/2021

क्या आपने सिंगापुर आने से पहले 6 दिनों में अफ्रीका या दक्षिण अमेरिका की यात्रा की है? *

Please indicate all countries/regions that you have been in (including the country/region of embarkation) or travelled to, (excluding transit and stopover for air travel only) in the last 14 days prior to your arrival in Singapore. To illustrate, if your expected arrival date is on 15 January 2021, please indicate your travel history from 1 to 15 January 2021 (both dates inclusive). *

क्या आपमें निम्न में से कोई लक्षण हैं: बुखार, खांसी, नाक बहना, गले में खराश, गंध का न आना या सांस लेने में तकलीफ? *

क्या पिछले 14 दिनों में आपका COVID-19 संक्रमण का निदान या संदेह हुआ है? *

क्या आपका पिछले 7 दिनों में COVID-19 के किसी भी केस से संपर्क हुआ था? *

क्या आप किसी गंभीर बिमारियों (जैसे कैंसर, हृदय रोग, स्ट्रोक) से पीड़ित हैं या क्या आपको अपनी दैनिक गतिविधियों (जैसे खाना, स्नान करना, ड्रेसिंग) को पूरा करने के लिए किसी सहायता की आवश्यकता है या क्या आप में गिरने की प्रवृत्ति है? *

If you are required to take COVID-19 Pre-Departure Test (PDT) under the current requirements for entry into Singapore, you may scan/upload the QR code on the digital PDT result (if available) here.
Please refer to <https://safetravel.ica.gov.sg/health/covid19-tests/pctest> for latest requirements.

Note: For successful transaction, only the QR code should be scanned or uploaded. Please do not upload a scanned copy of your certificate, as it will be rejected by the system. Please also note that the scan function will not be available if you are browsing on the desktop version of the site.

Upload/Scan (Optional)

यात्रा जोड़ें | +
पूर्वावलोकन

यदि आप सफारी ब्राउज़र पर धीमे कार्य करने की स्थिति का सामना करते हैं तो इस ई-सेवा का उपयोग करने के लिए कृपया अन्य इंटरनेट ब्राउज़र का उपयोग करें।
यदि आप इस ई-सेवा में आगे किसी समस्या का सामना करते हैं तो कृपया ICA_SGArrivalCard@ica.gov.sg पर त्रुटि संदेश के स्क्रीनशॉट के साथ ईमेल करें। कृपया ईमेल के विषय में यह भी इंगित करें कि आप वेब सेवा या मोबाइल एप्लिकेशन में से किसका उपयोग कर रहे हैं।

Figure 4.12: SG Arrival Card final review section in Hindi (desktop). Declaration section for travel history and COVID-19 test status translated in Hindi. Not having these sections translated creates added effort for Hindi speakers. Image reproduced with permission from Immigration and Checkpoints Authority (ICA).

While most of the fields are in Hindi, the section on travel history, and the notice for uploading proof of testing – set in a bold weight – are in English. These are especially important sections of the form that explain the proper

procedure to declare travel history and upload proof of pre-departure tests. The discrepancy also extends to some of the buttons that accompany these instructions. The resulting breakdown in the conversational layer (Jarrett & Gaffney, 2009, p. 6) results also in a loss of meaning owing to disengagement with the words and a breakdown in interactions (Mackenzie-Taylor, 1999, pp. 177–178). The resulting lack of clarity is also made worse by the fact that entry into Singapore is not allowed for travellers without this proof, which places users in a highly unfair predicament. Visitors providing incorrect information about their travel face hefty penalties, a common legal function to apply the rules (Jansen & Steehouder, 2001, p. 14). But the explanation in this declaration section is lengthy, and terminology confusing for most users, including those with a reasonable command of English: *Please indicate all countries/regions that you have been in (including the country/region of embarkation) or travelled to, (excluding transit and stopover for air travel only) in the last 14 days prior to your arrival in Singapore.* Such verbiage is against plain language policies that avoid “long convoluted sentences, technical or jargon-ridden vocabulary” (Waller, 2018, p. 145) and disadvantage groups with lower literacy. (Comptroller General of the United States, 1978, p. 11). This also exemplifies wording that is “of use to the expert reader who already possesses the basic stock of concepts, [but] not to the average reader” (Olson, 1984, p. 10).

Singapore’s government is aware of this issue and has even taken steps to mitigate the problem. In 2013, Singapore’s Attorney General’s Chambers began the Plain Laws Understandable by Singaporeans (PLUS) project, “an on-line public survey with a view to modernising our legislative drafting practice and improving the readability of our laws so that Singaporeans can better understand them” (Attorney General’s Chambers, 2020). Waller also argues that the “popular conception of legal language is that it is necessarily complex, and even archaic” (Waller, 2014, p. 4). Tiersma takes this further, noting

Long and complex sentences with unusual word order and other odd features make legal language convoluted, cumbersome, and hard to comprehend. Unless they have a legitimate function that cannot be otherwise conveyed, these

stylistic features of legal language have little to commend them (Tiersma, 1999, p. 69).

Of interest in Tiersma's assertions is the notion of legitimate functions. It is true that content which is needlessly expressed in complex terms may cause confusion or frustration for users. However, it is more difficult to determine whether the words and sentences used in the arrival form have been crafted without purpose. The ICA, for instance, might argue that such terminology protects them from legal challenges while also providing a legal mandate to prosecute deliberate offences.⁵¹ Recursion – the property of adding conjunctions like “and,” which keep increasing sentence lengths in legal documents (Tiersma, 1999, p. 62) – is present in some sentences, thereby adding to complexity. However, recursion has not been used in most parts of the form; nor do its instances eclipse the form's overall tone, which is largely straightforward – albeit bare and functional – in its instructions to users.

It is more conceivable the verbosity employed in the arrival form's health declaration section is a signal to users of the authority and strict demands of the responses (Schwesinger, 2010, p. 84), in addition to providing legal cover for the ICA. Moreover, the contrast between the language used in the form's health declaration and its other sections reveals something of the importance the ICA has attributed to the terms and conditions of entry into Singapore. Since the ICA is charged with border protection, it is reasonable to assume that the language in the health declaration section serves a legitimate function for Singapore's security, and the nation's wider governmentality. But if this is the rationale, then the declaration not only ignores the Attorney General's PLUS project, it also fails to grasp the benefits of plain language. Writing about this subject, Tiersma and Solan have observed that:

As plain language almost invariably employs fewer words its use, given any particular rate of errors per 1,000 words, will tend to reduce the absolute number of errors. But beyond this, its use reduces the chance of mistake arising from the

⁵¹ Sarangi and Slembrouck state that “bureaucrats, in their day-to-day activities, can be held accountable by the institutions which they are serving and where absolute power lies. Going through the procedure is their safety net” (Sarangi & Slembrouck, 1996, p. 126).

complexity of the language, and it increases the chance that someone will spot any remaining errors before they do harm. It also avoids the risk that meaning will be inadvertently changed during “translation” between plain language and legalese (Tiersma & Solan, 2012, pp. 72–73).

The challenges with mistranslating key terms in the form, owing to imperfections in third-party services, can result in a misunderstanding of meaning.⁵² This obstacle can be addressed via typographic styling — shorter line lengths, colour, and tool tips (Comptroller General of the United States, 1978, p. 35) that explain the form’s health and travel requirements in simple terms. Additionally, the placement of the dropdown option to translate the form is an issue that overlaps with problems of navigation. The case study deals with its more prominent aspects later, but a brief mention here is useful.

The translation problem applies to all languages; Figure 4.13 below shows the service screen in English (left) and the same screen translated to Mandarin (right). While the form provides a translation feature via a dropdown element, this function may not be immediately clear to first-time users. This is because the default text just reads ‘ENGLISH’ with a downward-facing arrow to the right. The rest of the options for each language are hidden in this dropdown.

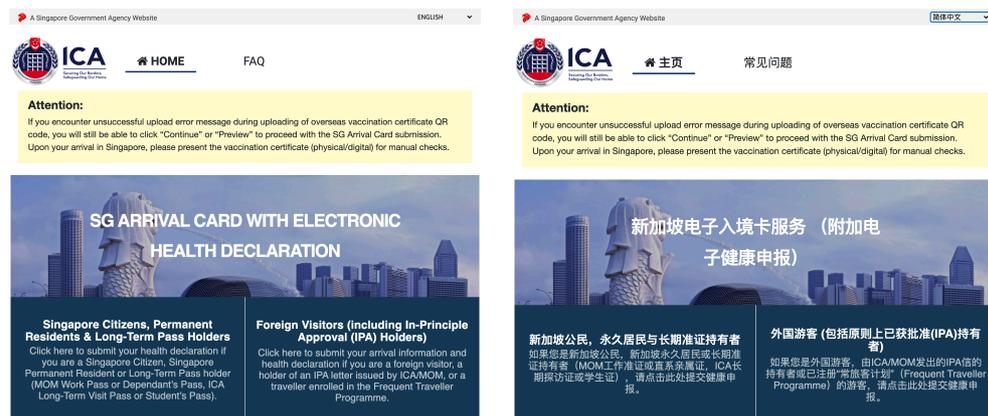


Figure 4.13: SG Arrival Card service start screen (desktop). The images show the start screen in English (left) and the same screen translated into Mandarin (right) with the dropdown menu outlined. Images reproduced with permission from Immigration and Checkpoints Authority (ICA).

⁵² Chapter 2 discusses Immigration Form 14A (paper form) and highlights Fitria’s concerns over the inaccuracy of machine technology to adequately address gender bias in translation activities. Chapter 3 discusses usability, meaning-making, and familiarity.

For users with adequate English skills, this may not present that much of a challenge, but unfair for non-English speakers and users with lower graphical literacies around digital forms, since there is no textual or visual marker that indicates the dropdown contains a translation feature (Waller, 2012, p. 241). Interestingly, the graphical literacy problem has been addressed in the app version of the form – which uses an icon to signify the translation feature – and is discussed later in this case study. Nonetheless, the omission of a clear indicator in the web version creates “usability issues [that] often arise from navigation that has been poorly designed, often because of the organization, placement, visual design, or terminology used” (Schall, 2014, p. 363).

Schall's list casts a wide net over the causes of usability issues; however, terminology and placement are particularly relevant. Given the SG Arrival Card is meant for every type of traveller landing in Singapore, the online form has insufficient literacy and clarity opportunities to address this user base, though it possesses relevant technology opportunities. This example indicates the intersectionality of fairness in design for all three categories, and exhibits the difficulties of building fairness into forms without a formal framework.

4.2.1.3 Digital literacy: email and phone number fields

The paper D/E Card simply asked for a “Contact Number” in a single field. The digital form is more specific, requiring the user's mobile phone number, and the country code. These details have to be entered twice to confirm the numbers are correct. Users are also required to enter an email address. As with the mobile number, a duplicate entry here is also mandatory. The emphasis on email addresses, hitherto unasked, and affirmation of the correct mobile number is indicative of Singapore's digital culture and assumptions of acceptance from target users (Lim et al., 2012, p. 111). It is also unsurprising, given the volume of transactions and exchanges that take place through these two mediums. However, not all users have an email address; nor are mobile

phones globally ubiquitous, much less smartphones.⁵³ Yet, both these fields are necessary, shown in Figure 4.14 below; the form does not allow a user to continue without entering these details. This raises clarity concerns for explanations and error-checking.

The screenshot shows a web form with the following fields and error messages:

- Email Address ***: A text input field with a red error message: "Please fill in the field above".
- Confirm Email Address ***: A text input field with a red error message: "Please fill in the field above".
- Country/Region Code ***: A text input field with a "+" sign and a red error message: "Please enter a valid country/region code".
- Mobile Number ***: A text input field.
- Confirm Country/Region Code ***: A text input field with a "+" sign and a red error message: "Please fill in the field above".
- Confirm Mobile Number ***: A text input field.

At the bottom right, there is a blue "Continue" button. Below the form, there is a small text block: "Please use another internet browser to access this e-Service if you encounter slowness issue on the Safari browser. If you encounter further problems with this e-Service, please email ICA_SGArrivalCard@ica.gov.sg with a screenshot of the error message. Please also indicate in the email subject whether you are using the web service or mobile application."

Figure 4.14: SG Arrival Card section on Email Address and Country/Region Code with error messages (desktop). Image reproduced with permission from Immigration and Checkpoints Authority (ICA).

While it is the government's prerogative to ask users for an email address — a confirmation of arrival is emailed to users at the address provided — not everyone will have email.⁵⁴ From a fairness perspective the form ought to instruct users on where to register for one if they are unable to provide this information, rather than display a generic error message. And although Singapore's government agencies may not want to show favouritism towards

⁵³ The Pew Research Center reported that as of spring 2018, 94% of adults in developed economies, and 83% of adults in emerging economies, owned a mobile phone. Smartphone ownership was lower: 76% in developed economies and 45% in emerging economies (Silver, 2019). For comparison, as of May 2019, mobile phone penetration in Singapore was 154.1% (GovTech, 2019).

⁵⁴ Statista calculated a total of 3.93 billion email users around the world in 2019 (Statista, 2021). In the same year, the United Nations estimated the global population to be 7.7 billion (Population Division, 2019, p. 5). This equates to little less than half of the world not having an email address.

any one email service, there is little harm in listing examples of providers such as Google, Apple, Outlook, and Yahoo, with a caveat that the government is not responsible for users' choices.

Adding clarity to such a degree may be deemed excessive by the form's issuers, as well as by the digitally initiated, but not for users without email addresses. Indeed, the form provides a line of advice for users experiencing slowness with Apple's Safari browser. A similar notice could be shown for users without email, especially since the ICA provides an email address for anyone facing issues with the digital form. Given the significance of email to the form's processes, the assumption that users will have an email address is understandable since most would be able to provide one. But if the same assumption is based on observing the majority, then the form is culpable of implicit bias since fairness in society, as Sen has written, approximates to an insistence for impartiality (Sen, 2009, p. 54).

Similar instances of such bias are present also in the phone section of the form. The form asks for a Country/Region Code and a mobile number. As with email addresses, these fields are compulsory. But the form does not specify what is meant by Country/Region Code; instead there is a tacit expectation users will infer from the form's pragmatic context (Holland & Redish, 1981, p. 205) what the question is referring to. This expectation is not unreasonable when considering the number of digitally-savvy users exposed to such norms; the a plus symbol reinforces the expectation that users will understand the international calling reference. But unlike Email Address, there is ambiguity in Country/Region Code.⁵⁵

Clicking on the field does not display a dropdown list of countries with their corresponding calling codes. Users are thus expected to (i) know what the form means; and (ii) find the correct information offsite. A Google search

⁵⁵ The World Bank provides a list of Country Codes as alphabetised entries for (i) International Standards Organization (ISO) 3-digit alphabetic codes; and (ii) the United Nations Statistics Division (UNSD) 3-digit equivalent numeric codes (The World Bank, 2010). The Country Code 044 i.e. the calling code for the United Kingdom, is also the UNSD's Country Code for The Bahamas. While unlikely these codes will be mistaken for international dialling by digitally-savvy users, the presence of alternate formats using the same title is nonetheless a potential – and easily avoidable – obstacle to fairness in design.

for the term returned results for the International Standards Organisation and the United Nations Statistics Division; both are sites of authority providing lists of 'country codes' that are markedly different to what the arrival form expects. As such, the omission of a clear section header referring to a contact number demonstrates Otlet's view that documents reveal underlying attitudes of their issuers towards stakeholders (Otlet, 1934, p. 217). This view extends to global digital skills: while users from less developed regions are more likely to be affected by digital literacy issues, interruptions of this nature affect users uniformly, leading to greater overall frustration with the form. This frustration is a result of breakdowns in the mental models proposed by Waller, Sless, and Jarrett and Gaffney, and summed up in Jansen's 2001 book chapter on clarity in documents: incomplete texts result in users plotting their own mental models, which may stray from the issuer's intentions (Jansen, 2001, pp. 126–128). Bailey et al.'s observations on task disruptions suggest "a possible correlation between a user's rating of task difficulty and his [*sic*] level of annoyance experienced due to an interruption" (Bailey et al., 2001, p. 8). The impact is also made worse by the form's failure to provide enough support for those without email or mobile phones. Moreover, the need to go offsite to find a country code causes additional anxiety, which "has a disruptive effect on a user's task performance and emotional state" (Bailey et al., 2001, p. 8).

The assumptions made of users' digital knowledge may apply to most Singaporeans and visitors from developed countries. But the same cannot be assumed for travellers from emerging economies, which Singapore receives its fair share of. It is helpful at this point to show the number of overseas arrivals into Singapore who need a visa to enter the city-state. Most countries in Table 4.3, on the following page, are emerging economies with varying degrees of internet access and mobile phone usage. Analysis of the SG Arrival Card with Health Declaration has thus far focused on the divide between the digitally initiated and those without sufficient knowledge of online conventions. And although the form shows signs of favouring digitally initiated users, there are also indications of implicit design bias in language options, which affects local Singaporeans and foreigners whose mother tongues are not English.

Number of arrivals, in December 2019, from countries/regions that require a visa to enter Singapore	
Bangladesh	13,812
China	272,472
Egypt	637
Greater China	342,199
India	115,193
Iran	581
Pakistan	1,976
Russia	9,629
Saudi Arabia	1,344
United Arab Emirates	7,174
West Asia	14,757
Other markets in West Asia	2,897
Other markets in Africa	4,182
Total	786,853

Table 4.3: Number of visitors that arrived in Singapore in December 2019, from countries and regions requiring a visa to travel to Singapore.⁵⁶ The data was compiled from SG Arrival Cards completed by visitors arriving at entry ports, excluding Malaysians arriving by land (Source: Department of Statistics Singapore, correct as of 1 November 2021, <https://tablebuilder.singstat.gov.sg/table/TS/M550001>).

⁵⁶ A four-year UNICEF report recorded information communication technology skills in developing nations. Nine key actions were identified, such as copying files and folders, writing a computer program in any language, and sending an email with attachments such as documents or videos. The database reported on the quantity of males and females who conducted these activities, over a three-month period. The percentage of males and females that sent an email with an attachment is as follows: 19% females in Algeria; 1% females in Bangladesh; 4% females in Iraq; 4% females and 10% males in Pakistan; 25% females and 23% males in Tunisia. (Source: United Nations Children's Education Fund, 2021, <https://data.unicef.org/topic/education/learning-and-skills/>).

4.2.1.4 Navigation and data management

Figure 4.15 below demonstrates the challenges with navigation that users face, along with the lack of data saving options. The breadcrumb trail, in the blue banner above the fields, is useful to indicate where the user is in the form journey. As the user progresses, the relevant breadcrumb title becomes bold with a faint underscore. However, these titles are not active links so users have no way to return to previous sections, until the very end when the form shows an edit option.

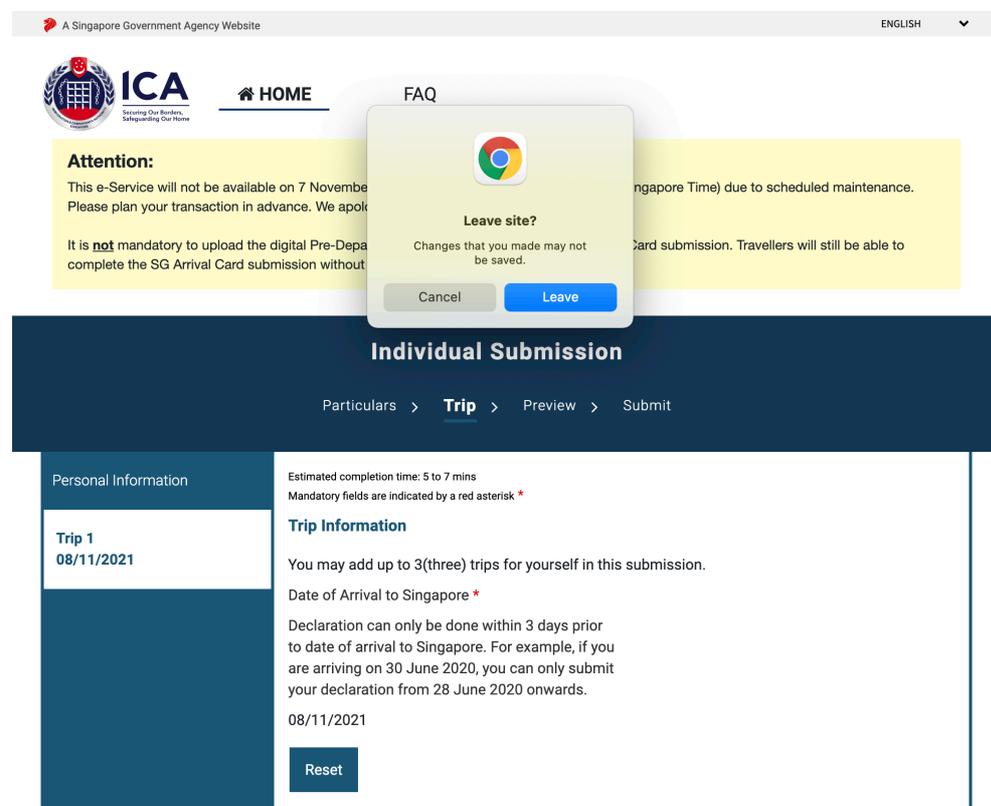


Figure 4.15: SG Arrival Card trip section (desktop). A browser pop-up box appears when the back button is clicked, since the breadcrumb trails indicating progress are not links. Image reproduced with permission from Immigration and Checkpoints Authority (ICA).

This is standard practice on several forms, whereby the “Preview” section shows all entries together along with the ability to edit fields. It is conceivable that first-time users will not know about this editing feature provided at the end of the process, and may rely on the browser’s familiar back button. But clicking on the back button at any stage of the process generates a warning

that the user is about to leave the site. If a user clicks “Cancel” the form remains in the same section and the user has no choice but to continue without knowing if an opportunity to edit their past entries will present itself. If the user clicks “Leave” the form redirects to the ICA’s web page, shown in Figure 5.16 below, and all user data entered thus far is deleted.

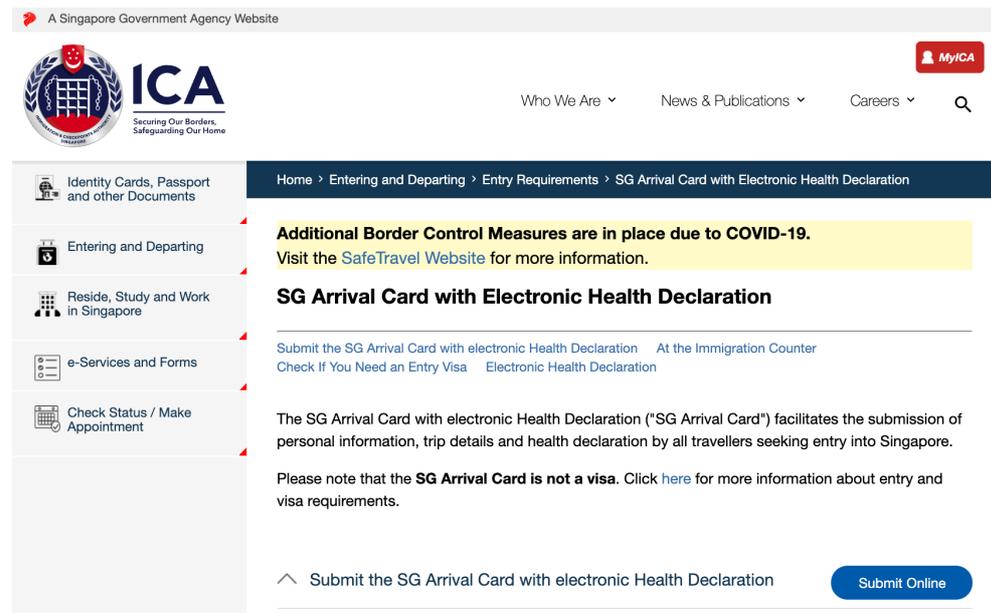


Figure 4.16: SG Arrival Card web page and start of application (desktop). If users click on ‘Leave’ in the pop-up box, the form redirects to the ICA’s web page. All data entry is lost and users are required to restart the process from scratch. There is no facility for users to save and return to their entered data. Image reproduced with permission from Immigration and Checkpoints Authority (ICA).

The inability to save progress can be argued both ways. On one hand, such features save users the need to complete the form in one go, or restart the process if something goes wrong. But for issuers, the feasibility of the feature can be costly and time consuming when balancing usability against quality (Wright, 2004, pp. 49–50). Furthermore, the arrival form suggests 5–7 minutes for a foreigner to complete, and 1–3 minutes for residents. Assuming most users will complete the form in one sitting, it can be argued a ‘save’ feature is an unfair burden on issuers. But the inability to navigate back and forth across the form’s sections is a serious technological concern that impedes users from efficiently completing the form.

While paper forms allow for non-linear data entry by virtue of their material accessibility, digital forms often display sections individually, as is the case of the arrival form. In such cases breadcrumb trails are valuable in orienting users to their progress. But the lack of navigability in the arrival form, once the process has begun, is a major flaw in the user interface. In a 2007 study of browser usage which studied forms behaviour and data logging, Obendorf et al. found that the back button tended to be used less when the success rate of form submissions was high. But when users needed to use the browser's back button on forms, the study found that:

The back button is often unsupported by Web applications. They show unexpected effects if the user returns to the last page, e.g. when the input data from the last form is deleted and has to be retyped. Backtracking to pages created from POST parameters actually leads into a warning message of the browser and often even causes an error message of the Web application. Furthermore, such pages cannot be bookmarked at all; they are volatile and no browser history mechanism allows for returning to them (Obendorf et al., 2007, pp. 602–603).

Once again, a cost argument can be made from an issuer standpoint: the arrival form only takes a few minutes to complete; therefore the chances of users needing to backtrack is relatively small, especially since the form shows an editable summary at the end. Setting up in additional functionality for navigation may therefore be a waste. But Waller's observations of forms go against such lines of reasoning: "Any form that has to be filled in by the entire population (with the full spectrum of literacy levels) will have an error rate of at least 10-15%, rising to much higher figures in the case of longer or more complex forms" (Waller, 2011, p. 28).

Added to this is the punitive nature of a government form that threatens repercussions for inaccurate entries. The lack of navigability is thus not only problematic in terms of error-checking but also raises the issue of missing accessibility features. At present, the arrival form's navigation is purely visual. This is a limitation in digital environments since breadcrumbs are typically coded as links for screen readers to orient visually impaired users. The lack of

active links in the arrival form's breadcrumb trail also means screen readers will not be able to identify the form user's current section's location.

4.2.1.5 Comparison of the SG Arrival Card with similar forms

The case study has so far raised three key areas that are pertinent to fairness: (i) assumptions about literacy over access to digital services such as email and mobile phones; (ii) oversight of clarity concerns relating to inconsistent translation of language options, especially to key sections of the form directly impacting a user's chances of entering Singapore during travel restrictions; and (iii) insufficient technical support provided for navigating the form, which leads to additional problems with accessibility tools. These issues are likely to affect three user groups: (a) users with visual impediments; (b) users with limited digital literacy; (c) users from non-anglophone backgrounds. Table 4.2 shows nearly three-quarters of a million travellers from emerging economies and non-English speaking regions entered Singapore on a visa in December 2019. It is therefore evident that a significant band of users are exposed to the design discrepancies of the form.

The digital arrival form is a critical administrative document that records and regulates immigration flows amidst a global pandemic. Failures of literacy, clarity, and technology at various points across the service highlights fairness gaps since the form does not account for the needs of large swathes of users. Chapter 3 discussed accountability in forms design and cited Rosenfeld et al.'s notion of "creating the right context for users to understand the environment they are in and what they're looking at" (Rosenfeld et al., 2015, p. 25). Given the excessive strains the form places on key areas such as digital literacy, language translations, lack of sufficient explanations, and technical problems, it may be expedient to suggest the SG Arrival Card lacks key elements of fairness for all users.

As previous chapters have shown, fairness in digital forms is facilitated through a combination of complex interrelated functions designed to reduce overall effort for all users (Schwesinger, 2010, p. 42), and with emphasis on the most affected/disadvantaged users (Schwesinger, 2017, pp. 612–613). These

functions cannot be adequately expressed solely by analysing their absence or shortcomings. Positive instances of their application are equally important to justify concerns around literacy, clarity, and technology, especially given the link between a document's contents and its production (Agar, 2003, p. 13). The contents – or lack thereof in government forms – depend as much on the medium in which they function, i.e paper or digital. Accordingly, there are limitations to evaluating the SG Arrival Card against its paper counterpart. This is because the contents of the D/E Card have not just been replicated in some sections of the digital form, but have been redesigned to better align with the ICT objectives of *Smart Nation*. Relevant insights are therefore better gained by comparing important aspects of the SG Arrival Card with proximate services, such as the United Kingdom's online passenger locator and standard visa application forms.

Both UK immigration forms feature comparable literacy, clarity, and technology concerns to Singapore's SG Arrival Card. The UK passenger locator form was specifically chosen owing to similarities in the service's purpose and length, whereas the UK visa application form was included for its appearance and language options. Analysing the similitude between these forms offers opportunities to identify and bridge the gaps when designing for fairness in Singapore's digital arrival form.

Note: the following overview of the UK's two immigration forms is not intended to provide insights into GOV.UK's digital forms policies or culture;⁵⁷ instead, the overview concentrates solely on fairness concerns that overlap with Singapore's SG Arrival Card which remains the focus of this case study. For consistency' sake, the images of both forms from GOV.UK have been reproduced using the same desktop computer used for the SG Arrival Card; thus, only the desktop versions of both forms are included in the following comparative analysis.

⁵⁷ Parts of the UK government's digital policies and culture inevitably come to the fore as a result of the case study's comparative analyses. However, such insights are chiefly intended to highlight fairness concerns with the SG Arrival Card, and link back to Singapore's attitudes and assumptions towards its own digital forms.

4.2.1.6 Overview of the UK's Passenger Locator and Standard Visa forms

The United Kingdom's Passenger Locator Form (UK-PLF) was introduced on 8 June 2020, amidst international COVID-19 travel controls. Similar to the SG Arrival Card and Health Declaration, all inbound travellers – including British residents – are required to complete and submit the UK-PLF online within 48 hours of arriving in the United Kingdom. Among the reasons listed above, I have also included the UK-PLF in this analysis having used the form recently. This inclusion is consistent with my interpretative and autoethnographic research methodologies in this case study. Figures 4.17 below and 4.18 on the following page, respectively, show the registration screen for the UK-PLF asking for a user's email address to setup an account.

The screenshot shows the 'Passenger Locator form' interface on the GOV.UK website. The navigation bar includes '1. Start', '2. Form', '3. Declaration', and '4. Download and print'. The main heading is 'Register an email'. Below this, there are instructions: 'Enter an email address and password so you can save your answers. You will then be emailed a unique link to let you log back in to your form at a later point, if needed.' and 'Throughout your form, you can select the option to 'Return to this form later' in order to re-send the link to your latest saved form.' The form fields include: 'Email address' (input field), 'Repeat your email address' (input field), 'Create a password' (input field) with a note 'Your password must be 8 characters or longer and include a letter and a number or symbol.', and 'Repeat your password' (input field). A green 'Save and continue' button is at the bottom.

Figure 4.17: United Kingdom Passenger Locator Form screen (desktop) requiring users to register their email address. Image reproduced under Crown Copyright Open Government Licence V3.0, available at <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>.

 **GOV.UK** Passenger Locator form ▼ Form menu

1. Start **2. Form** 3. Declaration 4. Download and print

[← Back](#)

Your phone number

Enter a phone number that you can use in the UK. We will use this number if we need to contact you about quarantine rules, or if someone you travelled with develops coronavirus (COVID-19) symptoms.

Use a mobile phone number, if you have one.

Your primary phone number

Only include the numbers for your country code and the rest of your phone number.
For example, 39 133457090

+

Repeat your primary phone number

+

Your secondary phone number (optional)

We will use this number if we cannot contact you on your primary phone number.

+

Repeat your secondary phone number (optional)

+

Figure 4.18: United Kingdom Passenger Locator Form screen (desktop) requiring users to register their phone numbers. Image reproduced under Crown Copyright Open Government Licence V3.0, available at <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>.

The United Kingdom's Standard Visitor Visa Application Form (UK-SVVAF) is issued for 6 months at a time and is given for purposes of tourism, business, and study. Like the UK-PLF, the UK-SVVAF is available on GOV.UK as an online form. However, the UK-SVVAF offers multiple services, including tourism, short-term study, and medical treatment. The visa is granted either as a single entry or for long-term visits over 2, 5, and 10 years. As with the UK-PLF, I have tested the UK-SVVAF from start to finish and included this form in the comparative analysis. Figure 4.19 below shows the UK-SVVAF screen for selecting a country/territory for users when providing their biometrics.

GOV.UK Visas and Immigration

Select a country to provide your biometrics

To complete your application, you must make arrangements to provide your biometrics (fingerprints and facial photograph) with our commercial partner, which may involve attending one of their centres. You will be able to see the options available to you after you have completed your application and continue to our commercial partner's website.

Enter the country in which you are making your application and wish to provide your biometrics

Si

Bonaire, Sint Eustatius and Saba
Sierra Leone
Singapore
Sint Maarten (Dutch part)
Slovenia
Brazil
French Polynesia
Indonesia
Madagascar
Malaysia

[Can I enter any country?](#)

Next

Figure 4.19: United Kingdom Standard Visitor Visa Application Form (desktop) asking users to enter the country from which they will be sending their biometrics. Image reproduced under Crown Copyright Open Government Licence V3.0, available at <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>.

4.2.1.7 Relative notions of fairness between the SG Arrival Card and the UK-PLF

Much like the SG Arrival Card, the UK-PLF requires users to go online to complete the form. Accordingly, there is an assumption that travellers entering the United Kingdom will have internet access. From an issuer's point of view, an online form offers convenience of location – the form is available in one central location on GOV.UK – and links to a national database. However, the form does not differentiate between British residents and visitors; the same questions and steps are shown to everyone. Given the same information is shown to all users, it can be said the UK-PLF meets the conditions for impartiality (Sen, 2009, p. 54) and is therefore fair. This contrasts with the SG Arrival Card, which cuts down the number of steps for Singapore residents.

From an issuer's perspective, the SG Arrival Card benefits citizens in ways that visitors do not receive, making the form implicit fairer by comparison for residents (James, 2012, p. 14). But visitors are not placed at any disadvantage since there is no expectation of recording and pre-populated their details through Singapore's national database. The relationship between the ICA and arriving Singaporeans meets the fairness criteria for a system operating on social cooperation principles (Rawls & Kelly, 2001, p. 6). This is discussed in more detail in Chapter 5. In speeding up the process for locals, Singapore's government is actively reducing the effort needed for residents to complete the form. But since the question of exclusion does not apply to visitors, these benefits do not affect their expectations or experiences. It is therefore fair to state that neither the SG Arrival Card nor the UK-PLF discriminates between locals and visitors, even though their respective processes differ significantly.

This scenario raises an intriguing question around fairness concerns: is it acceptable for government forms to be partial towards certain users? The issue is expounded on in Chapter 6, with a summary provided here. Chapter 3 discussed Jansen and Steehouder's three functions of forms, i.e. legal, data, and public relations. The data function best encapsulates an appropriate response to this discussion:

[Data transaction function:] forms transfer data from one entity to another...between individual citizens and the government. It is in the interest of both parties that this transfer is effective...and efficient (Jansen & Steehouder, 2001, p. 13).

Implicit in this quote is the notion that the quality of an exchange should benefit all parties, i.e. users and issuers. This ties directly with Rawls' "idea of rational advantage [which] specifies what it is that those engaged in cooperation are seeking to advance from the standpoint of their own good" (Rawls & Kelly, 2001, p. 6). A key term in Rawls' idea is 'rational'. If users are seeking to rationally reduce the effort needed to fill a form, and issuers desire to rationally obtain complete and accurate data, then there are grounds for Rawlsian cooperation. In this case the SG Arrival Card is allowed to favour Singapore residents because such cooperation is enhanced by the form's partiality, which crucially does not affect the quality of exchanges between visitors and the ICA. In other words, overseas users are not affected by the selective advantages that local users enjoy. It stands to reason then that there are instances when government forms can be partial to some users without being unfair to others, since overall effort is reduced for specific users without affecting the rest.

In this respect, the design of partial digital forms validates the claim that forms needs to be designed for everyone (Schwesinger, 2017, p. 613). Indeed, the SG Arrival Card's sequencing partiality towards residents does not take away from the experience for visitors. Taken from this perspective, the form's designers are within their rights to enforce the practical constraints of being unable to design for every user (United States Department of Health and Human Services & United States General Services Administration, 2006, p. 29). Furthermore, the expected compromise that needs to be present in the transaction for fairness to occur (Rawls & Kelly, 2001, p. 6) is present yet invisible for visitors. As such, the criteria for impartiality⁵⁸ is met by the form, in this regard, for all users. But other facets of the form's design require further analysis; a comparison of similar forms is useful to reveal key differences.

⁵⁸ Brad Hooker points to impartiality as a criterion for fairness, discussed in Chapter 5.

4.2.1.8 Comparison of genre conventions

When juxtaposed, the SG Arrival Card and the UK-PLF reveal the range of differences in their typographic arrangement, even though several questions are similar. Analysing these differences allows for deeper insights into the appearance and tone of the SG Arrival Card. Figures 4.20 of the SG Arrival Card below, and 4.21 of the UK-PLF on the following page, respectively, show the email and phone sections with error validation for each form.

Email Address *

! Please fill in the field above

Confirm Email Address *

! Please fill in the field above

Country/Region Code *

+

! Please enter a valid country/region code

Mobile Number *

! Please enter a valid mobile number

Confirm Country/Region Code *

+

! Please fill in the field above

Confirm Mobile Number *

! Please fill in the field above

Figure 4.20: SG Arrival Card personal details section with errors (desktop). Image reproduced with permission from Immigration and Checkpoints Authority (ICA).

Your phone number

Review your answers:

- enter a country code
- enter a phone number
- you must enter the same country code in each box
- you must enter the same primary phone number in each box

Enter a phone number that you can use in the UK. We will use this number if we need to contact you about quarantine rules, or if someone you travelled with develops coronavirus (COVID-19) symptoms. For more information, [view our privacy policy](#).

Use a mobile phone number, if you have one so that we can contact you via text message.

Enter a country code

Enter a phone number

Your primary phone number

Only include the numbers for your country code and the rest of your phone number.

For example, 44 7xxxxxxx

+

You must enter the same country code in each box

You must enter the same primary phone number in each box

Repeat your primary phone number

+

Figure 4.21: UK-PLF phone number section with errors (desktop). Image reproduced under Crown Copyright Open Government Licence V3.0, available at <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>.

Each form introduces users to a starting page informing them about the process through explanatory notes. However, neither provides an overview of the process, from start to finish. This ties in with Waddams' observations that electronic documents make it difficult for users to evaluate their overall process (Waddams, 2019, p. 98), since there is little if any indication of length, difficulty, complexity, and assumption of time needed to complete the form.

The forms also group their questions into categories but apply different structural and visual approaches. The SG Arrival Card has four overarching sections: particulars; trip; preview; and submit. Under each are multiple questions that loosely relate to the title of their main section. For example, place of birth, country of residence, email address, and mobile phone number are all grouped under the "Particulars" section. This convention tends to follow paper forms where space and printing constraints were an issue (Her Majesty's Stationery Office, 1962, p. 112). This clustered approach lets user see all the questions in a section at one go. However, there is the possibility of clutter leading to cognitive overload. The UK-PLF, on the other hand, displays fields that follow branching and are question-specific (GOV.UK, 2018); users entering their phone numbers, for example, are only shown those fields. This approach compels users to focus on a single topic at a time, with the disadvantage being the form gets longer as more web pages are needed.

Both systems have their merits; hence it is the management of attention that best defines which typographic structure is more useful, since a primary function of the form is to facilitate accurate responses. In this instance, clutter caused by multiple error messages is problematic. Wogalter writes that "most environments are cluttered, so in order for warnings to be seen they must possess characteristics that facilitate their standing out from the background" (Wogalter, 2004, p. 97). While the red warnings in the SG Arrival Card stand out from the background, there is still insufficient contrast between: (i) the warning message and the field label, which also turns red; and (ii) any warning messages across multiple fields that display simultaneously if any field is improperly filled. The advantage of the UK-PLF's approach is that warnings are constrained by the specificity of the display.

Beyond this, the selective use of red-coloured warnings in the UK-PLF stand in contrast to the form fields and their labels. This visual distinctiveness allows for greater visual clarity in determining where the error is (Jarrett & Gaffney, 2009, p. 168), and what needs to be done to fix it. Additionally, the UK-PLF also displays a summary of warnings at the top, with thicker red bars on the left edge to indicate where attention is required. This makes it easier for users to identify and rectify the issue. From this viewpoint, the UK-PLF offers a better error management system by chunking errors and providing distinctive visual cues. This is achieved by the form's single-page approach to organising content – which increases the form's length but reduces clutter and provides easier rectification of errors.

Analysing form layouts raises interesting parallels with tests that are worth briefly noting here. In many instances of written examinations, the test paper acts as a form: there are fixed and variable sections for candidates to read and understand instructions, and answer the questions accurately and completely in the spaces provided; in many cases these activities are carried out under pressurising conditions with significant consequences.⁵⁹ Much work has been done on tests and fairness: Zieky, for instance, writes about how candidates' skills are measured, stating "it is important that fairness concerns be among the demands attended to by test designers as they decide on the 'best' compromises" (Zieky, 2016, p. 11). The author observes that "test developers concerned with fairness have generally focused on the groups that have been, or are currently, the targets of discrimination" (Zieky, 2016, p. 11). This is followed up with an example whereby test designers had to choose between free-response and selected response layouts for students with weaker English skills. These issues are in many ways analogous to designing and using forms.

Unlike tests, forms do not explicitly measure users' skills, although they do assume certain levels of knowledge and literacy needed to complete the

⁵⁹ If forms generate a sensation of test-taking, then this could explain why most users are averse to filling in forms, especially mandatory government forms that tend to take on the role of tester by assessing users on a variety of topics, from taxes and travel history to qualifying for housing and obtaining citizenship.

process. But the appearance and layout of forms affects how users navigate instructions, answer questions, and respond to error messages (Schwesinger, 2017, 608). In the case of the SG Arrival Card, the warnings tend to overwhelm the screen when a user misses a question or enters an incorrect response. This is mainly to do with the form's paper-like layout with open fields and several questions grouped into a single page, which goes against Sless and GOV.UK's findings for branching and sequencing (Sless, 2018, p. 129). The use of bright red text adds to the intensity of the error messages which are accompanied by circular warning icons. In contrast, the UK-PLF uses more muted hues for its borders and "cheatsheet" box at the top.

The UK-PLF's error messages also come across as more insistent, stating "you must enter the same country code in each box". These warnings, however, are specific to the error. In the SG Arrival Card, most warning texts are phrased "Please fill in the field above," indicating a softer albeit more generic tone. The exceptions are the country code and mobile phone number which begin with "Please", a key facet in the HMSO's advice for polite wording (Her Majesty's Stationery Office, 1962, p. 21). The same red hue in warnings is also used on the asterisks next to each question, indicating a reply is mandatory. From an issuer's viewpoint, the red coloured asterisks likely draw added attention to the compulsoriness of the question since red is where users look the longest (Jarrett & Gaffney, 2009, p. 125). This treatment exposes users to a warning colour in every question of the form, thus limiting the form's ability to mitigate user anxiety stemming from insufficient visual clarity.

4.2.1.9 Comparison of language options

While the UK-PLF does not discriminate against locals and visitors in terms of questions asked, there is the issue of language. Unlike the SG Arrival Card, the UK-PLF is only available in English. This is a major failure in terms of clarity concerns, since users are expected to use just one language as their medium of communication with the Border Force. The SG Arrival Card, on the other hand, offers six different languages, although important sections of the form remain in English. When analysed on its own, it is easier to conclude the form suffers

from implicit bias. But comparing the SG Arrival Card to the UK-PLF adds a different dimension to the issue; namely, the extent of the problem. In other words, both forms fail in absolute fairness terms, but one does so relatively more than the other, in this case the UK-PLF. However, if the SG Arrival Card is evaluated alongside the UK-SVVAF, the latter emerges as a fairer form.

Figures 4.22 and 4.23 below show that when a language option is selected from the dropdown menu at the top right, the text of the dropdown changes to that language too. This creates problems for users who do not understand the default language in which the form is displayed, in this case English. Figure 4.23 illustrates this challenge by reversing roles: if the default language of the form were Tamil, it would be difficult for non-Tamil speakers to locate the translation option, and in some cases may not realise such features exist in the form. This, however, is not the case in the app, which uses icons to signify navigation. It is therefore worth including a brief discussion of how the app presents language options to users, before revisiting the UK-SVVAF.

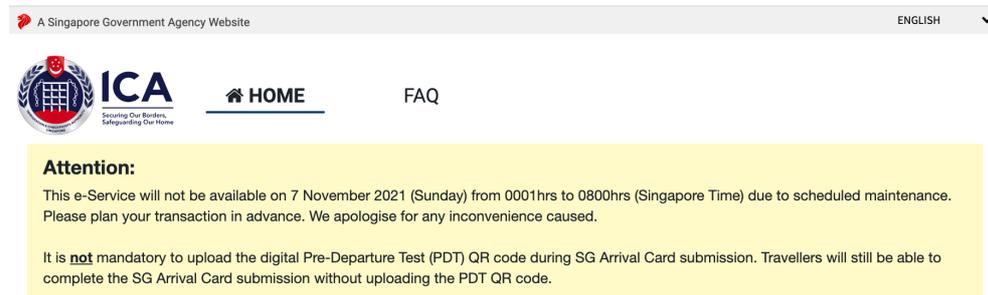


Figure 4.22: SG Arrival Card rendered in English (desktop). Options for the other languages are hidden behind the 'ENGLISH' button. Image reproduced with permission from Immigration and Checkpoints Authority (ICA).

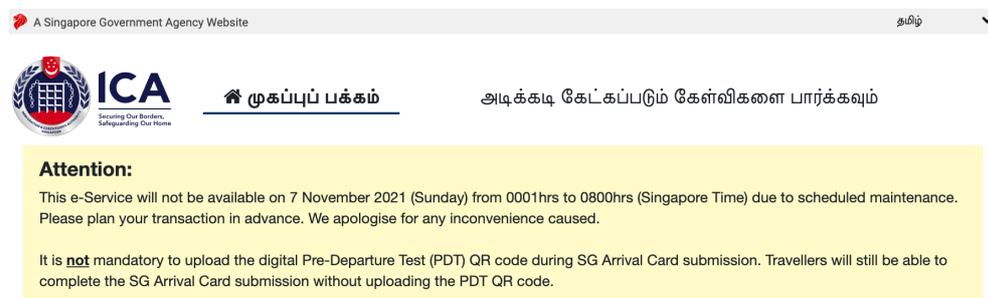


Figure 4.23: SG Arrival Card rendered in Tamil (desktop). Image reproduced with permission from Immigration and Checkpoints Authority (ICA).

Unlike the web version which uses a dropdown menu, the SG Arrival Card app uses icons in the navigation bar at the bottom, shown in Figure 4.24 below. These icons serve as visual markers for the form's navigation. They also help in overcoming language problems since “users recognize these icons and associate them with something they already know, rather than learn new, abstract concepts” (Gurak, 2003, p. 492). The layout of translation options in the web version of the SG Arrival Card places additional cognitive loading on users from non-English speaking backgrounds and those with lower digital literacy. The use of symbols in the app's navigation bar is therefore not only a contextual marker but also a criterion for fairness which reduces the amount of effort needed to complete the process.



Figure 4.24: SG Arrival Card rendered in Hindi (app). Images reproduced with permission from Immigration and Checkpoints Authority (ICA).

This is not to say the SG Arrival Card app is without issue.⁶⁰ Figure 4.24 above, for instance, shows the app contains similar translation issues to the web-based version of the form, wherein certain sections are not translated, leading to what Waller calls an administrative gobbledegook of impenetrable features (Waller, 1984, p. 36). But the emphasis on visual navigation is a clear improvement over the web version. Extending these features to the web version not only makes the translation options easier to identify for users, but also unifies the form's design language across its various platforms. This ties in with Corrales et al.'s view to make legal documents clearer through visual aids that maximise comprehension, readability, and clarity (Corrales et al., 2019, p. 7). And while the decision to use icons likely stems from spatial constraints, the typographic treatment of the app's navigation section demonstrates the SG Arrival Card can be designed to facilitate greater levels of fairness for local residents and visitors to Singapore by leveraging graphical structures for users that reinforce meaningful exchanges (Jarrett & Gaffney, 2009, p. 6).⁶¹

Like Singapore's immigration policies, only visitors from certain countries require a visa to travel to the United Kingdom. Compared with the SG Arrival Card, the UK-SVAF provides more language options through a list of radio buttons. However, each option is accompanied with a prompt set in the same language, shown in Figure 4.25 on the following page. This enables users of any of the languages on the list to natively understand their options in their chosen tongue. The UK-SVAF dedicates an entire introductory page to languages, which indicates the greater importance the form places on language literacy, as well as clarity of layout and comprehension. The typographic arrangement of language options in both forms not only communicates but also reveals the evidential character of their respective issuers' attitudes towards facilitating fairer user experiences (Buckland, 1997, p. 807).

⁶⁰ Additional images of the SG Arrival Card app are included in Appendix A.

⁶¹ Use of different typographic elements between the web form and the app is most likely due to the lack of a unified design language across Singapore's government ministries and agencies. This topic was discussed in Chapter 2.

Select your language

You can read the questions in a different language, but your answers must be in English.

All words used in any translation are there to help. The English version of the questions will be used to assess your application.

आप एक अलग भाषा में सवाल पढ़ सकते हैं, लेकिन अपने जवाब अंग्रेजी में होने चाहिए।

किसी भी अनुवाद में इस्तेमाल सभी शब्द वहाँ मदद के लिए हैं। सवालों का अंग्रेजी संस्करण आपके आवेदन का आकलन करने के लिए इस्तेमाल किया जाएगा।

Please select your language:

- English - please select your language
- 简体中文 - 请选择您的语言
- हिन्दी - कृपया अपनी भाषा चुनें
- Русский - пожалуйста, выберите ваш язык
- Türkçe - lütfen dilinizi seçin
- ไทย - โปรดเลือกภาษาของคุณ
- العربية - الرجاء تحديد اللغة

Figure 4.25: United Kingdom Standard Visitor Visa Form (desktop) asking users to select a language in which the form's questions will be displayed. Image reproduced under Crown Copyright Open Government Licence V3.0, available at <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>.

In providing a clear list of options, the UK-SVVAF creates conducive conditions for social cooperation. Chapter 5 discusses Wenger et al.'s writings about communities of practice, that “knit the whole system around core knowledge requirements” (Wenger et al., 2002, p. 6). Within the scope of government forms, language is a key knowledge requirement leading to user well-being and empowerment, discussed in Chapter 3. But in the context of reasonableness and fairness, “well-being”, according to McMahon, is “want-satisfaction or goal attainment...understood in a way that abstracts from the content of the wants or goals” (McMahon, 2016, p. 9). For forms users, the goal is to complete the process and not get mired in the same literacy, clarity, and technology concerns intended to support users along that process. Structuring language options in this format helps UK-SVVAF users focus on

goal attainment, rather than entangling them in the form's typographic scaffolding. Thus, while the SG Arrival Card also offers language options via a dropdown menu, the typographic arrangement of the menu detracts from the helpfulness of the feature. In other words, the SG Arrival Card may be fair on features, but falls short of the fairness model's benchmark. The calculation and realisation of this benchmark is the subject of Chapter 6. It is useful to refer back to Waller's 2012 paper on graphic literacy, whereby the author comments on the need for documents, including forms, to employ effective reading and writing strategies (Waller, 2012, pp. 8–10). Since the SG Arrival Card falls within the forms genre, users are able to take advantage of the genre's visual familiarity, thereby leading to a more meaningful engagement with the exchange (Mackenzie-Taylor, 1999, pp. 177–178). This also ties in with Rogers' work on the effective of typographical elements to deliver better meaning-making experiences (Rogers, 1999, p. 169). In this case, however, the SG Arrival Card fails to implement these works, thereby resulting in a relatively poorer form-filling experience for non-English speaking users.

It should also be mentioned that the UK-SVVAF states at the beginning that responses must be provided, and will be processed, in English. The same statement is repeated below in Hindi. The automatic inclusion of Hindi – shown to all users at the beginning of the form till another language option is picked – indicates Hindi-speaking applicants comprise a significant number of users for this visa. This makes sense since more than 503,000 nationals from India received visitor visas to enter the United Kingdom in the year ending June 2019 (British High Commission New Delhi, 2019). This number pertains only to residents who were granted a visa – not the total number of applicants – and does not include nationals from other Hindi-speaking countries and regions who were also granted a visa. As with the SG Arrival Card, the UK government may exercise its prerogative to process applications in English. But in this regard, the UK-SVVAF goes a step further by applying translations uniformly across all form elements. Figures 4.26 of the SG Arrival Card and 4.27 of the UK-SVVAF, on the following pages, respectively, show how users opting for a Hindi translation select a country from each form's dropdown list.

व्यक्तिगत सबमिशन

[विवरण](#) >
 [यात्रा](#) >
 [पूर्वावलोकन](#) >
 [प्रस्तुत करें](#)

व्यक्तिगत जानकारी	<p style="font-size: 0.8em; margin: 0;">अनुमानित पूरा करने का समय: 5 से 7 मिनट</p> <p style="font-size: 0.8em; margin: 0;">अनिवार्य क्षेत्रों को लाल तारांकन द्वारा इंगित किया गया है *</p> <h3 style="margin: 0;">व्यक्तिगत जानकारी</h3> <p style="margin: 0;">पूरा नाम (पासपोर्ट में) *</p> <hr/> <p style="margin: 0;">लिंग * जन्म की तिथि *</p> <p style="margin: 0;">कृपया विकल्प चुनें dd/mm/yyyy</p> <hr/> <p style="margin: 0;">निवास की जगह *</p> <p style="margin: 0;">कृपया विकल्प चुनें</p> <hr/> <p style="margin: 0;">देश/जन्म स्थान * राष्ट्रीयता/नागरिकता *</p> <p style="margin: 0;">कृपया विकल्प चुनें कृपया विकल्प चुनें</p> <hr/> <p style="margin: 0;">पासपोर्ट संख्या *</p> <div style="border: 1px solid #ccc; padding: 5px; font-size: 0.8em;"> <p>NETHERLANDS</p> <p>NEW ZEALANDER</p> <p>NI-VANUATU</p> <p>NICARAGUAN</p> <p>NIGER</p> <p>NIGERIAN</p> </div> <hr/> <p style="margin: 0;">ईमेल पता *</p> <hr/> <p style="margin: 0;">ईमेल पते की पुष्टि करें *</p> <hr/> <p style="margin: 0;">देश/क्षेत्र कोड * मोबाइल नंबर *</p> <p style="margin: 0;">+ </p>
<p style="margin: 0;">यात्रा 1</p> <p style="margin: 0;">जानकारी</p>	

Figure 4.26: SG Arrival Card (desktop) rendered in Hindi, with dropdown items of countries displayed. Image reproduced with permission from Immigration and Checkpoints Authority (ICA).

In the SG Arrival Card, options in the country dropdown are shown in English, regardless of which language the form is translated into. Moreover, this default to English is only specific to some fields. The field to select the user’s sex, for example, shows the two options – male and female – in the selected language. Such discrepancies indicate that behind-the-scenes coding is not consistent with what users experience on the frontend. Mahajan et al. refer to the term “Visual Inconsistency (VI) – a discrepancy between an area of a page and its intended (visually consistent) appearance” (Mahajan et al., 2016, p. 361). The authors posit that fixing such inconsistencies is contingent on the expertise of the developer given the tediousness of spotting and rectifying these problems. This highlights the unique challenges of fairness,

over related concerns such as inclusivity and accessibility, since fairness takes into equal consideration the exigencies of issuers in its design calculus.

 GOV.UK
Visas and Immigration

Select a country to provide your biometrics

अपने स्थान का चयन करें

To complete your application, you must make arrangements to provide your biometrics (fingerprints and facial photograph) with our commercial partner, which may involve attending one of their centres. You will be able to see the options available to you after you have completed your application and continue to our commercial partner's website.

Enter the country in which you are making your application and wish to provide your biometrics

कृपया दर्ज करें आप किस देश में वीजा का आवेदन कर रहे हैं।

Si

Bonaire, Sint Eustatius and Saba Bonaire , Sint Eustatius और सबा
Sierra Leone सियरा लिओन
Singapore सिंगापुर
Sint Maarten (Dutch part) सेंट मार्टेन (डच हिस्सा)
Slovenia स्लोवेनिया
Brazil ब्राज़िल
French Polynesia फ्रेंच पॉलीनेशिया
Indonesia इंडोनेशिया
Madagascar मेडागास्कर
Malaysia मलेशिया

Figure 4.27: UK-SVAF (desktop) rendered in Hindi, with dropdown items of countries displayed. Image reproduced under Crown Copyright Open Government Licence V3.0, available at <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>.

Whereas the UK-SVVAF solves this translation problem, the level of language does not extend to the UK-PLF, which is only available in English. The issue is exacerbated by the fact that the UK-PLF is used far more often, i.e. by almost every individual entering the UK. The SG Arrival Card, on the other hand, offers six languages. However, the absence of clarity in instructions ties in with ideas of usability and trustworthiness. Referring to Neutelings and Maat's work on trust in public documents, the authors called for cooperation between users and issuers (Neutelings & Maat, 2001, p. 234). But cooperation is difficult if clarity is absent and the form's "structure is poorly articulated graphically [and] does not make its function clear" (Waller, 2017, p. 200). This raises questions of how best to assess the extent of fairness in the design of government forms, discussed in Chapter 6. What remains clear is that gaps in fairness are better seen in the light of comparative analyses between forms with same/similar functions but varying designs. While the question of which governments ultimately issue fairer documents makes for an intriguing study, the scope of such a query is beyond the limits of the thesis. However, these questions will be considered in future research projects.⁶²

4.2.1.10 Comparison of digital literacy: email and phone number fields

The SG Arrival Card and the UK-PLF have fields for emails and phone numbers. Both forms require users to enter an email address and phone number. The assumptions around emails and phones are largely uniform across both governments about users having basic digital literacy. However, in the case of the SG Arrival Card an email address is part of the form's larger repertoire of personal details whereas with the UK-PLF an email is required to register for the arrival process. The email is used to send these details to the user, with a save and return link to the form at a later point. Figures 4.28 of the SG Arrival Card and 4.29 of the UK-PLF, on the following pages, illustrate this point.

⁶² Chapter 7 outlines the merits of a quantitative fairness model to measure the fairness zone for digital government forms. Such a quantitative model would employ artificial intelligence systems to determine a baseline for fairness across several Singapore government forms.

Place of Residence *
Please Select Option ▾

Country/Place of Birth * **Nationality/Citizenship ***
Please Select Option ▾ Please Select Option ▾

Email Address *

Confirm Email Address *

Country/Region Code * **Mobile Number ***
+ _____

Confirm Country/Region Code * **Confirm Mobile Number ***
+ _____

[Continue](#)

Figure 4.28: SG Arrival Card personal details section, including fields for email addresses (desktop). Image reproduced with permission from Immigration and Checkpoints Authority (ICA).

GOV.UK Passenger Locator form

1. Start 2. Form 3. Declaration 4. Download and print

Register an email

Enter an email address and password so you can save your answers. You will then be emailed a unique link to let you log back in to your form at a later point, if needed.

Throughout your form, you can select the option to 'Return to this form later' in order to re-send the link to your latest saved form.

Email address

An email will be sent to:
a.s.khara@pgr.reading.ac.uk

Repeat your email address

Create a password

Your password must be 8 characters or longer and include a letter and a number or symbol.

Repeat your password

Figure 4.29: UK-PLF email address page (desktop). Image reproduced under Crown Copyright Open Government Licence V3.0, available at <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>.

When a user begins typing their email address into the UK-PLF, the entry is simultaneously duplicated below, with an advisory stating an email will be sent to that address. This feature impacts users positively in two ways: (i) it reinforces the validity of the entry by showing the user what they are typing, as they are typing; (ii) it reassures users that an action will be taken based on this entry. This links with the urgency of action that forms impel users to take, rather than having them store and recall the contents later on (Holland & Redish, 1981, p. 205). This helps reduce what Orna described as the anxiety, stress, and distress users feel when approaching forms (Orna, 1984, p. 29).

The SG Arrival Card does not implement such features, relying instead on the user to re-enter their email in the 'Confirm Email Address' field. The form has an error-checking function that informs the users if the entries do not match. This same functionality, however, is also present in the UK-PLF. This

leads to a review of whether the UK-PLF is increasing the amount of effort for users through excessive redundancies. From an issuer's point of view, the email address is a vital part of the process, without which the UK-PLF will not work. Hence, repetition of the email address is necessary. From a user's perspective, though, their email is displayed in three different parts of the form, whereas in the SG Arrival Card users need only check their details twice. This raises the issue of balancing issuer needs against reducing user efforts, which include matters of time and efficiency.

Citing a 1984 study of bank forms designs that were tested on users, Leong pointed out that customers exposed to redesigns "would accept the change if it meant faster processing of their investment transactions" (Leong, 1984, p. 161). From a purely efficiency-motivated perspective, user need to enter their email for both forms twice; but in the case of the UK-PLF, users need to check their email one more time than what is required by the SG Arrival Card, which leads to the SG Arrival Card being less burdensome, and therefore fairer to users looking to improve their processing times. But as illustrated in Chapter 6, fairness, in information design, is not a point but a zone within which forms are assessed; efficiency is therefore not only a matter of who finishes first, but how many are able to finish the process and achieve their desired outcome.

Leong's study is reflective of the works of Sless on insurance and tax forms, whereby the author found that organisations tended to account for their time costs, but not the user's (Sless, 1999, p. 148). As such, the issue of efficiency for users is salient when balanced against issuer exigencies that include accuracy and error avoidance. At this stage the example shows that functions like efficiency, that reduce user effort, can be used to assess fairness in forms at a microlevel. In the case of contact numbers, the UK-PLF allows users to enter a landline number and asks users to enter a mobile number only if they have one. This is different to the SG Arrival Card, which requires every user to enter a mobile number. Figures 4.30 of the SG Arrival Card, and 4.31 of the UK-PLF, on the following pages, show the mobile phone sections of both countries' forms.

Place of Residence *
Please Select Option ▾

Country/Place of Birth * Nationality/Citizenship *
Please Select Option ▾ Please Select Option ▾

Email Address *

Confirm Email Address *

Country/Region Code * Mobile Number *
+ _____

Confirm Country/Region Code * Confirm Mobile Number *
+ _____

[Continue](#)

Figure 4.30: SG Arrival Card personal details section including mobile phone number fields (desktop). Image reproduced with permission from Immigration and Checkpoints Authority (ICA).

1. Start **2. Form** 3. Declaration 4. Download and print

[Back](#)

Your phone number

Enter a phone number that you can use in the UK. We will use this number if we need to contact you about quarantine rules, or if someone you travelled with develops coronavirus (COVID-19) symptoms.

Use a mobile phone number, if you have one.

Your primary phone number

Only include the numbers for your country code and the rest of your phone number.
For example, 39 133457090

+

Repeat your primary phone number

+

Your secondary phone number (optional)

We will use this number if we cannot contact you on your primary phone number.

+

Repeat your secondary phone number (optional)

+

Figure 4.31: UK-PLF phone number page (desktop) with the highlighted asking users for a mobile phone number if they have one. Image reproduced under Crown Copyright Open Government Licence V3.0, available at <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>.

Like the SG Arrival Card, the UK-PLF does not display a list of country codes when the field is clicked. However, the explanations offer additional context for what is meant by country code. In this aspect, the UK-PLF is not only clearer but also more forgiving of users with limited access to mobile phones. The form also asks users to provide a second optional number. This makes for an interesting contrast since none of the displayed fields in the SG Arrival Card are optional; every field is mandatory as marked by a red asterisk, including email addresses and phone numbers. On the other hand, the UK-PLF marks optional fields with an (optional) prompt in the label; red warning markers in the UK-PLF only appear when there is an error. However, the UK-PLF also display more explanations, in light grey, about how the Border Force will use these details. This may be acceptable from a legal point; but such

explanations contribute to additional cognitive loading: UK-PLF users with lower literacy run the risk of being overwhelmed by too many prompts, whereas the SG Arrival Card suffers from a lack of sufficient and imprecise explanations for users from similar backgrounds which inevitably leads to confusion, reduced trust in the process, and an erosion of well-being (Felker et al., 1981, pp. 19–20). Felker et al.'s observations on how forms affect well-being were published in the context of paper forms. However, their relevance applies to digital forms, and evidence the challenges that paper forms transport over to digital environments. Likewise, how such explanations are structured in forms impact (i) how users approach a given form-filling process (Twyman, 2017) and (ii) a government's ability to empower and enable their citizenry through effective digital technology (Michael O. Leavitt, as cited in United States Department of Health and Human Services & United States General Services Administration, 2006, p. ii). The notions of document structure and digital technology invites discussions of comprehension and access to online translation services through the design of navigation and data management elements in both countries' digital forms.

4.2.1.11 Comparison of navigation and data management

As discussed earlier, the SG Arrival Card has a clearly marked breadcrumb trail that helps in identifying which stage of the process the user is at. However, none of these section headers are clickable, thereby making it difficult for users to navigate back and forth across the form. These problems of control are made worse in situations where users do not notice or are unable to use the navigation controls (Jarrett & Gaffney, 2009, p. 111). Lack of navigability across sections thus confines users to a linear process that is only resolved at the end, when an option to edit the form appears. Using the back button on the browser generates a pop-up that informs users they are about to leave the form environment and changes may be lost, as shown in Figure 4.32 on the following page.

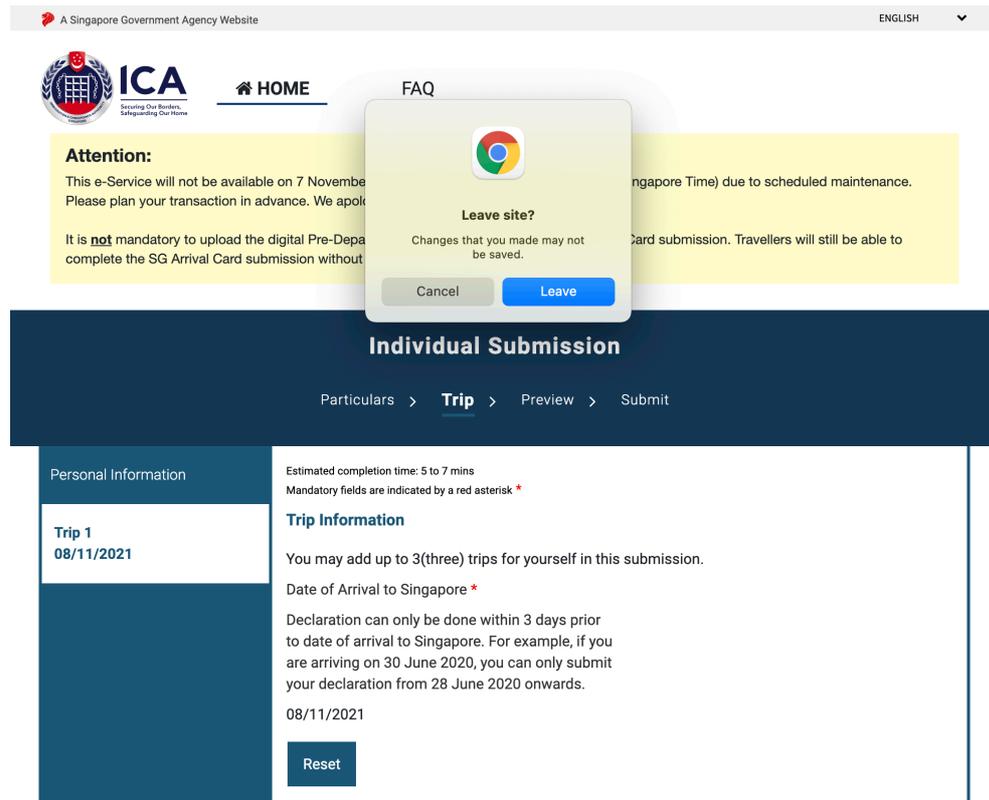


Figure 4.32: SG Arrival Card (desktop) showing the breadcrumb trail and a browser pop-up message when the back button is pressed. Image reproduced with permission from Immigration and Checkpoints Authority (ICA).

The UK-PLF, on the other hand, does not raise any of the issues that users encounter in the SG Arrival Card. Users are shown a numbered breadcrumb trail, running at the top of the form, with clickable titles. The form has a separate “Back” button with an arrow which is sufficiently distinct from the rest of the form so that users can spot the difference in its appearance and function (United States Department of Health and Human Services & United States General Services Administration, 2006, p. 60). The distinct use of the “Back” button reassures users of navigating back and forth along the process without resorting to browser controls located outside the form window.

In both forms, the back button on the browser has been left intact. This ties in with Jarrett and Gaffney’s recommendations to avoid removing browser controls in the event users need to “change task partway through: to get help, to check the privacy policy, to visit another website temporarily because someone interrupted them, and many other reasons” (Jarrett & Gaffney, 2009,

p. 152). Using the back button on the browser also worked; users who default to using the browser buttons are therefore able to navigate the form in the same way as those who opt to click on the breadcrumb links and back button. The form also has a menu option allowing users to return at a later time, or sign out completely. Figure 4.33 below shows the UK-PLF form menu options while Figure 4.34, on the following page, shows the result of clicking the option to “Return to this form later.”

The screenshot shows the 'Passenger Locator form' on the GOV.UK website. The breadcrumb trail indicates the user is on step 2, 'Form', with previous steps being 'Start', 'Declaration', and 'Download and print'. A 'Back' button is visible. The main heading is 'Your phone number'. Below this, there is explanatory text: 'Enter a phone number that you can use in the UK. We will use this number if we need to contact you about quarantine rules, or if someone you travelled with develops coronavirus (COVID-19) symptoms.' and 'Use a mobile phone number, if you have one.' The form asks for a primary phone number and a secondary phone number (optional), each with a country code dropdown and a main number input field. At the bottom, there is a green 'Save and continue' button and a blue link 'Return to this form later'. A dropdown menu titled 'Form menu' is open, showing 'Public Health Passenger Locator Form', 'Return to this form later', and 'Sign out'.

Figure 4.33: UK-PLF phone number page with an option to save the form and sign out of the process (desktop). Image reproduced under Crown Copyright Open Government Licence V3.0, available at <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>.

GOV.UK Passenger Locator form Form menu

Form saved

Use the link below to return to your form.

<https://provide-journey-contact-details.homeoffice.gov.uk/resume/e229f9ff-d4f6-464e-99ff-dfff60eb71ce>

Email this link Return to your form

to a.s.khara@pgr.reading.ac.uk
 You must return to your form within 7 days, or it will be deleted to protect your privacy.

Before you travel to or through the UK, you must submit this form. You may face penalties at the border if you do not have a completed form.

[Download your part-completed form \(PDF\)](#)

Sign out

[Cookies](#) [Terms and Conditions](#) [Privacy Policy](#) [Accessibility Statement](#)

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Figure 4.34: UK-PLF screen showing the form’s status as saved when a user clicks on ‘Save and Continue’ (desktop). Image reproduced under Crown Copyright Open Government Licence V3.0, available at <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>.

Once saved, the UK-PLF generates a link with further options for the user to return to the form at a later date. From an issuer’s viewpoint, such features are costlier since additional database storage and administration is required, as well as security enhancements to protect stored user data. But from the perspective of reducing user effort, the “Save and return later” feature provides added convenience for applicants who do not complete the entire process in a single pass, bypassing Obendorf et al.’s backtracking problem and related instances of errors (Obendorf et al., 2007, pp. 602–603). This feature is not available in the SG Arrival Card’s web version. However, it is possible for users to save part of their details in the app. This is not made immediately clear and was revealed only after repeated tests.

In terms of fairness in design, the model requires that such opportunities be balanced against issuer exigencies since it is untenable to design forms that cater to every user (United States Department of Health and Human Services & United States General Services Administration, 2006, p. 29). Indeed, forms users ought to benefit from as many design opportunities as possible, but only if providing such opportunities does not exceed what the issuer is rationally and reasonably able to include in the form. Consequently, the model factors in user-issuer expectations into its fairness calculus. This case study has shown both governments are able to provide relatively greater design opportunities to forms users, owing to the levels of resources available to each country.

This may not be the case for governments of emerging economies, but the fairness calculus remains constant: issuers ought to afford as many design opportunities as they are able to, within rational limits that are agreed upon by all parties. In this instance, the SG Arrival Card is able to provide contextually meaningful navigation and save features, but does so only in the app. Further research is needed to understand the ICA's reasons for this variance, which is beyond the scope of this thesis. Nonetheless, from a fairness perspective, the UK-PLF delivers a comparatively fairer experience in terms of navigation and data management.

4.2.1.12 Summary points of the SG Arrival Card case study

The focus of this case study was on highlighting specific design issues with Singapore's digital form that affected fairness concerns. The case study analysed the SG Arrival Card as a representative instance, across literacy, clarity, and technology concerns in two parts. The first part examined the form as a standalone document and discussed some of its merits and discrepancies. Given that Singapore residents only fill in a portion of the SG Arrival Card, the focus of the case study was on how the form was displayed to visitors. Attention was paid to local users as well when discrepancies in the form affected this group: as a result, the study found several issues with the form that had an impact on overall user experience. Nonetheless, the study also revealed that some design decisions did not necessarily constitute as

unfairness, even though they impacted certain features such as form length and the reduction of errors owing to pre-populated fields. This made it more difficult to determine whether the form was fair, and so led to a comparison between the SG Arrival Card and proximate immigration forms issued by the Government of the United Kingdom. An overview of two forms was provided and comparisons were drawn between these and the SG Arrival Card. This formed the second part of the case study. The overview focused on decisions of specific typographic functions to analyse how fairness may be better achieved in the SG Arrival Card. Comparisons between the SG Arrival Card and the UK's passenger locator and visa forms have: (i) highlighted the merits and discrepancies in the design of the SG Arrival Card; and (ii) demonstrated that fairness within the context of design is better understood by making relative determinations of design decisions, rather than through absolute claims.

To this effect, the resemblance of the SG Arrival Card to a paper analogue suggested that Singapore's digital immigration forms tended to be functional in their appearance and consequently in the quality of interactions. While user and issuer preferences may vary between form layouts, these dispositions are secondary to a form's ability to elicit requisite cooperative behaviours (Rawls & Kelly, 2001, p. 6) rather than reactionary responses.

In the SG Arrival Card, the web form grapples with navigability, language options, error checking, and reading strategies (Waller, 2012, pp. 8–10). These oversights likely stemmed from unconscious and thus automatic assumptions (Johnson, 2020, pp. 20–21) about digital literacy, coupled with the disparate nature of government design systems across the various ministries and public agencies. These design flaws observed in the SG Arrival Card are not uniformly present in other digital forms of equal import; a second, shorter case study is needed. Section 4.3 analyses the Singapore government's public health tracing app, *TraceTogether*. The study analyses the role of fairness in digital forms design during a crisis in which the government required social cooperation on a hitherto unseen scale. The case study also draws comparisons between the SG Arrival Card and *TraceTogether* to determine how forms design attitudes vary internally across agencies that are part of the same government.

4.3 Case study: health and contact tracing forms

The global pandemic forced a reappraisal of political, economic, and social systems within Singapore. Responses to the crisis not only led to the rapid creation of government documents, but also affected how these documents facilitated government-citizen exchanges. Various stages of lockdowns in the country caused many exchanges to move online on a semi-permanent basis. This shifted the focus of communication and cooperation largely to digital platforms that placed e-government – and its constituent agencies such as GovTech and the Data Protection Office – at the frontlines of Singapore’s response to COVID-19. Key factors in the government’s response were summed up by the country’s Prime Minister: “We have to test, we have to trace, we have to vaccinate and we have to do all three of these more quickly, and more extensively” (Lee, 2021).

This case study analyses the centrality of fairness to forms design in situations where the greatest possible levels of cooperation are needed by the government from its citizens and visitors. This is especially relevant to crisis situations where the government does not require users participate in a form-filling process, but users opt do so despite their reservations. There are myriad reasons, other than design, why users might choose to participate in such situations. This case study concentrates on the role of design in encouraging user cooperation for Singapore’s COVID-19 tracing app, *TraceTogether*.

Analysis of the app’s forms are conducted against three functions listed in Table 4.1: digital literacy; language and tone; and error-checking. Functions relating to explanations and accessibility are also included within these three main discussions. Attention is paid to how these functions affect explicit and implicit user experiences within the context of fairness. Brief comparisons are also drawn between the *TraceTogether* app and the SG Arrival Card. The case study concludes by summarising and collating its findings with those from the SG Arrival Card analysis. The app was chosen for three main reasons:

- (i) At its core are forms that are used by a significant proportion of Singapore residents, and visitors who are required to download the app onto their smartphones.⁶³ These forms contain similar elements to the SG Arrival Card and therefore provides a suitable analogue for comparison.
- (ii) Downloading the app is not mandatory for residents. This means buy-in from locals is motivated by a number of factors, including health concerns and access to information. However, the issuers emphasised inclusivity in the app's design to promote uptake equally across Singapore's diverse communities, and thus increase the effectiveness of tracing. Hence, the successful uptake of the *TraceTogether* app depends strongly on cooperation from willing participants.
- (iii) This cooperation is driven *inter alia* through design features which reveal the state's attitudes towards digital documents in a time of crisis, thereby highlighting the role of fairness in creating digital government forms that work for everyone.

Apart from the reasons listed above, the *TraceTogether* case study also analyses the impact of fairness on implicit users. The design of the SG Arrival Card with Health Declaration form focuses mainly on explicit users since the form's issuer, i.e. the ICA, is in most instances also the implicit user. This is not the case for the *TraceTogether* app whereby implicit users are external to the issuers and without whom contact tracing would falter. The government therefore paid active attention to the needs of these implicit users. This case study examines these opportunities which address both types of users within the context of fairness.

Chapter 5 discusses Suranovic's notion of fairness whereby the author stated that "fairness is a normative principle...[and] Actions and outcomes ought to be fair, ought to be just, and they ought to be ethical" (Suranovic,

⁶³ "One month after its launch, *TraceTogether* was installed by 20 per cent of the population of Singapore with a total of 1.1 million users. No further results are published due to the app's data privacy rules. However, the app has attracted interest globally: More than 50 governments have expressed interest in adopting or adapting the app for their country" (Global Migration Data Portal, 2021).

2002). While this list is relevant for fairness in all documents, it is particularly applicable to *TraceTogether* given how data concerns are communicated through the app's typographic treatment. The following comments by the deputy commissioner of the Personal Data Protection Commission Singapore capture the themes of this case study.

The story behind *TraceTogether* is a story of partnerships: partnerships between public sector agencies, the data protection regulators and the community of data protection officers. It is also about how we can involve citizens in our battle against COVID-19 (Yeong, 2020).

4.3.1 *TraceTogether*

TraceTogether collectively refers to a mobile application and a physical token that was launched nation-wide, following the COVID-19 pandemic. The app allows local residents and foreigners to access public buildings and other venues in Singapore by scanning a QR code. The app is also used to track and trace possible exposure incidents and notify those affected to seek additional support from the health authorities. Launched in March 2020, *TraceTogether* is currently at the fore of Singapore's public efforts to chart and contain the spread of the virus.

At the core of the *TraceTogether* app is a forms-driven process: users fill and save their details at registration, then use their smartphone's camera to scan government-issued QR codes located at venue entrances. The system accordingly pre-populates and validates the form fields. In mid 2021, functionality for the *TraceTogether* app was expanded to record the user's vaccination status if that user had been inoculated in Singapore.

As discussed in Chapter 3, the construction of a document can never be fully independent of the issuing organisation's attitudes – whether intentional or unrealised – towards their stakeholders. In the case of *TraceTogether*, the app is intended to be a registration portal for users entering and exiting public venues. But instead of entering their details each time into a ledger or record book – as is still the case for those without *TraceTogether* – the process is

made more efficient by scanning QR Codes which automatically registers the user's details stored in the app. That data entry is sped up via pre-populated fields – and submission is done through scanning instead of clicking – does not relegate the process to another document genre. To do so would be to elevate a document's presentation above its core properties and sidelining its functional purpose. Accordingly, this case study treats *TraceTogether* as a digital form. The *TraceTogether* app⁶⁴ registration screens are shown in Figure 4.35 below.

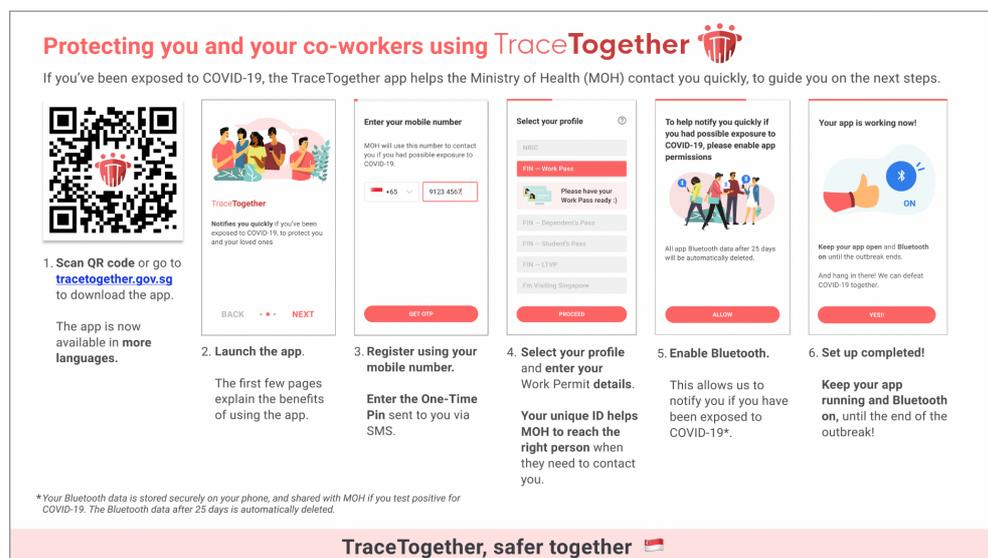


Figure 4.35: A poster of *TraceTogether* app's overview and user journey across the main screens, from registration to setup and first use. Image reproduced with permission from Government Technology Agency (GovTech).

It must also be mentioned that the *TraceTogether* app is part of a larger government ecosystem organised to combat the effects of COVID-19 locally. On 22 January 2020, Singapore set up the Multi-Ministry Taskforce (MTF). The MTF comprises members from ten ministries sharing a common set of objectives: “direct the national whole-of-government response to the novel coronavirus outbreak; coordinate the community response to protect Singaporeans and stay vigilant against the spread of the disease; and work with the international community to respond to the outbreak” (Ministry of

⁶⁴ The *TraceTogether* app is available on the App Store, Google Play, and Huawei AppGallery.

Health, 2020). In an article on the importance of *TraceTogether*, Low writes that “the MTF’s strategy was to reduce the number of cases as much as possible. This meant that contact tracing was key to reducing the risk of local community transmissions” (Low, 2020).

The centrality of *TraceTogether* to the government’s COVID-19 strategy meant the app had to work at a time of crisis by taking maximum advantage of Singapore’s technical infrastructure, high digital literacy levels among Singapore residents, and easy availability of smartphones. This resulted in criticism of the system’s potential to exclude users without access to digital devices and smartphones. Lee and Lee summed up the issue:

There is a need to contend with technologically determined socio-economic bias: only those who have the resources to own a mobile phone – in particular, the appropriate brand and model of mobile phone – would be able to use the app. This would leave significant segments of the population, such low-wage foreign workers and the elderly, unable to utilise the app’s purported benefits (Lee & Lee, 2020, p. 50).

Lee and Lee touch upon an important aspect of digital exclusion, a core focus of fairness in designing government forms. However, inclusiveness was a fundamental component of the MTF’s strategy. This was echoed by the Government Technology Agency (GovTech) which launched *TraceTogether* as a digital token for users without smartphones.⁶⁵ In doing so, GovTech noted:

Not everyone has access to mobile devices. While this may only apply to a small percentage of the population, it is crucial that every member of the community is protected....The token provides citizens with an alternative, which enables a more inclusive society for everyone to benefit from community-driven contact tracing....At present, over 99% of people in Singapore are currently using *TraceTogether* to help stop the spread of COVID-19 (Government Technology Agency, 2021).

⁶⁵ Individuals who do not wish to use either the *TraceTogether* app or token are required to show their national identity card or passports at venue entrances for verification purposes. Some venues have scanners that read the barcodes on these identity documents. Others require a checker stationed at the entrance to manually record the individual’s details into a ledger or other record-keeping log. Please see Appendix B for acceptable forms of identification.

This is not to imply that Lee and Lee's concerns are dismissible. Indeed, as discussed in Chapter 2, there may be little incentive for migrant workers, low-income earners, or the elderly to adopt the app owing to financial or digital literacy constraints. Moreover, the issue of privacy and means of access to citizen records by the state has drawn criticism of Singapore's government and affected levels of trust. This issue affects all app users, and thus makes the analysis of *TraceTogether* particularly relevant given how the app's design is used to encourage uptake and allay fears.

Owing to privacy concerns, the government does not provide exact figures of how many users have *TraceTogether* installed on their phones. But given GovTech's statement above that 99% of Singapore's population are using *TraceTogether* – and the high mobile penetration rates in Singapore⁶⁶ – it is safe to presume a significant number of users would have installed the app and thus interacted with its form. This also makes further comparisons more consistent between the *TraceTogether* and SG Arrival Card apps in order to reveal fairness concerns in Singapore's digital forms design. Note: Mentions of the term *TraceTogether* from this point in the case study refer to the app. This case study used an iPhone with a 5½ inch display.

5.3.1.1 Digital literacy: registration and setup

As a mobile app, *TraceTogether* is constrained in its typographic structure by spatial concerns. However, the app uses a similar format to the UK-PLF by displaying each question on a single screen. Users subsequently navigate a series of explanatory and data entry screens that require users to submit their personal particulars, agree to terms and conditions, and finally activate the app at the end of the registration process.

But unlike the SG Arrival Card which users interact with once per visit, *TraceTogether* may be used several times a day across multiple circumstances. As such, the app's user interface plays a more significant role in the exchange

⁶⁶ Mobile penetration rate in Singapore in 2019 were at 154.1% (GovTech, 2019). Mobile usage and digital accessibility was discussed in Chapter 2.

of information. Figure 4.36 below shows the app’s registration process, starting with the welcome screen.

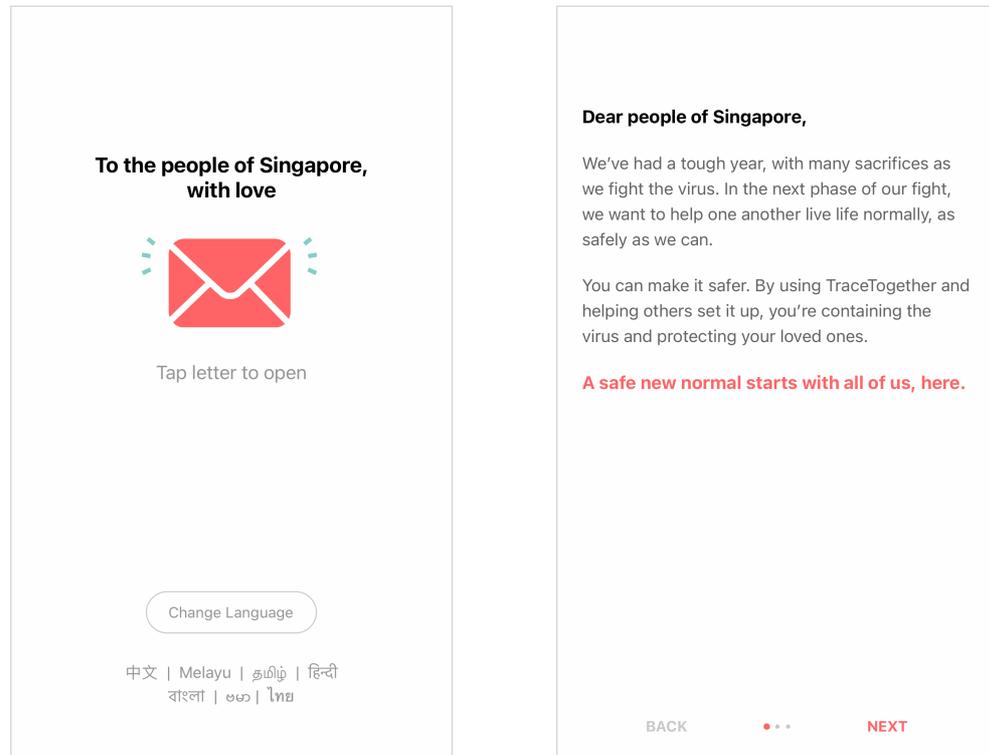


Figure 4.36: *TraceTogether* welcome screen showing an envelope for new users to tap (left) and the contents of the letter (right). Images reproduced with permission from Government Technology Agency (GovTech).

The form-filling process begins with a sealed envelope icon set in an intense salmon colour, which signifies *TraceTogether*’s visual identity. The envelope icon is addressed “To the people of Singapore, with love.” When a new user taps on the envelope icon (left), the contents of the letter appear (right) on the following screen. The layout is uncluttered with ample white space around the main content blocks. This draws focus into the clear to action informing users to “Tap letter to open.” This prompt is visually reinforced by motion lines on either side of the envelope icon, which makes it easier for users with low digital literacy skills to understand what is required.

The default language is English; nevertheless, the welcome screen also contains a button for users to switch to their language of choice. Below this button is a list of language options that users can choose from. According to

GovTech, “the *TraceTogether* app is available in Bengali, Burmese, Chinese, English, Hindi, Melayu, Tamil and Thai” (Government Technology Agency, 2020). The list is clickable and takes users to their device’s system page. This is a key user benefit of *TraceTogether* over the SG Arrival Card, i.e. providing immediate support for non-English speaking users by placing the option to change languages at the very beginning of the process. However, clicking on the button or options on an iPhone creates some confusion. Analyses of language and navigation is conducted later in this case study.

The contents of the letter follow the same visual treatment as the welcome screen, with ample whitespace and just two paragraphs. Emphasis is given to the recipient of the letter, i.e the “people of Singapore” in a bold weight, while the message at the bottom regarding safety and a new normal is also set in bold but in the intense salmon colour. This colour is repeated in the navigation bar that appears below. Clicking “Next” in Figure 4.36 (right) leads to an explanation of the app’s two main benefits, shown in Figure 4.37 below.

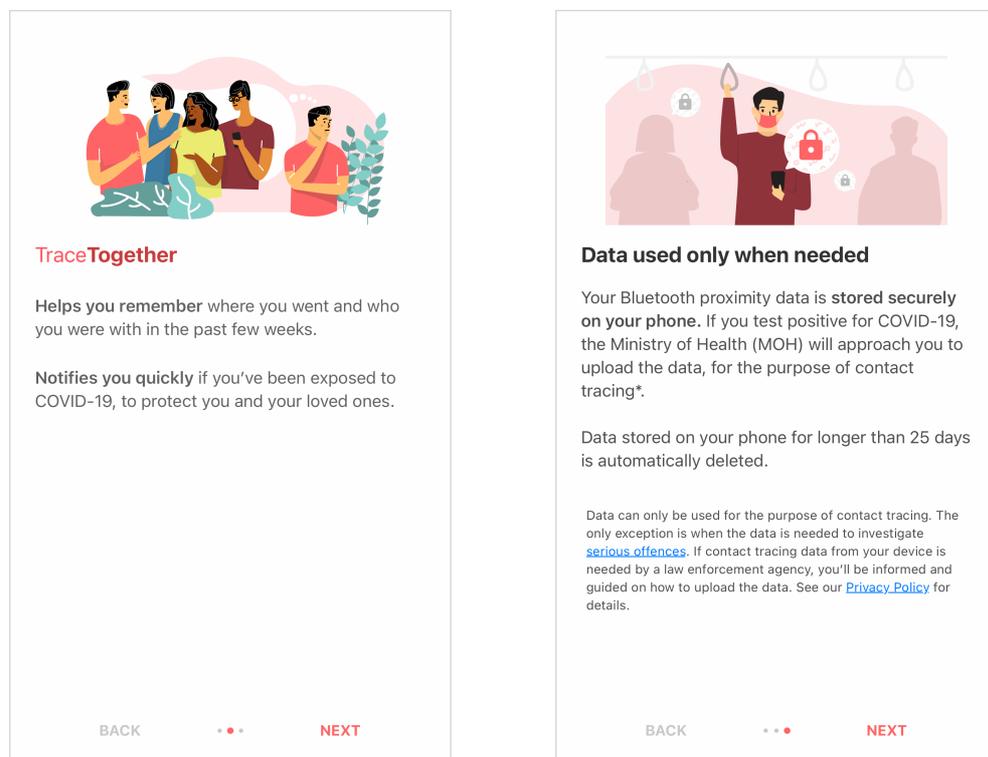


Figure 4.37: *TraceTogether* screens showing an overview of the app’s benefits (left) and how data is used (right). Clicking “Next” (left) displays a data and privacy notice (right). Images reproduced with permission from Government Technology Agency (GovTech).

The screen in Figure 4.37 above left is the first instance whereby the *TraceTogether* title is displayed. The portmanteau uses two different colours, with a darker hue for “Together” to likely reinforce the need for cooperation among users. The corresponding illustration above shows a group of people contained within another’s thought bubble. This is an interesting visualisation of memory and togetherness since the illustration frames a problem that *TraceTogether* solves, i.e. helping users track and recall past events.

The images help reinforce textual explanations, and reassure users of the app’s usefulness, through framing. Hajer and Laws refer to a frame as “an account of ordering that makes sense in the domain of policy and that describes the move from diffuse worries to actionable beliefs” (Hajer & Laws, 2006, pp. 256–257). In other words, a frame offers constancy through a definite structure that allays anxiety. Bekkers and Moody extend framing to discussions on how e-government uses visualisations to communicate with citizens, observing that “visualization supports a process of policy framing in which social reality is (re-)constructed, thereby including or excluding elements into the constructed picture....In essence, this is a political process in which specific stakeholders try to structure reality in such a way that it may serve their purposes” (Bekkers & Moody, 2011, p. 459). The illustrations in *TraceTogether* are oriented towards a positive outcome at a time of crisis. They also communicate responsibility by appealing to civic participation: everyone else is doing it this way because that is the right thing to do. This construction of social reality, to which Bekkers and Moody refer to, is reflected throughout the app. It is also not necessarily a morally ambiguous representation since one of the underlying purposes is to teach users to stay safe. Approached from this perspective, framing is effective in helping to facilitate knowledge and familiarity for app users, thereby empowering the participants of this process.⁶⁷

Indeed, the next screen which explains data management is accompanied by an illustration of a man on a bus or train wearing a mask. An icon of a lock

⁶⁷ Chapter 3 discussed the centrality of empowerment and trust to fairness concerns in designing documents.

with keys — set in the same intense salmon colour — is prominently displayed next to the phone, along with secondary lock icons in the background, thereby visually reinforcing the protection of data. There is also a paragraph at the bottom, in small print, stating user data can be used in the investigation of serious offences and that law enforcement agencies can direct users to comply with these demands. This is the only instance of small print in the registration process; however, appearance and placement are crucial to how users are informed of data security; these are analysed later in this case study.

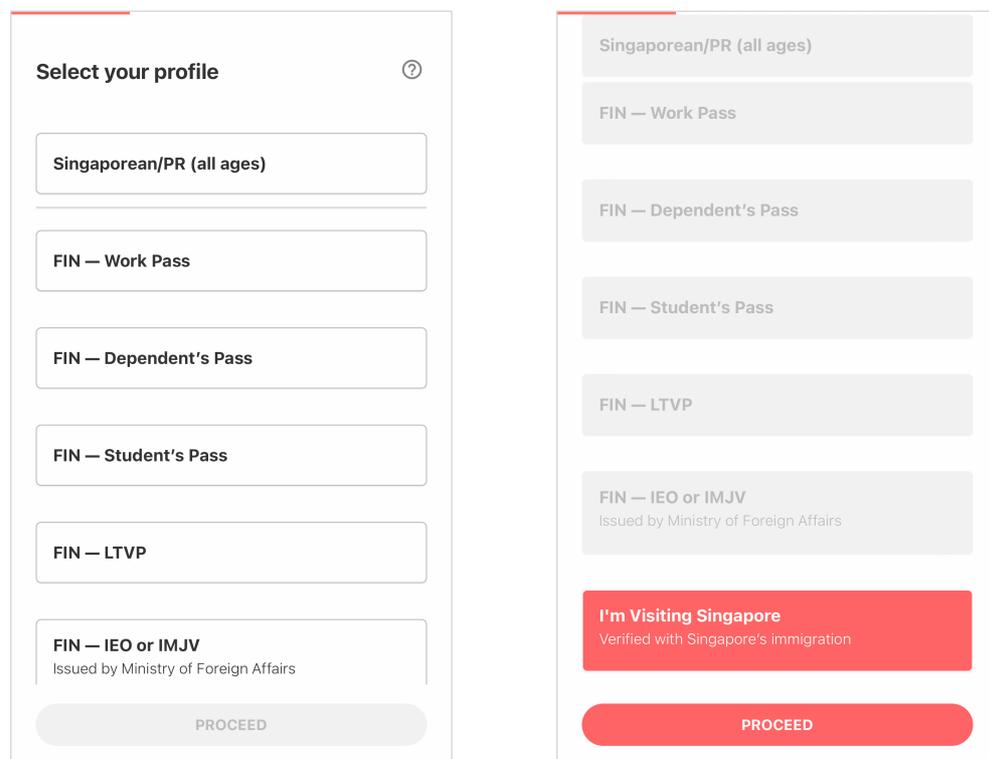


Figure 4.38: *TraceTogether* screen showing options for a user's residency status (left) and the option selected by visitors (right). Images reproduced with permission from Government Technology Agency (GovTech). FIN stand for Foreign Identification Number.

Throughout the registration process, text is displayed in a variety of colours and shades, each matching a specific category of messaging. Figure 4.38 above shows the residency status options that users need to select and the option in this list for visitors, respectively. As users make their way through the process, a progress bar at the top shows how far along the user has come. The list of residency status options begins with placing Singaporeans and

permanent residents at the top. The option for visitors to Singapore is placed at the bottom of the list which is scrollable. While it appears citizens and permanent residents are prioritised, which may well be the case, the hierarchy of options is also somewhat aligned to the number of users within the population: most are Singaporeans, followed by employment pass holders, students, and long-term visitors.

There is also an assumption in this list that users will understand what the abbreviations stand for, i.e. FIN for Foreign Identification Number, and LTVP for Long-Term Visit Pass. In less-known circumstances these terms are explained, especially for visitors, whereby the option is accompanied by a condition stating “Verified with Singapore’s immigration.” Making a selection greys out the other options and highlights the selection in the intense salmon colour. Visual consistency is therefore maintained through the application of the same colour to interactive elements.⁶⁸ Figure 4.39 on the following page shows the form’s passport particulars section below left, and the date selector below right.

⁶⁸ The exception to this is the bold sentence in the welcome screen about “a safe, new normal”, shown in Figure 4.36.

The figure consists of two side-by-side screenshots of the 'Your Passport details' screen in the TraceTogether app. Both screens feature a back arrow and a help icon at the top. A pink information box at the top of each screen reads: 'Use the Passport that you'll enter Singapore with. Details below will be matched with Singapore's immigration.'

The left screenshot shows the form fields:

- Name: (empty)
- Date of Birth (as per Passport): dd-mmm-yyyy (dropdown)
- Nationality / Citizenship: (dropdown)
- Passport Number: (empty)
- Checkbox: 'The details that you provided are true. You agree to our [Terms of Use, Privacy Statement](#), and for Ministry of Health to approach you to upload your Bluetooth data for the purpose of contact tracing.'

The right screenshot shows the form with the following data entered:

- Name: ARJUN KHARA
- Date of Birth (as per Passport): 01-JAN-2002
- Nationality / Citizenship: (dropdown)

 Below the form, there are 'Prev', 'Next', and 'Done' buttons. An iOS date selector is visible, showing the month 'January' and the year '2002'.

Figure 4.39: *TraceTogether* screen showing form fields for passport particulars (left) and the iOS date selector (right). Images reproduced with permission from Government Technology Agency (GovTech).

TraceTogether follows a clean layout with single-line fields separated by whitespace. Unlike the SG Arrival Card app, *TraceTogether* uses wireframe icons next to each field label. These too change colour when the relevant field is selected as shown in Figure 4.39 above right. The form also uses the device's native user interface to display the date. An announcement box at the top of the screen provides information to users on providing details of the passport they will use to enter Singapore. Given the number of travellers to Singapore, many will have dual citizenship and therefore multiple travel documents. The announcement clarifies and thus helps reassure such users who may be unsure of which details to provide.

This is different to the SG Arrival Card which does not provide guidance, despite its centrality to immigration-related activity. The anticipation and management of anxiety that *TraceTogether* offers is, in this instance, a positive example of how issuers can reduce the effort needed by users to complete a form. Informing visitors of which passport to use thus increases

the chances of users co-operating with the process in order to reach a desired outcome. As with the initial screens in the explanatory section, the final stage of the registration form is again presented in a combination of illustrations and text shown in Figure 4.40 below.

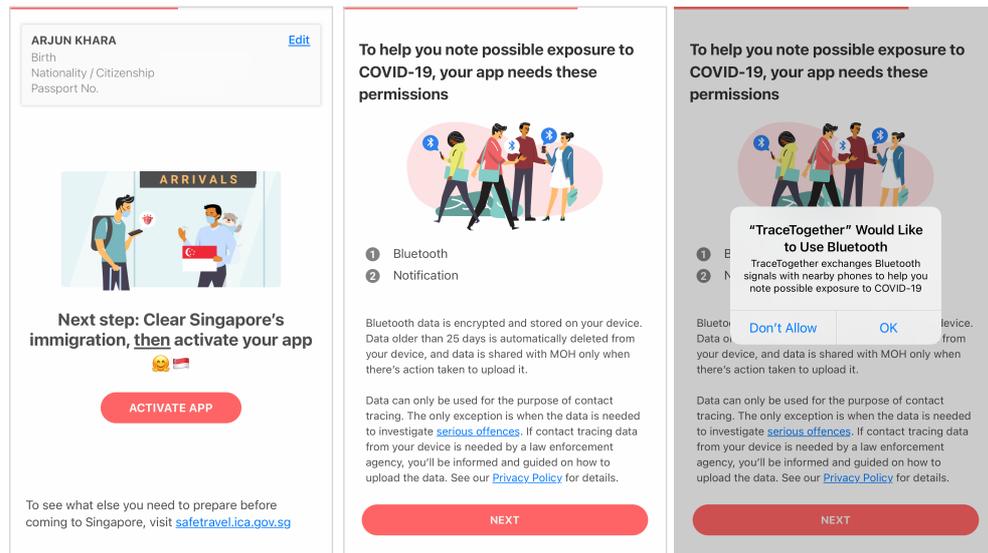


Figure 4.40: *TraceTogether* screen showing the user's registered details (left); this is followed by the activation screen (middle); clicking 'Next' generates a system pop-up asking for permission to use Bluetooth (right). The pop-up contains a brief explanation informing users how signal exchanges in the app work. Note: personal details required to generate these screens have been obfuscated. Images reproduced with permission from Government Technology Agency (GovTech).

When users complete the registration process, they are prompted to activate the app only after clearing the immigration checkpoint. The button to activate the app appears below these instructions, together with an advisory at the bottom informing users of what else they require before entering Singapore. The advisory links the ICA's web page on safe travel. The size and placement of this advisory at the end serve as additional information and do not deter from the screen's main function, which is to activate the app. This is also reinforced by the illustration of a passenger using a phone showing the *TraceTogether* icon.

Interestingly, the image also includes a figure under an "Arrivals" sign holding the Singapore flag. This marks the end of the immigration process for visitors who from that point on merge with the local population. There is also

an otter on the receiver's back. The significance of this is discussed later in this chapter, but it is worth highlighting at this point. The illustration changes in the next screen to a group of users using Bluetooth technology. The small print at the bottom of this screen again explains how data is protected.

The contents of the second paragraph are identical to that shown in Figure 4.37. This emphasis on privacy reveals the government's attempts to reassure residents and visitors that their data is handled securely and responsibly. When a user clicks next, a system prompt informs users of how the app will work with Bluetooth.

The basic typographic properties of *TraceTogether* follow conventions of standard digital government forms: the process begins with an explanation section and options to switch language; the form contains fields with labels and prompts to aid in data entry; and there is a response generated at the end. However, *TraceTogether* is also an example of the future of digital government forms. Shephard writes that “as new technologies emerge and mature, they will create new regulatory needs and may also offer novel ways to regulate activities in a faster, more reactive, and more precise way” (Shephard, 2019).

The efficiency and novelty of artificial intelligence-driven data exchange activities in forms like *TraceTogether* is of significance to the design of digital government forms in Singapore in the coming years, and is discussed in Chapter 7. But regardless of these changes, the ability of *TraceTogether* to encourage buy-in and greater usage from the population is primarily affected by the attitudes of its issuers towards the form's design.

4.3.1.2 Tone and language

Compared with the SG Arrival Card with Health Declaration, *TraceTogether* adopts a more casual and inviting tone. And whereas the title “SG Arrival Card with Health Declaration” is functionally descriptive, the app instead uses a portmanteau that merges functionality with inclusivity. This difference is also reflected in the design of each app's icon, shown in Figure 4.41 on the following page.



Figure 4.41: *TraceTogether* app icon (left) and the SG Arrival Card app icon (right). App icon image for *TraceTogether* reproduced with permission from Government Technology Agency (GovTech). App icon image for SG Arrival Card reproduced with permission from Immigration and Checkpoints Authority (ICA).

This difference between the SG Arrival Card and *TraceTogether* would be notably apparent to first-time overseas users arriving in the country. The SG Arrival Card (above left) conveys a stern, authoritative image that aligns with its vision of “Securing Our Borders, Safeguarding our Home.” In contrast, *TraceTogether* (above right) uses a community-driven image comprising three figures merging to form the outline of two Ts. The adoption of this web 2.0 style has been attributed by Soon and Soh to its “immediacy and personalised nature” which stimulates online participation and builds greater trust in the government (Soon & Soh, 2014, pp. 42–59).

This dialogic tone is extended to phrasing instructions and prompts in a relaxed and unaffected style, and accompanied by cartoon-like animations, illustrations, and emojis throughout. Visitors, who would have gone through the SG Arrival Card process, are required to download *TraceTogether* and register their details, including their disembarkation/embarkation number. However, regardless of nationality, all *TraceTogether* users follow the same setup, which begins with a brief letter from the Singapore Government. While the contents are immaterial to the scope of this thesis, the language used in the welcome screen exemplifies the unaffected and sincere style of communication which the state establishes with users.

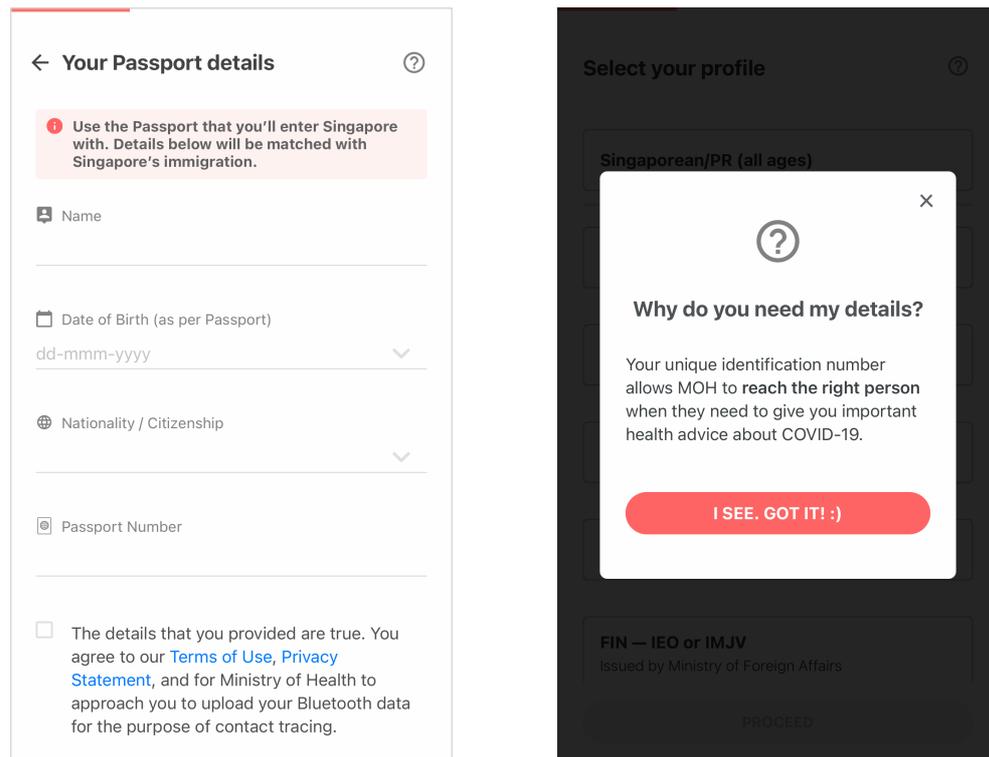


Figure 4.42: *TraceTogether* registration screen with a question mark icon (left) and the pop-up which appears when the icon is clicked. The text in the prompt and the large button uses a conversational tone, i.e. You/I to personalise the exchange between users and the government. Images reproduced with permission from Government Technology Agency (GovTech).

The conversational style reveals a dialogic attitude by the state towards its citizens that emphasises “partnership and joint value creation” (Olabe, 2017, p. 56). It also makes a case for how tone can be implemented in government-citizen communication to connect with the largest possible number of users in a time of crisis. Furthermore, the language used to drive partnership and cooperation is achieved in ways that not only preserve the government’s perceived status as a service-oriented provider, but also causes the state to appear more human, and humane, to residents and visitors alike.

This is not to suggest a casual tone is more conducive to fairness, but rather that language which is perceived as participatory is more likely to increase cooperation. Bourdieu emphasised this quality, stating that “everyone participates in language as they enjoy the sun, the air, or water” (Bourdieu & Wacquant, 1992, p. 146). And while the SG Arrival Card uses a tone befitting of the authority of the ICA, the paucity of a dialogic tone in the

form's error messages is less likely to attract cooperation. Similarly, obfuscation and exclusion is also reflected in instances within *TraceTogether* that diminish the effectiveness of the app's overall tone. Figure 4.43 below shows two screens, each with a paragraph at the bottom in smaller print than the main text.

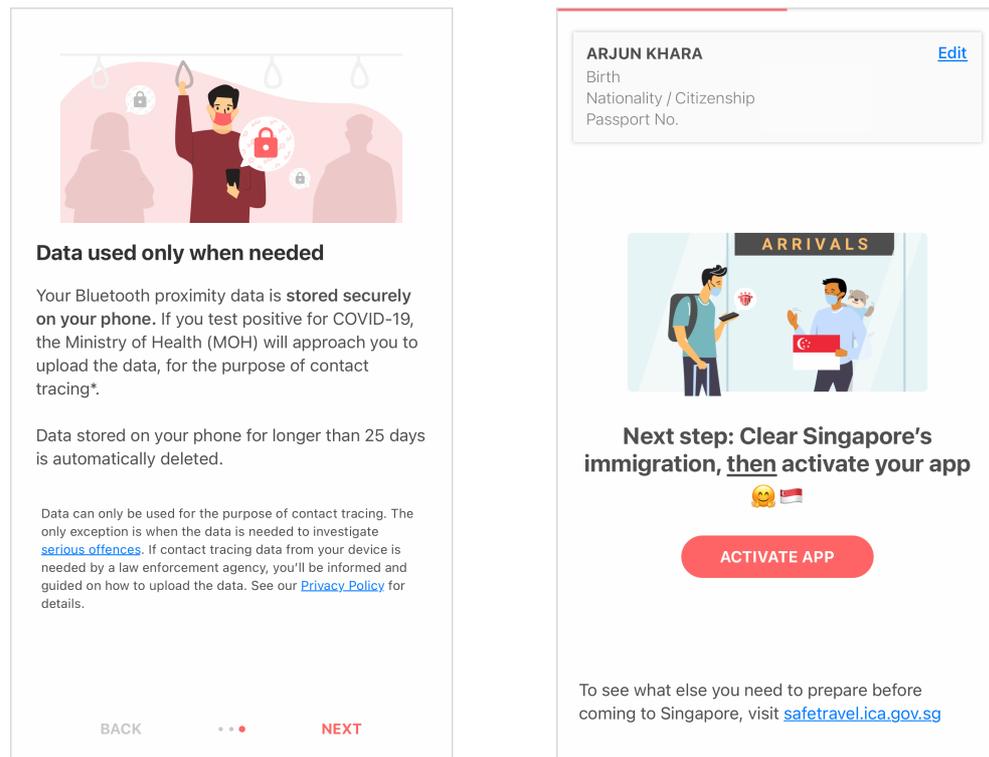


Figure 4.43: Small print at the bottom of the data usage screen (left) with links to “serious offences” and “Privacy Policy,” and an advisory for visitors (right) on the preparations needed before arriving in Singapore. Image reproduced with permission from Government Technology Agency (GovTech).

The screen on the left states user data can be used in the investigation of serious offences and that law enforcement agencies can in fact direct users to comply with these demands. Clicking on the link “serious offences” takes users to the website of the Attorney General’s Chambers, which details the laws around “Personal Contact Tracing Data.” This website is the official repository of Singapore’s laws and statutes, which means most users wanting to find out what the app meant by serious offences would encounter dense legalese. As a

result, there is insufficient explanation about how the app treats and communicates data security to users.

Both illustrations, followed by a third at the end of the process, show a male figure in the foreground. While COVID-19 health concerns among the population may have outweighed this instance of gender representation,⁶⁹ the problem is nevertheless significant since it points to the implicit biases in designing fairly across all groups, including gender. Chan, for instance, claimed in 2000 that “the Singapore state is also an overtly patriarchal state. The authoritarian nature of Singapore therefore enables the swift implementation of national policies that are patriarchal in nature” (Chan, 2000, p. 39). The emphasis on male figures throughout the major sections is concerning, and likely caused by implicit bias.

Johnson investigates the effects of bias as a cause of divergence: “Divergence occurs when our unconscious mental states differ, or diverge, from our consciously-held mental states”. The author also states that implicit bias “comes very naturally to us, as we’re used to our minds making associations quickly, automatically, and without our conscious awareness” (Johnson, 2020, p. 20). Divergence could well explain issuers’ oversight in the framing of these visuals. However, the same argument would then apply equally to users who unknowingly conclude the app is male-oriented and/or meant for a younger demographic, since this is what the illustrations communicate. The presence of implicit gender and age biases in the tone of *TraceTogether* thus inadvertently risks creating perceptions of exclusion for those not adequately represented in its process.

4.3.1.3 Error-checking

TraceTogether has recently focused more on the needs of implicit users who are vital to error-checking. These are users who do not use the app to check-in and check-out, but instead check up on users entering and exiting venues. Such attendants – as they are informally referred to – are stationed at entry

⁶⁹ Despite privacy and data concerns, Singapore reached a penetration rate that was highest among countries that have implemented similar tracking apps (Lee & Lee, 2020, p. 51).

points and conduct manual checks on each visitor to the venue. The primary role of the attendants is to ensure that visitors have scanned the QR code, and that the details in the form match the user's profile. This is a significant step in mitigating the problem of erroneous entries corrupting contact tracing data. This matches the discussion in Chapter 5 about "participation as a concept that includes a wide variety of behaviours, activities, and responsibilities, carried out by both users and system developers" (Barki & Hartwick, 1994, p. 60). Figures 4.44 below, and 4.45 on the following page show a standard check-in process for when a visitor enters a shopping mall; the process is repeated when that visitor enters a store inside that mall.

The figure consists of three sequential screenshots of the SafeEntry mobile application interface. The first screenshot shows the user's location as NEX with 'Check-In' and 'Check-Out' buttons. The second screenshot shows the NEX check-in form with fields for Passport and Mobile Number, and a 'Remember my particulars' toggle. The third screenshot shows a health declaration form with a 'Check-In' button.

Figure 4.44: Check-in screen is shown after a QR code is scanned (left). Form fields display the user's registered particulars (middle). Scrolling down the screen shows a health declaration which the user agrees to by clicking "Check-in" (right). Personal particulars needed to complete this form have been redacted. Images reproduced with permission from Government Technology Agency (GovTech).

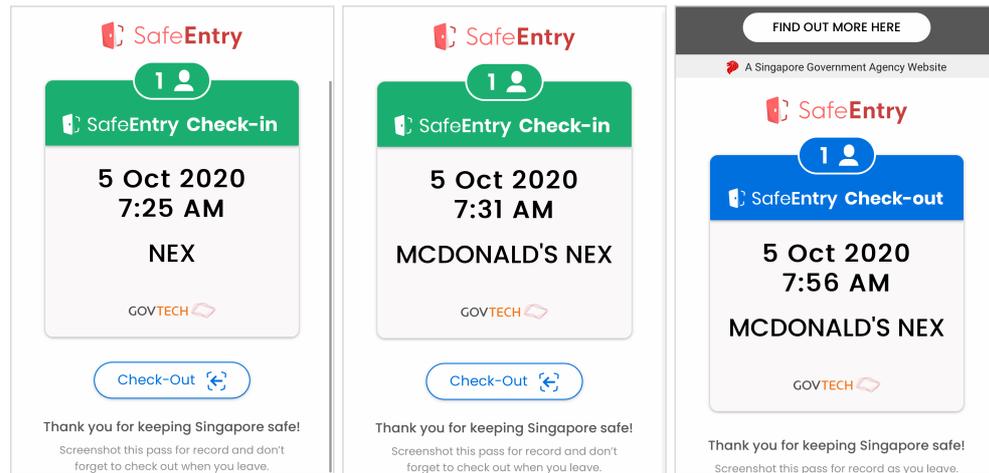


Figure 4.45: Clicking “Check-in” registers the user’s entry and provides a count for the number of users who have checked in, indicated by the oval icon in green below the *SafeEntry* logo (left). The same process is repeated when accessing individual stores inside the mall (middle). Clicking “Check-out” registers the user’s exit from that venue (right). Images reproduced with permission from Government Technology Agency (GovTech).

People stationed at venue entrances check each visitor’s phone primarily to ensure that the check-in status is correct.⁷⁰ These screens thus serve as a feedback mechanism for implicit users. Interestingly, the form prompts users to take a screenshot of the check-in/check-out status for record-keeping purposes. This led to several users falsifying their entry status in subsequent visits by showing the screenshot, rather than having to repeatedly complete the entire process. Furthermore, the volume of visitors to these places meant that checkers were overwhelmed and therefore could not verify every entry.

This problem was exacerbated when the government passed a new ruling that permitted only vaccinated visitors into malls. This led to long queues as more checkers were employed, along with security personnel. In addition, Raguraman et al. reported that the queues were forming because “most people activated their *TraceTogether* app to show their vaccination status only when asked” (Raguraman et al., 2021). This placed added effort on the implicit users in the process responsible for facilitating entry into these places. But while additional teams were used to speed up the process, *TraceTogether*

⁷⁰ My observations of the process showed that the check-out status is checked less frequently, and in several cases not at all. Check-ins, on the other hand, are thoroughly vetted by the authorities.

issuers responded to the problem by re-designing the interface of the check-in screen. Figure 4.46 below shows the old screen below left and the updated check-in screen – the same screen in two states of animation – below right.

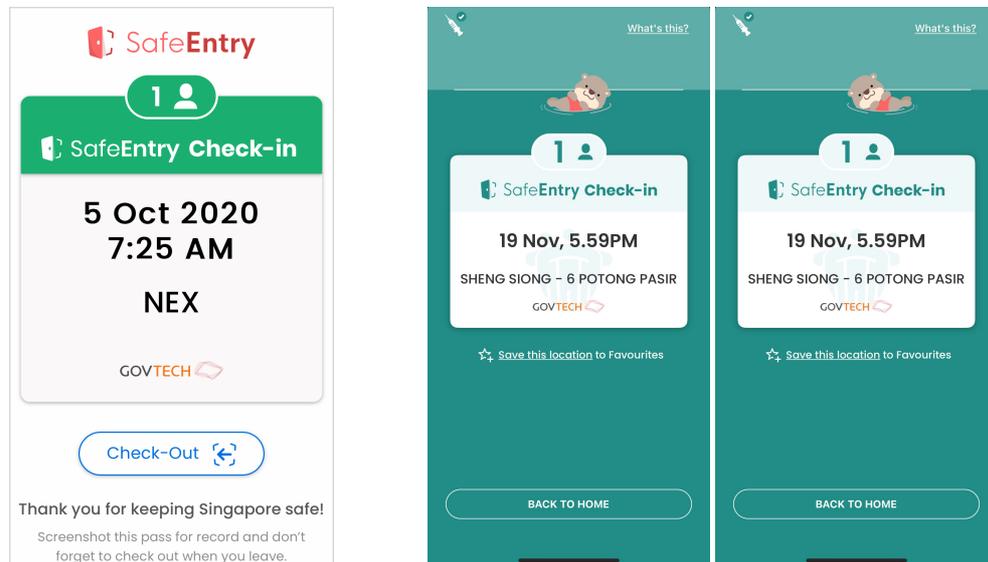


Figure 4.46: The old check-in screen left (left). The updated check-in screen with an animation of an otter swimming back and forth (right). Images reproduced with permission from Government Technology Agency (GovTech).

To expedite the process for implicit users, the new check-in screen was given a full green-blue background. Additionally, an animation of an otter, shown in the registration process in Figure 4.46 (right), swimming back and forth was added as a visual marker to demonstrate that the check-in process was genuine, and not a screenshot. Furthermore, attempting to record a video of the animation results in a watermark appearing over the screen, shown in Figure 4.47 on the following page. The watermark device thus warns implicit users of user attempts to violate entry policies.



Figure 4.47: Recording the animation on a video-capturing device generates a watermark. The recording was tested on an iPhone using the device’s native screen capture software. Image reproduced with permission from Government Technology Agency (GovTech).

Chapter 5 discusses the issue accountability and trust in government documents. Writing on how user interface design increases accountability and decreases access violations, Vance et al. observe that “not every system can be tightly controlled without placing inordinate constraints on employees’ ability to perform their work” (Vance et al., 2015, p. 346). The authors also list several methods to counter fraudulent behaviours. Of interest is expectation of evaluation, which suggests users are aware of being assessed against specific expectations of behaviour, which carry ramifications if these expectations are violated. Consequently, user interfaces can be deployed to alter such negative behaviours due to their cognitive effect on user psychology (Vance et al., 2015, p. 345–366).

While the effectiveness of these recent changes has not yet been published, the re-design of *TraceTogether’s* check-in screen is a pre-emptive attempt to counter negative user behaviours by establishing a visual system of checks. This ties in once again with Rosenfeld et al.’s view towards establishing contextually accurate spaces for users – implicit and explicit – to work within. Since these checks are carried out by implicit users, the re-design of the app’s

tone provides a stronger visual context to facilitate this understanding. This in turn reduces the amount of effort required by implicit users who are also participating in the process.

The re-design also alludes to principles of deterrence, whereby the animation not only serves as a visual indicator of genuineness for checkers, but also as a signal to users reinforcing that correct protocols for entry have been followed. Within the context of law and justice, Ellis discusses the balance between threats of aggression, punishment, and deterrence. Ellis argues that in social systems which are less automatic in their approach, the issuance of a threat may be sufficient in deterring wrongdoing without the need to administer punishment (Ellis, 2003, pp. 340–341). The re-design of the check-in screen appears to follow this notion in dissuading antisocial behaviours. But Vance et al. differentiate between deterrence and accountability, noting that the latter promotes prosocial behaviour which leads to higher levels of trust in the system (Vance et al., 2015, p. A2). Indeed, the new interface facilitates greater trust through a combination of accountability and deterrence that affects user behaviour. But the greatest benefit is to implicit users who are in a position to better evaluate accountability in every check-in owing to a re-design that is fairer to them. The updated check-in screens are a positive instance of fairness in design since they not only generate better accountability and trust in the system, but also reinforce Rawls' idea of social cooperation being “guided by publicly recognized rules and procedures which those cooperating accept as appropriate to regulate their conduct” (Rawls & Kelly, 2001, p. 6).

4.3.1.4 Summary points of the *TraceTogether* case study

The focus of this case study was on the extent to which fairness affects forms design in crisis situations, in which a significant level of cooperation is required. The case study analysed the *TraceTogether* app, used for contact tracing instances of COVID-19. Analysis was conducted across three functions: digital literacy; language and tone; and error-checking.

The study revealed that cooperation from users can be encouraged through design practices that humanise the government to its users. The app positions itself as a solution to the COVID-19 problem. This was evidenced through a system of illustrations, informal language, and generous use of emojis and emoticons. Each of these elements connoted positivity, in addition to facilitating understanding, thereby facilitating buy-in from users. The use of graphic elements helped frame the context of the app's purpose, and also made the setup simpler for users with lower levels of digital literacy. The app is premised on users having a smartphone. This was a more significant issue for visitors than residents, given the high levels of literacy and mobile phone subscriptions in Singapore. However, when compared to the SG Arrival Card, *TraceTogether* facilitated a smoother registration and setup experience for users. This was demonstrated in the appearance and layout of fields, labels, prompts, and explanations.

The tone and language likewise suggested greater user empathy. This was observed in the dialogic tone of the app, which was reflected in the subject of the accompanying images. However, some of the main images were dominated by young, male users. This was a cause for concern since it risked inadvertently excluding users who may not adequately identify with this demographic. These problems were attributed to the likelihood of implicit bias, which was also present in the SG Arrival Card, at various sections, including its error-checking function.

In this respect, *TraceTogether* was found to be fairer, given the emphasis it placed on not only providing explicit users with feedback mechanisms for error-checking, but also accounting for implicit users. This was highlighted in a re-design of the app's check-in screen, which reduced the effort required by checkers at venue entry points. The re-design also raised the notions of accountability and deterrence. The re-design pointed more to a system of accountability and trust, which are central to fairness.

4.4 Chapter conclusion

This chapter laid out a framework in which to assess the extent of fairness present in Singapore's government forms. The framework has been separated into three categories: literacy, clarity, and technology. Each of these categories contain multiple design functions. These functions were specifically selected owing to: (i) the frequency of their use in designing documents, including digital government forms; and (ii) overlaps in their meaning with fairness terminologies. These functions were used to analyse two case studies on government forms in Singapore. While these functions were split into their component categories, in practice they overlap and integrate with each other. Accordingly, analysis was conducted across representative instances of these functions to holistically assess fairness concerns the forms. It is also necessary to state that the list of design opportunities in Table 4.1 is not exhaustive; however, the current contents of this list are sufficient for analysing the forms and helping establish a fairness model.

Likewise, the two forms chosen for analysis are representative instances of Singapore's forms design system. Since the government does not have a unified design system, these forms were chosen due to their frequent use by local residents and visitors alike. They also served to answer three concerns in this chapter: (i) How is fairness evaluated in the design of digital government forms? (ii) What are some of the design issues with Singapore's digital forms that help or hinder the facilitation of fairness for all users? (iii) How does emphasis on fairness in digital government forms change when greater levels of cooperation are required by the government of its citizens and visitors?

The case studies revealed a number of merits and discrepancies in both forms. A summary of the findings was discussed at the end of case study. On balance, the case studies showed that there are distinct fairness elements in each form. The merits and discrepancies, however, were not uniform. It then follows that in the absence of a unified government design system, the forms could benefit by applying the merits of each to the other. But these merits come at added expense to issuers, whereas the discrepancies lead to unfairness for users. This is a major reason why fairness is not easy to achieve,

even though it is a desirable policy. This is also why a fairness model is needed, the contents of which are discussed in Chapter 6.

Nonetheless, it is worth briefly mentioning here that fairness is not just the removal of complexity, but the addition of opportunity that reduces overall effort. The first case study, for instance, found that the SG Arrival Card had a lot of complexity removed but possessed insufficient opportunities. In contrast, *TraceTogether* manages to achieve a better balance by eliminating complexity through the provision of design opportunities that reduce overall effort. Hence, of the two, *TraceTogether* may be considered a more fairly designed digital form. This does not mean that *TraceTogether* is necessarily a general benchmark, but rather a representative example of how fairness practices in digital forms can be developed into a policy layer. This is because the narrative of *TraceTogether* as a tool to facilitate government-citizen cooperation is reinforced through its textual and graphic elements. And while the app serves a vital government purpose of tracking and tracing COVID-19 cases, its design incorporates several opportunities for government ministries and agencies in Singapore to facilitate fairness for all parties.

In addition, the ability of the government to improve service efficiency while collaborating across the public and private sector is encompassed in *TraceTogether*. The app represents a nationwide effort to bring together multiple government ministries and public expertise to combat COVID-19 using open government access. Equally, it also requires the cooperation of Singapore's diverse society. This is a central tenet of *Smart Nation*, discussed in Chapter 4. The provision of literacy, clarity, and technology opportunities influences how users adopt and participate in emerging government digital tools such as *TraceTogether*. The case studies revealed that many of the opportunities in *TraceTogether*, and the SG Arrival Card, can conceivably be provided by the government in other digital forms.⁷¹

The case studies also raised another intriguing query about the necessity of fairness. The design functions and improvements proposed from analysing

⁷¹ I was not able to interview issuers due to health restrictions. The assumption is based on publicly available literature on related public services in Singapore, many of which are included in the bibliography of this thesis.

the SG Arrival Card and *TraceTogether* require significant levels of attention from form issuers. Is this level of concern justified? For example, in the case of *TraceTogether*, it can be argued that users spend comparatively little time on the registration and setup screens, and therefore are not as affected by the shortcomings identified. In their publication for improving government forms, the Behavioural Economics Team of the Australian Government advises:

In selecting which form to re-design, prioritise based on how often a form is used, and the proportion of clients who have difficulties with it. These difficulties are particularly important if they prevent access to services or benefits, so you [form designer] should also consider the consequences if clients cannot complete the form (Behavioural Economics Team of the Australian Government, 2020, p. 5).

While there is some rationale to the above-mentioned quote, there are also limitations to its logic. First, the statement mentions difficulties and consequences, but does not expound on what these are other than pointing to difficulties that prevent access to services or benefits. Hence, the spectrum of difficulties, and resulting consequences, that forms users encounter is virtually limitless. It is therefore impossible to determine which difficulties prevent form completion given the sheer variety of circumstances. These might be caused by user-driven challenges such as low comprehension levels and limited access to digital tools, or by issuer oversights including vague explanations, confounding sections, and lack of device support.

Indeed, each of these problems were identified in the two case studies, which entailed setting up categories where such issues can be broadly identified and themed. Categorisation helps issuers *inter alia* prioritise which forms, and their constituent sections, need attention. Nevertheless, this leads to a second concern.

The statement assumes that poorly designed forms prevent completion. This is a risky position to adopt since certain aspects are not essential to completion but are crucial to the process. For example, a captcha field is not required for a form to be completed – in fact it often gets in the way – but is essential to security for users and issuers. Likewise, most required fields can be

populated with any values and submitted; but this does not guarantee data accuracy. And finally, users may want to send additional information but are unable to locate an appropriate field. From an issuer's perspective the process is complete, but for users the form is lacking full information. In such instances Schwesinger's observation about the process benefitting issuers more than users (Schwesinger, 2010, p. 210) is particularly relevant.

Third, the statement asks issuers to prioritise a re-design based on the proportion of clients who have difficulties with the form. The statement does not specify what this proportion is, but from context it can be inferred the statement is referring to the majority. If this is the case, then such a policy alienates minority groups and thus labelled as unfair. This is especially problematic when considering who comprises these minority groups. To take an example from the second point: like security, lack of accessibility features, such as screen readers, will only hinder the form completion process for visually impaired users. In any population comparable to Australia's most users will not be suffering from visual impediments. For this 'normal-sighted' majority, the form can be completed without issue. The same argument can be extended to those with low digital literacy skills and limited access to resources.

Chapter 3 showed that usability concerns became mainstream some time after the advent of digital technology. Likewise, web accessibility and security only took on more prominent roles much later in the life of the internet. There is general agreement that these policies should have been developed alongside instead of after the process. This chapter revealed that digital forms similarly face considerable gaps in fairness. Plugging these gaps offers chances at a better cooperative exchange between issuers and users, which leads to higher levels of trust. But while these gaps can be plugged in future re-designs, I posit that digital forms overall are better served when opportunities for fairness are developed and integrated alongside the forms creation process. Thus, fairness — like security and privacy — needs to come in at the start of the process, as a policy layer, rather than as an afterthought which is often the case with design.

This chapter has also discussed the benefits of approaching government forms as cooperative, rather than reactive, exchanges. Cooperation is facilitated by managing and agreeing expectations between issuers and users. These expectations are managed and agreed upon by reducing user effort without unreasonably increasing issuer effort. But how much should each be reduced or increased by? Is there a point at which user effort and issuer exigencies are in balance? And how would an overarching model for fairness reconcile the relationship between effort and design opportunities discussed in this chapter?

These queries are discussed next in Chapter 5. Chapter 6 then discusses the development and implementation of fairness in design by: (i) collating findings from the case studies; and (ii) extracting a relationship between the effort required to create and complete a form, and the design opportunities needed to reduce effort to a point which facilitates fairness for all users. This point is also fair to issuers, whose exigencies are accounted for. The model thus takes into account the discussions around fairness in this thesis – especially Rawlsian notions, discussed in Chapter 5 – and applies these towards building a policy layer for government forms designers.

5. Defining fairness in digital government forms

5.1 Chapter overview

This chapter discusses the concept of fairness in digital government forms design. The chapter begins by considering the statement that government forms need to facilitate fairness for all users, and moves on to clarify what is meant by “forms users”. Distinctions are then made between form owners and authors to establish accountability in designing fairness and mitigating errors. This is followed by an examination of the principles of legal design. Legal design and fairness intersect at several junctions. However, some of the fundamentals of legal design are either inapplicable or go against the notion of fairness. These differences are also discussed in this chapter.

The chapter then looks at existing definitions of fairness across the disciplines of law, economics, society, and morality to: (i) understand what fairness means in these contexts; and (ii) extract a meaningful interpretation for forms design. The chapter concludes by setting out a premise for fairness which forms the basis for: (i) analysing the design of digital government forms; and (ii) developing a fairness model through which policy decisions may be framed and implemented when designing digital government forms.

5.1.1 The case for facilitating fairness in government forms

As mentioned in previous chapters, Schwesinger asserts that “government forms must work for everyone, and facilitate fairness” (Schwesinger, 2017, p. 613). This is a salient observation that is central to this thesis. However, the terms “fairness” and “everyone” are only vaguely outlined and require a more robust interpretation within the context of information design. Furthermore, the mere mention of “government” evokes multiple ideas and abstractions of authority, legislation, citizenship, rights, justice, sovereignty, and organisation of society around these and other concepts. But while a detailed ontological enquiry of government extends beyond the boundaries of this thesis, a brief overview of its core ideas is useful.

In brief, government establishes a framework of law and policy within which society functions. Of particular interest is the government function of creating new policies to address perceived problems in society. Governments formulate policies in service of their priorities (Little, 2020, p. 127).

Little’s summary captures the essence of a government’s functions, aims, objectives, and outlook.⁷² These aspects fit with how Mill and Barker frame the purpose of any government: “The question with respect to Government is a question about the adaptation of means to an end” (Mill & Barker, 1937, p. 1). In this case, the authors were referring partly to the objective of having a government in the first place. This opens up further avenues of discourse, most of which are beyond the scope of this thesis. However, several political ideologies tend towards fairness as a central principle, though the rationale and approaches can vary significantly. Liberalism, for instance, is rooted in the idea of a social contract to “preserve a constitutional order that protected the weak, avoided the possibilities of domination by social elites and allowed for continuity across time” (Freeden & Stears, 2013, p. 391).

Likewise, Bentham’s and Mill’s utility principle enquired into the morality behind the idea that an action is right if it promotes happiness, and wrong if it

⁷² The notion of creating policies to solve societal problems is central to how fairness may be facilitated in government forms. Consequently, Little’s view of government and its policies is revisited in Chapter 6.

results in pain – not just for the one performing the action but for all who are affected by it (Mills, 2017). Rawls took this further in his *Theory of Justice*, which expounded on the notion of equal rights for citizens in a society. Here Rawls emphasised that socio-economic equalities should be arranged so as to be of maximum benefit to the least advantaged members and that these equalities “should be attached to offices open to all” (Wolff, 2008, p. 18). In a sense then, the question posed by Mill and Barker can be rephrased to understand the role of government as a mediator of exchanges between parties that produce a fair outcome for all. Such exchanges are mediated daily by multiple artefacts, of which forms comprise a significant proportion.

Returning to Schwesinger’s earlier observation, the author follows up with a brief observation of what fairness might mean within the context of government forms, but stops short of offering a working definition of “users” and “fairness”. Instead, Schwesinger adopts a broad acceptance of the terms’ implications on forms design. Nonetheless, these issues are key to discussions of past and present practices around government forms design:

Form designers have to take into consideration different levels of literacy, different levels of language fluency, different languages spoken, as well as different expectations, experiences, and motivations. Government forms are often part of legal or administrative acts that require conformity with the law. This tends to make forms complex, and the processes that the forms support hard to understand. Simplifying can be tricky because it can result in unintentional legal issues. [...] It only means that everyone who is involved in developing or redesigning government forms has to be sensitive to the many different needs of the users of such forms (Schwesinger, 2017, p. 613).

Schwesinger thus establishes fairness as the need for forms designers to account for users with varied backgrounds and abilities, and highlights the additional challenges of designing government forms that represent legal procedures. But these observations offer little explication regarding: (i) who qualifies as a user; (ii) the differences between a form’s owner, i.e. a ministry or agency issuing the form, versus that of the form’s author which could be either that government ministry, or an outsourced third-party; and (iii) what some of

the power struggles are that arise between users and issuers and how they can be mitigated through fairer design. In order to define fairness within the context of government forms design there needs to be clarity on what constitutes a forms user. Such clarity concerns should be developed alongside matters of accountability between owners and authors, while also considering the challenges that arise from user-issuer power imbalances.

While forms can and do exist as standalone documents, the process includes not just the form itself, but explanatory sections with instructions intended to help users with navigating and filling the fields. In addition, there are response elements which typically involve an acknowledgement letter, email, or confirmation message indicating the form has been submitted or received. Sarangi and Slembrouck refer to information-seeking documents as *application forms*, and explanatory notes as *leaflets* (Sarangi & Slembrouck, 1996, pp. 127–128). In making this distinction, the authors point to the fact that even though both parties are participating in the same process, user needs are not always aligned with issuer exigencies.

A core purpose of such explanations is to counterbalance present disparities of power. But regardless of whether explanations are provided separately, or integrated within the form itself, the clarity that they afford is crucial to creating fairness conditions within a forms environment.⁷³

Explanatory documents or sections collectively constitute the forms process, and therefore represent the user journey for the form filler, i.e. the explicit user (please see Section 5.2). Waller and Delin discuss prototypes in document design, observing that “humans tend to group things into classes for the purposes of convenient identification and understanding, and that some members of those classes may appear to be more ‘central’ members than others” (Waller & Delin, 2010, p. 8). The form itself may be considered a central member of this process. But the design of “extra matter” (Norrish et

⁷³ Chapter 4 lists explanations as a key function of clarity, which is used to determine the extent of fairness in Singapore’s government forms. Chapter 6 shows how clarity, together with literacy and technology, can be collectively represented as design opportunities to reduce the effort required by users when completing digital government forms.

al., 1987, p. 21) also contributes to how users perceive the entirety of the process. Figure 5.1 below shows a simplified representation of this process.

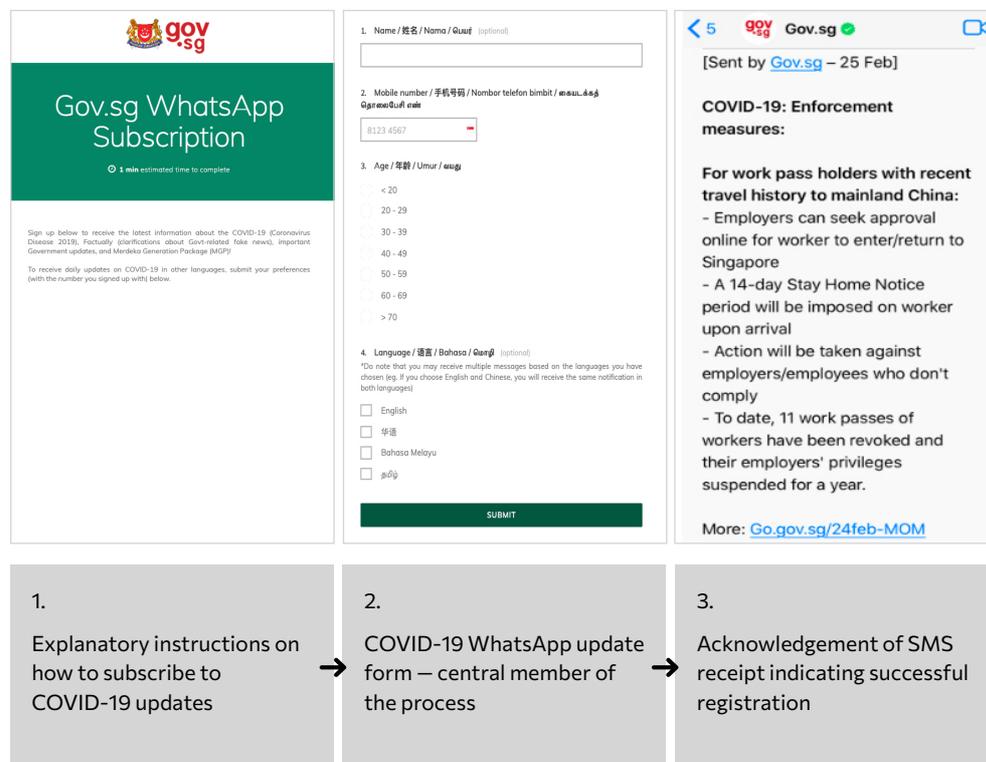


Figure 5.1: Simplified forms process model representing the user journey for COVID-19 text updates. The journey begins with an explanation of the subscription (left). Users then enter their details to register (middle). A confirmation message is sent to the user's phone confirming the subscription is working (right). Images reproduced with permission from Government Technology Agency (GovTech). Adapted from an article by Basu (2020).

Each of the document genres in Figure 5.1 make up the forms' process; however, their individual functions differ, and are expressed in their respective appearances. Users of government forms are therefore compelled to interact not only with a form, but with a range of accompanying documents that make up a multimodal document process, thereby having to contextualise and correlate each with the others in order to successfully complete the process.

Designing a fairness model for government forms therefore applies not only to the primary document of the process, but extends also to the extra matter, since a user identifies each individual document as being part of a holistic process. Chapter 4 analysed the gaps in digital government forms in

Singapore; this chapter expounds on the centrality of fairness to designing digital government forms, a model of which is proposed in Chapter 6.

5.1.2 Cultural perceptions of trust in government-citizen interactions

Specific discussions of government forms within the context of Singapore are detailed in Chapter 2. However, for the purposes of defining fairness, a brief note is made here regarding the cultural perceptions of government-citizen interactions which influence how users – locals and visitors – may experience communication with the state.

In researching the government's stance on public choice for Section 377A (the criminalisation of oral and anal sex between two male persons in public and in private in Singapore) Chen commented on the government's abilities to compromise and align its position with "the majority's preference despite concerted pressures from well-mobilised minority interest groups" (Chen, 2013, p. 109). While the broader topic of Chen's research is not germane to this chapter, what remains pertinent in this discussion is the willingness of the public to trust the government's ability to deal fairly across all involved parties. As a heterogenous society, Singapore balances issues of language (there are four official languages) and religion with ethnic integration and social stability. In You's study of fairness and social trust, the author argues that "societies that are fair in terms of distributive, procedural, and formal justice produce stronger norms of trustworthiness" (You, 2012, p. 703).

If You's argument is to be accepted, then trust is a corollary to fairness, and vice versa. Given the relatively high degree of trust placed by citizens in their government, it is safe to assume that fairness is highly expected of the Singapore government by citizens and residents, and thus ought to extend to all categories of state communication, including government forms. A suitable definition of fairness – one which is applicable in the context of Singapore's government forms – needs to also address the cultural attitudes of issuers and users in establishing a compromise, rather than exacting absolute standards of what constitutes a fair form. These attitudes subsequently define the quality of exchanges between a government and its citizens. The question then of

who qualifies as a user is important since the answer affects how issuers perceive their target audiences for whom the forms are created.

5.2 Who qualifies as a forms user

In their discussion of user experiences, Albert and Tullis propose three criteria: (i) a user is involved; (ii) this user interacts with a product or system; (iii) that the user's experience is of interest, and is observable, or measurable. There should also be "behaviour," or at least "potential behaviour," present in order to be considered a user experience (Albert & Tullis, 2010, p. 4). The importance of analysing behaviour through participation within exchange environments such as government forms is highlighted by Tromp et al., who advocate for the power of design to change behaviour (Tromp et al., 2011, pp. 3–19).

Users and behaviour are also noted in Waller's work on transformational information design, which cites the "needs of the user" (Oven et al., 2016, pp. 35–52) and Gibson's idea of affordance, where the "human perceptual system looks for action possibilities" (Gibson, 1977, pp. 67–83). Within this collective context, a user may be defined as any participant – an individual or group – who acts within a process, and whose behaviours or responses manifestly alter the outcome of that process.

5.2.1 Explicit and implicit users

These definitions do not imply that all participants in a given process carry equal status, leading to the need to make a distinction between **explicit users** and **implicit users**. Schwesinger's observations of users with many different needs and expectations reinforces Ives and Olson's position on "participation as a concept that includes a wide variety of behaviours, activities, and responsibilities, carried out by both users and system developers" (Barki & Hartwick, 1994, p. 60). System developers here refer to form issuers, i.e. the authors and creators; this distinction is further discussed in Section 5.3.

A user who becomes involved along the process will inevitably approach with motivations that differ from the others, thus giving rise to the distinction between explicit and implicit users: explicit users are participants for whom a process has been primarily created and whose responses are directed by the principal purpose of that process, whereas implicit users are participants

whose responses to the process are directed primarily by explicit or other implicit user actions.

Figure 5.2 below shows a simplified submission process regarding a bond deposit. The form, in Figure 3.3 on the following page, is issued by Singapore's Ministry of Manpower (MOM) and is used whenever a local resident or local organisation wants to hire a foreign worker. To do this, the local entity needs to put up a security deposit to the MOM and declare this amount in the form. The form is then sent to the MOM where an officer acts on its contents. The form may also be shared with the local entity's bank to verify the amounts. A number of users thus become involved in the process at different stages and with varying roles to ensure the purpose or telos⁷⁴ of the form is fulfilled.

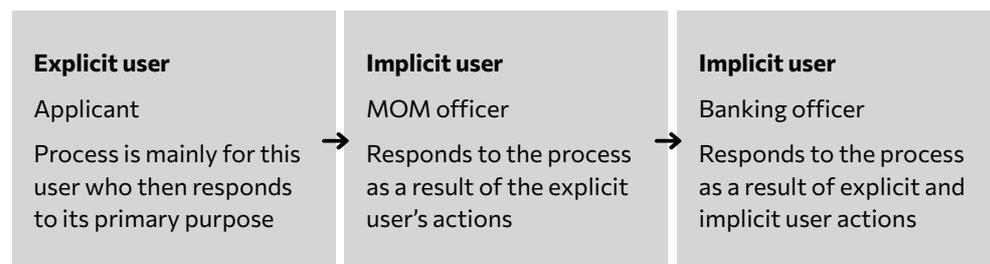


Figure 5.2: MOM Security Deposit Form the process showing the different stages at which one explicit user and two implicit users become involved.

An overview of the process for the MOM's Security Bond Form for Foreign Workers (Domestic and non-Domestic) demonstrates the differences between explicit and implicit user roles. This distinction is important to the objective of defining fairness for users since it: (i) addresses the question of who qualifies as a user; and (ii) helps establish a framework to identify design functions that facilitate or fail to provide fairness for all parties involved in the process. This is especially relevant in the second case study in Chapter 4, which discussed the impact of forms design on implicit users tasked with tracing and stemming the spread of COVID-19.

⁷⁴ The purpose or telos of a form is discussed in Chapter 6 alongside the teleological role of fairness in helping achieve this purpose.

Work Pass Division
18 Havelock Road
Singapore 059764
www.mom.gov.sg



**MINISTRY OF
MANPOWER**

Employment of Foreign Manpower Act (Chapter 91A)
Employment of Foreign Manpower (Work Passes) Regulations (Regulation 12)
Security Bond Form for Foreign Workers (Domestic and non-Domestic)

BY THIS BOND received this _____ day of _____ 20_____.
(Date indicated must be on/ before the Banker's or Insurance Guarantee start date.)

I/We _____ of (or having our registered office at) _____
_____ acknowledge myself/ourselves bound to pay
the Government of the Republic of Singapore the sum of SGD\$_____ ("the Obligation").

PURPOSE

I/We wish to apply for the issue of Work Passes:

- a for the persons whose particulars appear in the Schedule to this Bond (the "Schedule") ("the said persons");
- b for the number of persons indicated in the Schedule whose particulars shall be supplied from time to time on the date of their arrival in Singapore and when so supplied shall form part of the Schedule ("the said persons");
- c for the persons whose particulars may from time to time be included in the Schedule with the consent of the Controller of Work Passes prior to or on the date of their arrival in Singapore in substitution for those whose particulars appear in the Schedule ("the said persons").

**(Delete a, b or c as necessary)*

STATUTORY AUTHORITY

The Controller of Work Passes is agreeable to the issuing of Work Passes to the said persons on the following conditions to be observed by me/us in respect of the said persons, namely:-

- i. That during their stay in Singapore, I/we shall be responsible for the prompt payment of salary, be responsible for and bear the costs of their upkeep and maintenance, including medical treatment, and give them reasonable notice of and bear the full cost of their repatriation, ensuring that all outstanding salaries or monies due to them have been paid before their repatriation;
- ii. That I/we shall provide acceptable accommodation for them;
- iii. That, if any of them should die while in Singapore, I/we shall be responsible for the cost of burial or cremation or the return of the body to the country of nationality;
- iv. That I/we shall produce to the Controller of Work Passes any person whose Work Pass has been cancelled or whose Visit Pass/Special Pass has expired or who is required to report to the Controller at such times as I/we may be required to do so;
- v. That I/we shall employ them in accordance with the Work Pass applicable to them;
- vi. That I/we shall take reasonable steps to ensure that they comply with the Work Pass Conditions applicable to them, and such steps shall include (a) reporting to the Controller of Work Passes if I/we know they are not complying and (b) informing them of the Work Pass conditions applicable to them; and
- vii. That upon completion or termination of employment or resignation from employment of any of them, or the cancellation or revocation of their Work Passes, I/we shall inform the Controller of Work Passes in writing within seven days of such completion or termination of employment or resignation from employment and, subject to giving them reasonable notice, I/we shall immediately or within such period that may be specified by the Controller of Work Passes repatriate them.

And regulation 12 of the Employment of Foreign Manpower (Work Passes) Regulations provides that the Controller of Work Passes may require a bond to ensure compliance of the above conditions.

SECURITY DEPOSIT

I/We hereby deposit the sum of dollars _____ (SGD\$ _____) as security in respect of the performance of the above conditions.

NOW THE OBLIGATION shall be void and the cash deposit shall be returned to me/us if I/we at all times perform and observe the above conditions.

But should I/we breach any of the above conditions in respect of any of the said persons, then the Obligation shall be in full force and effect and the amount in respect of that person as indicated in the Schedule shall be forfeited partially or in whole by the Government of the Republic of Singapore. A partial forfeiture shall not extinguish the Government of the Republic of Singapore's right to forfeit the remainder for the same breach or a different breach.

Signed by**:	In the presence of:
NRIC/Passport No., Name, Designation & Signature	Name & Address of Witness Signature
for and on behalf of _____ Name of Company	
(to be filled up if non-domestic foreign workers are employed)	

The Schedule***

S/N	Name of Worker	Work Permit Number	Amount
1			

** For sole proprietorships or partnerships, it has to be signed by the sole proprietor or partner. For private limited companies, it has to be signed by a director, registered with ACRA. If the director wishes to appoint his employee to sign the form, he must provide a written authorisation to MOM.

*** To provide another worker's particulars, please provide the details on a separate A4 size paper and attach it together with this Security Bond Form.

WPCM 013
The information is updated on 31 Jul 2018

Figure 5.3: MOM Security Deposit Form. Image reproduced under the Ministry of Manpower's (MOM) terms of use, available at <https://www.mom.gov.sg/terms-of-use>.

It follows that where all three participants act upon and thus alter the outcome of the process, then each participant may be identified as a user. Any definition of fairness that targets users therefore needs to include not only the explicit user, but also other implicit users involved in the process.⁷⁵ Sless captures the benefits of including implicit users in design processes. Writing about components that allow users to check their responses on tax forms, Sless noted that “these features also dignify the task for people processing the form – often themselves the victims of a form’s poor design” (Sless, 1999, p. 146). Interestingly, fairness between issuers and explicit and implicit users goes beyond transactional values to a more participative paradigm as demonstrated by Franke, Keinz, and Klausberger.

In a study of how expectations of fairness in an exchange are influenced by users deciding whether or not to participate, the authors posited that such participation involved a symbiotic relationship between themselves and the organisation; individuals draw perceptions of their own outcome-to-input ratio and what they feel they “deserve” which is derived from the perceived outcome-to-input ratio of reference parties (Franke et al., 2013, pp. 1495–1516). These parties are the organisations initiating the transaction with users.

Franke et al.’s study, coupled with discussions in Chapter 3, suggest that users introduce expectations of fairness into any exchanges, regardless of whether the exchange is mandatory or optional. This user-mindset raises the need to address fairness at a participative level, where users place perceived value on their roles in the process in relation to the outcomes of that process. A viable definition of fairness in government forms should therefore include participative perception as a criterion for forms issuers. But as with explicit and implicit users, issuers too are better understood by their roles in the forms

⁷⁵ The separation of users into explicit and implicit roles is helpful for forms issuers to identify the various points at which each user-type becomes involved along the process. Ultimately though, when applying the fairness model to forms users, it is the *least advantaged user’s needs* that are taken into consideration. This ties in with Rawls’ difference principle, whereby the provision of any opportunities in a society should be made with a view to benefitting those members who are less fortunate (Rawls, 1999, pp. 65–66). It follows then that the concept of “least advantaged user” is central to notions of equitable participation. “Least advantaged user” is discussed within the context of the fairness model in Chapter 6.

creation process. This is important since those who own the form, and those who design it, are not necessarily the same entity. Subsequent chapters treat the term “issuers” as a collective group of forms owners and designers. In this chapter, it is helpful to review the differences in roles, characteristics, and levels of accountability between “forms owners” and “forms designers” within the broader context of government forms and fairness. These differences are also useful in providing localised insights of how some government ministries in Singapore tend to approach the design and development of public forms.

5.3 Accountability issues with forms owners and authors

Waller et al. refer to forms as transactional documents (Waller et al., 2016), observing that users enter into a shared exchange with the form's issuers, i.e. the form's owners and authors. However, authors and owners are not always the same entity, a distinction with implications for how fairness is defined and facilitated. McKeen et al. note "the relationship between users and developers has always been symbiotic....what facilitates effective collaborative effort is effective communication" (McKeen et al., 1994, p. 434). Such modes of symbiosis are equally applicable to form owners and authors; any lapse in effective communication inhibits the facilitation of fairness, which in turn affects users. An Internal Revenue Service (US) report evinced this point, citing the following:

The American people simply do not believe that the IRS, or other government institutions, are on their side. They do not want to get more than they deserve, but they feel that the IRS should provide enough help to ensure that every taxpayer gets everything he or she does deserve. [...] These feelings adversely affect their attitudes toward the whole tax filling process, and the tax forms in particular (Internal Revenue Service 1980, in Barnett, 2007, p. 11).

Barnett points to a deficiency of trust in government systems as the problem. However, the IRS report links this dearth of trust to the lack of help provided in the form, which raises the question of who is responsible for a form's failures – the owner or the author.

The issue is particularly pertinent to Singapore: in many cases, shorter and more simplified forms have been designed internally, usually as Microsoft Word or PDF documents. Longer forms, and those involving complex layout decisions, have often been outsourced to advertising, communications, and design agencies⁷⁶. These entities may possess considerable independence and oversight of the design process. Such practices blur the boundaries between

⁷⁶ There are no established or published guidelines for this practice. Information on this trend is from: (i) working with government agencies in Singapore as an external consultant from 2007 to 2017; and (ii) several conversations with key decision-making staff working across Singapore's government agencies and ministries.

“language and layout, and the roles of writer and designer” (Waller, 1999, p. 9). However, with the introduction of government-owned services such as *FormSG*, ministries and agencies have been retaking ownership – and therefore accountability – of the forms design process, albeit within the constraints of the *FormSG* service. This service is discussed in Chapter 2.

Reflecting on the usability of forms, Barnett comments on how effective communication takes place when understanding of terms is shared; without such understanding, sharing between users and issuers deteriorates or is even lost completely (Barnett, 2007, p. 10).

The responsibilities of building understanding and creating appropriate contexts for users rest with the form’s issuers who may or may not be the form’s owners. Nonetheless, the institution releasing the form is ultimately responsible for the form’s performance and failures. Fairness in this case then goes beyond the identification and inclusion of explicit and implicit users, to the form’s overall ability to provide sufficient opportunities to help all users achieve their desired outcome. A suitable definition therefore needs to adopt a cooperative approach that takes into consideration who sets criteria for fairness standards, and who is responsible for misunderstandings and user errors. Distinguishing between owner and author helps clarify this approach, while collectively holding the issuing institution responsible for potentially unfair design practices.

Moreover, the lack of clearly defined roles between form owners and authors affects how fairness is implemented in digital government forms in Singapore. This is largely because: (i) unlike GOV.UK, there is no unified design system in Singapore’s government documents and websites, which means individual offices can produce forms according to their own interpretations; and (ii) the criteria for fairness in information design is currently pegged to varying interpretations.⁷⁷ Accountability is thus diminished for those parties ultimately responsible for the form’s performance and failures, often with users bearing the brunt. There are no publicly available reports of form failures

⁷⁷ Chapter 6 details a framework that lists the criteria against which fairness can be pegged to and measured when designing government forms.

in Singapore;⁷⁸ however, the IRS report suffices in addressing problems that Singapore residents would also likely encounter when using forms under similar circumstances.

⁷⁸ *FormSG* is discussed in Chapter 2, along with regulations that make the process more accountable and open to scrutiny.

5.4 Fairness in user-issuer relationships

In examining support for the 2019 Australian bush fires, Sless argues that the “victims of natural disasters are now also finding themselves, perhaps for the first time in their lives, the victims of a manufactured disaster – a government form” (Sless, 2020). Sless makes specific reference to the impact of the design on users, which the author highlights in Figure 5.4 below i.e. “the many people who routinely have to deal with forms like this to receive government support” (Sless, 2020).

Exchanges between users and issuers occur within an unequal power relationship. This is because user responses are subordinated to the issuer’s intentions which are expressed in the form’s typographical layout. The power dynamic of this relationship is central to creating fairer government-citizen communication, especially if there is an expectation that government forms ought to treat all participants equally.

7 Do you receive an Income support payment or pension (for example, Age Pension, Newstart Allowance, Youth Allowance, Service Pension from the Department of Veterans' Affairs or Farm Household Allowance)?

No *Go to next question*

Yes You may not be eligible for this payment.
Call us on **180 22 66**.

8 Are you subject to an Assurance of Support agreement?

A person is not eligible to receive Disaster Recovery Allowance if they are subject to an Assurance of Support agreement.

No *Go to 10*

Yes *Go to next question*

Figure 5.4: Extract of the recovery allowance form, State of Victoria, Australia. Image source: David Sless, Communication Research Institute, available at: <https://communication.org.au/government-forms-disaster/>.

If fairness is to be allocated equally to all parties, it is important to first consider the perspectives of each of these parties, i.e how the experiences for users can be enhanced without making unreasonable demands on the issuer.

5.4.1 Fairness concerns from a user perspective

Unlike company-customer or survey-feedback forms, government forms are mostly non-negotiable; users are thus unable to ignore or opt out of the process when communicating or fulfilling a need (Schwesinger, 2017, p. 613). Moreover, users are also compelled to accept the design decisions of forms issuers, and respond within set environments and pre-determined processes established by the issuer.

While responsibility for fixing errors falls to issuers, the consequences to users as a result of such errors are serious and often largely unavoidable. These ramifications include an array of punitive measures, from applications being returned or rejected, to prosecution and curtailment of rights and privileges for failing to respond accurately.

The immigration documents, on the following page, are examples of how such forms require valid entries and declarations, but do not provide sufficient visual clarity for users. This creates problems across a wide base of users who are affected by the form's inability to address literacy, clarity, and technology concerns.⁷⁹ But the consequences for this confusion are borne by the user. Figure 5.5 on the following page shows the paper version of both forms. However, the imbalance of power and culpability has a significant impact on how fairness is facilitated for users of digital government forms in Singapore.

⁷⁹ These concepts are developed in Chapter 5, and form the basis for analysing the case studies.

Form 14 is used by visitors who are extending the duration of their visa in Singapore. The form asks for a visitor's disembarkation/embarkation number, which is a unique 10-digit number printed at the top of every arrival card. The format in which this number is requested does not match that given on the arrival card: Form 14 follows a 3-3-1 format, whereas the disembarkation/embarkation card follows a 5-5 format. This incongruence is a potential source of confusion for visitors filling in both forms.

Form 14 attempts some clarity by providing paratext to explain where the number may be found on the arrival card. However, the explanation does not say what, where, or how long this number is. Nor does the white arrival card make this clear. First-time visitors are thus compelled to make a judgement of whether their unique ID is the 10-digit barcode or the title of the card, IMM27I.

Any error made in Form 14 poses a risk to visitors of having their request for visa extensions delayed or cancelled owing to incorrect information, which includes providing the wrong 10-digit number. Fairness in this case requires that users are given clarity in a government-visitor exchange that is non-negotiable, i.e. one in which visitors cannot opt out of when seeking a visa extension. Rearranging the boxes in Form 14 to follow the pattern on the Disembarkation/Embarkation Card would not only lead to greater consistency and understanding, but also remove the need for additional explanations, thereby reducing clutter.

Other incongruences are present, including mismatched appearance and layout between the two forms, different number of boxes for information, and indiscriminate use of square brackets in official and non-official sections of the card. The first case study in Chapter 5 analyses the digital version of the Disembarkation/Embarkation Card. However, a brief note on some of the issues is useful here for context. Barnett claims "since the language of forms involves graphic elements and layout, these form an important part of the grammar of the form" (Barnett, 2007, p. 11), i.e. conventions used to organise a form's lay out. But while forms are organised and laid out to facilitate two-way communication, this communication is not equal between users and issuers. In

establishing the purpose of a form through defining the nature of its questions as well as its typographic appearances, which users are then obliged to accept, the issuer holds a position of dominance. This power dynamic is evident in Miller's observation:

If one examines virtually any filled out form, what is most impressive to the eye is the printed content of words and lines and boxes, whereas the user's work in producing his data on the form is, to the eye, unimpressive and insignificant (Robert Miller, in Barnett, 2007, p. 14).

Miller calls this phenomenon an “inverted state of affairs” (Robert Miller, in Barnett, 2007, p. 14), reflecting on the reality that a user's input is subordinate in the process. In writing about the development of insurance forms, Sless also suggests that “we see the texts we write and read from our own unique position in the communicative environment” (Sless, 1999, p. 150). User response is thus determined by the extent to which the form's design is empathetic to the effort needed by users to complete the process. This ties with Penman's view of the “ever increasing barrage of incomprehensible documents which if properly managed will bring greater equity to ordinary citizens” (Penman, 1992, p. 2). Fairness in forms therefore needs to account for design decisions that demonstrate empathy alongside the threat of punitive consequences for users.

5.4.2 Fairness concerns from an issuer perspective

Power and Cavallotto outline the implementation of Europe's multilingual forms in English, Italian, and German, in their paper about the European Community's “longterm objective of producing official documentation in all the main languages of the community” (Power & Cavallotto, no year, p. 17). From a typographical point, all the languages are represented in a single script, i.e. Latin, whereas for Singapore the four official languages are spread across three scripts: Latin, Chinese, and Tamil. This brings about a separate set of challenges when designing forms for multilingual or multi-ethnic populations,

since the problems solved for one script, Latin in this case, are not necessarily transferable across Mandarin and Tamil.

Given literacy rates in Singapore for English are 97.5%⁸⁰, the question of whether to produce forms in all four official languages needs to be balanced against certain exigencies. The problems of partiality through language, for example, are not confined to user experience, but result from a deeper dispute in what the philosopher John Rawls calls “reasonable and rational ideas...of society as a fair system of social cooperation” (Rawls & Kelly, 2001, p. 6) discussed in Section 3.6. In societies like Singapore with four major languages, partiality shown towards English, for instance, threatens to exclude 2.5% of the country’s population. Problems that stem from excluding swathes of users – and the resulting errors that arise from producing government forms in a limited number of scripts – are better understood when situated within the context of readability.

Fisher and Sless have observed that “significant improvements in communication are often due to radical changes in the reader’s task rather than to incremental refinements in the designed object” (Fisher & Sless, 1990, p. 118). This suggests communication between users and issuers through forms should not only include the effective design of its graphical elements and layout, but also how these elements enhance readability, thereby reduce effort. Berghammer and Holmqvist have defined readability as “assessing word choice and sentence length, allowing the user to compare the readability level of a given text with a person’s reading ability, or terminal educational age.” (Berghammer & Holmqvist, 2012, p. 211).

This definition ties in with Waller’s reading strategies which observe that “information documents of all kinds need to be read strategically” (Waller, 2012, p. 185). When applied to government forms, fairness needs to take into account literacy and clarity issues to facilitate clearer communication. Any

⁸⁰ Education, Language Spoken and Literacy, (Literacy Rate Among Residents Aged 15 Years and Over) in Department of Statistics Singapore, 2019, available at <https://www.singstat.gov.sg/find-data/search-by-theme/population/education-language-spoken-and-literacy/latest-data>, accessed 13 March 2020. Note: there is some vagueness as to whether literacy rates apply only to English or to all four languages.

facilitation of fairness will consequently require forms issuers to reduce barriers to literacy and clarity for all users, but especially for the least advantaged groups. Overmyer considers the communicative purpose of typographic documents, and sums up the range of issues discussed:

The anticipation of audience — ready-made or only dimly perceived, by degrees willing or disinclined — is very much a part of any consideration of subject or purpose. If...a typographic document is an example of language use, if indeed the intent is to communicate with others, then...the needs and expectations of these potential users will certainly be reflected to some extent in the artifactual character of any particular document (Overmyer, 1991, p. 206).

This summation reinforces the problematic areas identified so far in this chapter, while serving as a corollary to the case for legal design as a framework to mitigate such problems. Legal design is discussed in Section 5.5. The impact of poor design on users highlights the unequal power dynamics which exist between forms issuers — authors and owners — and users, and uncovers the unfairness in users having to bear, the often punitive, consequences of poor design failing to anticipate users' expectations along the forms process.

These issues point also to the vagaries of fairness as a concept in document design, and the difficulties forms issuers face in determining how fairness is facilitated for users. Waller touches on this issue as an opportunity for issuers to go further, by creating documents designed not only for their accuracy and legal soundness but also by the degrees to which they enable a good working relationship, cooperation and effective contract management (Waller et al., 2016) thereby implying that issuers might benefit from the principles of legal design as a framework to facilitate greater fairness in government forms.

5.5 Principles of legal design

Schwesinger's previous statement that "government forms are often part of legal or administrative acts that require conformity with the law" (Schwesinger, 2017, p. 613) ties in with an explanation of legal documents offered by Haapio: "legal documents are information products that look for ways to communicate their contents more clearly and effectively" (Haapio, 2014, p. 451). Haapio also makes the argument that the "ultimate judges as to what makes a 'good' document – legal or otherwise – should be the end-users: those impacted by or expected to act upon the document" (Haapio, 2014, p. 452).

This argument reinforces the observations of Waller's and Gibson's, who underscore needs of users in information documents. Justification for designing legal documents that are user-centred is also provided by Hagan, who refers to legal design as the application of human-centred design to make legal systems and services more usable, and more satisfying and that adopting a design approach to legal services puts people and their contexts as the focus (Hagan, no year).

Haapio and Hagan emphasise the need for clarity for users in the design of legal documents. However, I posit that for fairness to occur, the end-user should not be the ultimate judge of a form's design. This is because such a stance does not take into consideration issuer exigencies. While placing users at the heart of design decisions is empathetically viable, allowing them to determine the final design of the form risks placing unreasonable burdens on issuers. This goes against the idea of social cooperation, discussed later in this chapter. Hence, legal design – on the whole – does not fit squarely into a framework for fairness in designing digital government forms.

Nonetheless, there are certain aspects of legal design that are practical. This thesis considers the following legal design principles, which overlap with a wider definition of fairness discussed in other chapters: (i) emphasise on user needs; (ii) taking context and behaviours into account; and (iii) addressing the extant power dynamics between forms users and issuers. Such arguments and reasons are collectively embedded in the framework of legal design, which, as

Hagan observes, focuses on people's comprehension of the rules and systems that apply to them. Any definition of fairness in government forms therefore needs to, at the very least, incorporate some aspects of legal design, if not for anything else then to attenuate costly design errors for both, users and issuers.

5.5.1 Legal design: a framework for designing government documents

The term "legal document" encompasses several disciplines in which users of are expected, or compelled, to act within prescribed parameters of the law or regulations. These parameters are vast and go beyond the scope of this thesis. For the purposes of this research therefore, a legal document is considered to serve the purpose of facilitating legal discourse between two or more entities.

Bhatia suggests "legal discourse is different from most other professional discourses, in that the nature of its interpretation process, whether spoken or written, is very much dependant on the context in which it is likely to be applicable" (Bhatia, 2013, p. 37). The context and interpretation Bhatia refers to encompass a number of documents, including government forms in Singapore, where any discourse between a user and a ministry is likely to occur within Singapore's judicial and regulatory framework. This is made evident in instructions and forewarnings of punitive actions which are included in most forms. Such instances are discussed in the case studies in Chapter 4.

Nevertheless, research by the *d.school* at the University of Stanford situates the purpose of legal design in enhancing user experiences through documents that are both, "legally strategic (for complying with regulations and protecting legal interests) and user-friendly (enhancing the lay person's engagement with complex information, their comprehension of it, and their overall experience with the legal system)" (Stanford Legal Design Lab, 2018).

This design-centric approach to enhancing user experiences with legal documents is reflected in Bhatia's model of "easification" to make texts more accessible: "Easification not only promotes accessibility and readability, and dealing with ambiguity and difficulty, but also provides solutions to text layout without losing...the essential form and content of the original text" (Bhatia, 2010, p. 56). Bhatia's "easification" model is thus a useful lens through which

to examine reduction of effort for forms users. Likewise, the need for textual and visual clarity in legal documents – which include government forms – as outlined by Haapio and Hagan are thus useful for analysing how fairness may be facilitated in government forms. These design functions are adapted to a framework for analysing government forms, discussed in Chapter 4.

5.5.2 Role of legal design in changing user behaviour

The centrality of the user to forms processes is evident from multiple studies and sources. Writing about user-centred design approaches, Garrett proposes that “any user experience effort aims to improve efficiency. This essentially comes in two key forms: helping people work faster and helping them make fewer mistakes” (Garrett, 2011, p. 15). Increasing efficiency and reducing errors is discussed in a study on the development of new designs for insurance forms by Frohlich who states that form fillers follow the principle of least effort and will “only read what seems to be necessary to maintain form-filling progress” (David Frohlich, in Sless, 1999, p. 137).

Much of Garrett’s and Frohlich’s observations are rooted in efficiency of completion. This is traditionally how forms design has been approached. However, this is not primarily applicable to fairness in design, since the focus is not on speed but on completion. Put another way, fairness in forms design is about empowering every user to complete the form in order to achieve their desired goals. Attention is thus given to the design of the form, as well as the efficiencies that facilitate its completion.

Participation in a process, then, is not as much contingent on how quickly the process can be completed, but rather how many are able to complete the process. This is a departure from approaches that emphasise speed in form-filling; the focus shifts to approaches that favour least advantaged users but without taxing either the most advantaged users or the form issuers. This places the spotlight on user-issuer cooperation, rather than primarily on user reaction. Chapter 6 explores this approach in detail. However, parts of this approach appear in various studies on forms design, discussed in this section.

Frohlich's study, for example, observed user behaviour as involving minimal scanning and deciding whether the questions in a form required answering or not. This behaviour was subsequently altered through design changes in the form's logic, which prompted users to make decisions about answering only after the question had been read, thereby reducing the possibility of user errors or process abandonment. Slowing down the process in this case improved user experience.

This ties in with Tromp et al.'s notion for the power of design to change behaviour. Haapio and Waller cite examples from the Creative Commons Licensing repository, pointing to instances where principles of information and legal design overlap – in this case through simplified icons, simplicity of language to aid readability, and colours and illustrations to aid comprehension of legal text for lay users. These applications are relevant also to government forms that regularly act as instruments of the law for citizens contracting with ministries and public agencies. Use of illustrations, icons and visual aids offer a sense of familiarity for users wading into new and unknown processes. This is key to designing government forms, since clearer explanations and plain language work in favour of casting forms as instruments to facilitate fairer government-citizen transactions.

5.5.3 Role of legal design in aiding comprehension

Documents created for legal purposes are regularly perceived as having been designed for lawyers by lawyers (Haapio & Hagan, 2016, p. 381). This implies that documents are created from the point of view of the authors, with scant regard for user needs. Such perceptions also suggest that the design of legal documents “matter to contract users only as long as they are instrumental in achieving their goals” (Passera, 2015).

Absent any consideration of users, the comprehensibility of documents – legal or otherwise – suffers at the expense of periphrastic and inaccessible content which is predominantly issuer-centric. Writing on how information design professionals can produce better documents in general, Carliner calls to attention the problems with voluminous documents including books,

booklets, and long direct mailers, which result in a user either reading too fast for effective comprehension, or ignoring the information (Carliner, 2002, pp. 42–51). Part of the effectiveness of reading long or dense documents falls within the purview of clear and comprehensible language. A need for clear language and layout is expressed in the Plain Language Act (US):

The Plain Writing Act defines plain writing to mean writing that is clear, concise, well-organised, and follows other best practices appropriate to the subject or field and the intended audience. It covers both paper and electronic information. Although it does not apply to federal regulations (there were political obstacles), it applies to any other document that: (1) is necessary for obtaining any federal government benefit or service or for filing taxes; (2) provides information about any federal government benefit or service; (3) explains to the public how to comply with a requirement that the federal government administers or enforces (Cheek, 2011, p. 53).

Of particular significance in the Plain Writing Act is the emphasis on clarity and organisation intended for users, as well as the need for plain writing to extend to government–citizen documents. Cheek offers tax filing as a key example of plain writing to benefit users, noting also the need for such clarity to extend to both paper and online formats. The applicability of legal design principles to therefore improve readability of documents extends across document genres, including government forms. Writing on these genres, Passera states that:

[it is] crucial to see contracts as a document genre similar to instructions and user guides: this is because not only do the rules need to be fair and consistent, but they also must be logically and clearly delivered if we want contract readers to apply them in practice and be compliant (Passera, 2015)

By concentrating on user comprehension, legal design acts as a potential framework to mitigate literacy problems implicit within complex information environments, including forms. Such mitigation extends also to accompanying explanatory notes and responses, e.g. a letter of acknowledgement, SMSes, email confirmations, error messages, and prompts that are produced during the form submission process. Therefore, any definition of fairness applicable

to the design of government forms needs to encapsulate user experiences — beyond basic form fields and other input elements — that are affected by explanations, responses, and errors. These could be the result of poor graphic and typographic decisions. They could also stem from technological oversight, as well as from human-driven bias embedded in cultural perceptions and attitudes. Prevailing ideas of fairness are thus better understood when examined in the context of related disciplines, discussed in the next section.

5.6 Existing definitions of fairness

The concept of fairness is broad and adaptable across numerous disciplines seeking to integrate its meaning into their own individual scope of reasoning. This section analyses some of the definitions and terminologies of fairness, employed in these varied disciplines, to determine if any commonality exists that is pertinent to and overlaps with forms design. The disciplines considered here relate to the wider areas of law and justice, sociology, economics, and morality and ethics. These areas have been specifically selected for their well-established approaches to the concept of fairness, together with extensive vocabularies which help clarify and contextualise fairness. This section also considers the limitations of these existing definitions to the field of forms design. The findings and analysis from this, and other sections in this chapter, contribute towards a definition of fairness that is suitable for government forms design.

Fairness is better understood when analysed in connection with related terms such as “equality, golden rule, impartiality, objectivity, respect, code, and law” (Dator et al., 2006, p. 20). Of these, “impartiality” and “objectivity” are of particular interest in determining how fairness may be defined and facilitated in government forms. In writing about Broome’s theory of fairness (in the Proceedings of the Aristotelian Society 2006) Hooker circumscribes formal fairness to “applying rules consistently and impartially” and suggests that formal fairness is noticed when it is absent (Hooker, 2005, p. 329). Hooker states that this is a bad thing because rules made under formal fairness can be impartially implemented, even if morally divergent. In locating fairness within the context of consistency and impartiality, Hooker provides a useful segue into further discussions of the concept in other related areas, many of which share similar approaches and vocabularies. These notions are central to forms design, given (i) the inconsistencies of the two government forms discussed in Chapter 4, and (ii) the suspected presence of implicit bias favouring digitally-savvy users over those with limited digital knowledge or access to technology.

5.6.1 Fairness as a function of social cooperation

Writing about fairness within the context of justice, Rawls emphasises social cooperation as an expedient to understanding participation and behaviour, and advances the idea of mutual benefit between participants in an exchange. To this end, Rawls lists three ideas that are central to the wider discourse of fairness: (i) social cooperation; (ii) reciprocal acceptance; and (iii) participant goals and gains:

(a) Social cooperation is distinct from merely socially coordinated activity – for example, activity coordinated by orders issued by an absolute central authority. Rather, social cooperation is guided by publicly recognised rules and procedures which those cooperating accept as appropriate to regulate their conduct.

(b) The idea of cooperation includes the idea of fair terms of cooperation: these are terms each participant may reasonably accept, and sometimes should accept, provided that everyone else likewise accepts them. Fair terms of cooperation specify an idea of reciprocity, or mutuality: all who do their part as the recognised rules require are to benefit as specified by a public and agreed-upon standard.

(c) The idea of cooperation also includes the idea of each participant's rational advantage, or good. The idea of rational advantage specifies what it is that those engaged in cooperation are seeking to advance from the standpoint of their own good (Rawls & Kelly, 2001, p. 6).

Rawls' notion of social cooperation, and the principles it incorporates, suggests that fairness is both a product of and a facilitator for ensuring the acceptance of terms, by all participants involved, that govern an interaction. This acceptance is not tantamount to equality, as Rawls points out, but is instead rooted in reciprocity and mutuality. Additionally, there is an indication of compromise: participants entering into a transaction with each other are aware of imbalances that may exist in the power dynamics between the parties involved, but accept this imbalance on the premise that everyone achieves what they set out to gain. In other words, users are willing to accept issuers' terms and conditions so long as issuers and users both get what they

want out of the transaction. The ideas of the reasonable and the rational as a means to facilitate cooperation are key markers in the fairness paradigm.

It must be noted as well that while compromise is central to the concept of fairness, there exists a parallel need to preserve non-negotiable elements of cooperation, i.e. aspects which are essential in order for any exchange to occur in the first place. For example, language standards in government websites – discussed in Section 5.4.2 – need to ensure a basic level of inclusivity for all participants since government documents are intended to reach the widest possible audience. Likewise, issues of readability and legibility, clarity of text, use of structured layouts, and access to technology all drive the cooperative mechanisms between participants in an exchange. But which of these may be considered negotiable or non-negotiable is contingent on what Luna calls the salience value given to each element. This is determined by: (i) a reading of the writer’s intention; and (ii) the assumption of the reader’s requirements (Luna, 2018, p. 62).

While the premise of compromise is implicit in Luna’s proposition – readers and writers are both required to acknowledge and negotiate their needs – cooperation cannot happen without all parties recognising and accepting the rules and procedures needed to regulate the exchange. In other words, compromise is contained within the non-negotiable parameters that all participants accept as necessary. Fairness as an act of social cooperation then is not a matter of blind compromise, but the establishment of rules and regulations that all participants agree to accept and abide by.

Luna cites the work of Crystal and Delin, stating that “part of the role of typography is to support the aim of writing in relation to an audience” (Luna, 2018, p. 62). In the context of government forms design, rules and regulations may include the need to optimise user-experience through the considerations of text-sizes, layout and format, field descriptions, the use and placement of paratext, and publication in all official languages where feasible. The feasibility of these needs, however, needs to be balanced against issuers’ exigencies of production costs, literacy levels, access to technology, and data collection.

The theory of social cooperation is reflected in the works of Wenger et al., who write about communities of practice, i.e. “groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis” (Wenger et al., 2002, p. 4). The authors have also suggested that organisations and systems benefit from cooperative exchanges that “knit the whole system around core knowledge requirements” (Wenger et al., 2002, p. 6).

It follows then that fairness applies across an array of participant systems, including government documents. Given that notions of social cooperation lend themselves well to interactions between organisations and users – as Wenger et al. suggest – then the applicability of such notions to government-citizen exchanges can be considered equally feasible. This hypothesis was tested in the case studies in Chapters 4.

5.6.2 Fairness as a function of the golden-rule

Writing about laws governing international trade, the economist Suranovic suggests fairness overlaps with notions of the golden-rule, which influence behaviours of individuals and groups involved in participative exchanges. The author claims that the golden-rule – typically understood by the saying, *do unto others as you would have them do unto you* – applies more to morality and ethics, rather than fairness: murder, for example, is an issue more easily understood in terms of morality, but perhaps less so when described as an act of unfairness. Nonetheless, there are instances where fairness concatenates with morality and ethics. In discussions of cheating during games or trade, Suranovic states that rules have been violated and any harm, or even potential harm, caused to participants can be deemed unfair:

Fairness is a normative principle...used to suggest outcomes or actions that ought to, or should, occur. [...] Actions and outcomes ought to be fair, ought to be just, and they ought to be ethical. [...] In general, golden-rule unfairness arises when actions are seen as causing harm to others, when actions are inadequately helpful to others, or most commonly when countries or businesses are charged with violating some agreed or implicit set of rules (Suranovic, 2001).

In this respect, the golden-rule approach to fairness shares fundamental similarities with Rawls' basing of fairness on recognised rules and procedures, and the notion of unfairness as being a failure to comply with an agreed or implicit set of rules. Helpfulness or usefulness towards participants is another factor cited by both scholars who emphasise user needs in transactions and exchanges. In a separate study on the effects of fairness in trade, Suranovic states the actions of participants "are perceived as unfair only if some group expects to suffer losses as a result of the action," (Suranovic, 1997, p. 121).

This again ties in with Rawls' first and second points about the need for regulating conduct to benefit the participants of the process. Ideas of fairness and morality as regulators of interaction and behaviour are also supported by Turiel, who defines the moral domain as "prescriptive judgements of justice, rights, and welfare pertaining to how people ought to relate to each other" (Turiel, 1983, p. 3). Based on these arguments and definitions, fairness as a function of morality is useful in determining how participants relate to each other through a set of agreed rules that regulate a process and manage expectations, so that all participants achieve what they have sought out of that process. With respect to fairness in government forms, fairer design in government-citizen communication must consider the morality aspects of the golden-rule, i.e. the negotiation of fair terms which advances the expectations of users, while also preventing harm as a result of processes that diminish trust in forms environments, and in the institutions which issue these forms.

5.6.3 Fairness as a function of obligation and ability

In the previous discussion of golden-rule fairness, Suranovic asserted that an outcome "ought" to be fair. However, the implication of "ought" – which suggests an obligation – equating to "can" – which conveys an ability – is not necessarily true in all situations. Just because a state *ought* to provide help to citizens filling in forms, does not automatically imply the state's *ability* to provide such help. This distinction has an impact on how fairness is defined and facilitated by forms issuers in government-citizen exchanges. van

Someren Greve presents this distinction as an equation of how “ought” and “can” affect notions of fairness and the problems with the OIC approach:

Let us take ‘ought’ to express overall moral obligation, and ‘implies’ to express strict implication, or entailment. The principle, then, reads as follows: ‘Ought’ Implies ‘Can’ (OIC): For any agent S, and action A, necessarily, if S is morally obligated to do A, then S can do A (van Someren Greve, 2014, p. 913).

If one accepts that there can be situations where someone is morally required to do something she cannot do, one should... maintain that it is fair to require that someone does something even if she cannot do it, provided that she is morally required to perform the action in question (van Someren Greve, 2014, p. 920).

The first part of van Someren Greve’s argument discusses the proportion of OIC, which states that where an agent is morally obligated to perform a set of actions, then that agent can perform those actions. The limitations of this argument form the bulk of van Someren Greve’s discourse, which examines instances whereby the OIC approach fails to adequately address notions of fairness. Much of this discourse extends beyond the scope of this thesis; of relevance, however, is that an obligation is not tantamount to an action even if morality requires that the action be performed.

This has ramifications for how fairness may be defined and facilitated in state communication. While the arguments in this chapter have so far placed the user and the process at the core of fairness concerns, it must also be noted that the issuers — forms owners and authors — are not able to act on all these concerns given the limitations that arise from exigencies relating to cost, time, production methods, access to technology, and other practical considerations. The actions and behaviours of users within a process are susceptible to the distinction between the obligation and the ability of issuers to build a 100% fair form — further highlighting Rawls’ call for reciprocity and mutual understanding. In this case, any suitable definition of fairness must also take into account the problem of OIC in applying fairness standards and criteria to government forms.

5.6.4 Procedural fairness and outcome fairness

The discussions on fairness have so far focused on the approaches adopted by scholars of different areas, who define fairness within the context of their respective subject disciplines. Fairness as a concept itself, however, may be further analysed by breaking down the term into its component integrants. In their study of price fairness, Ferguson et al. have stated that consumers make a distinction in fairness between how prices of goods are set i.e. procedural fairness, versus the fairness of the offered price i.e. outcome fairness (Ferguson et al., 2014, pp. 217–231).

The importance of this distinction is highlighted by van den Bos et al., who argue that procedural fairness reveals more about what authorities think of the recipients of such procedures, i.e. “Does the authority trust me? Am I treated in a neutral manner? Am I accorded an appropriate standing? Am I included in the group, organisation, or society in question?” (van den Bos et al., 1997, p. 1035). These questions are central to how issuers frame relationships with users in information exchange environments where the issuing authority holds greater power.

The notion of assessing an authority’s character is reflected in the IRS report, discussed in Section 5.3, which cites low trust levels in government tax forms, and by extension, in the government departments themselves. This is an example of procedural and outcome fairness: lack of help for users across the process i.e. procedural fairness, leads to lack of trust in the form itself i.e. outcome fairness. Hollander-Blumoff and Tyler highlight the importance of individual user concerns as being a key facilitator of procedural fairness:

Individuals are motivated by concerns about the fairness of the process by which decisions are made, and that people place a high value on the fairness of the process by which decisions are made and on the fairness of the treatment they receive from others (Hollander-Blumoff & Tyler, 2008, p. 477).

In balancing the findings from the IRS report with Hollander-Blumoff and Tyler’s observations about process fairness and user motivations, this thesis posits that where perceptions of fairness about the authority, or author in the

case of forms design, are in question, a framework for procedural fairness may be adopted; whereas those areas involving outcomes — the actual form itself — benefit from a framework for outcome fairness. Maintaining this separation helps categorise the problems of fairness that are applicable to either issuers or users.

Based on the observations of Ferguson et al., and the examples provided by van den Bos et al., this thesis approaches procedural and outcome fairness as follows: procedural fairness involves user perceptions of how a specific process develops; outcome fairness involves user perceptions of the results of that process. Within the context of forms design, procedural fairness applies to the design processes that go into authoring the forms, i.e. the inherent decisions that determine development; outcome fairness applies to the form and any accompanying extra matter, i.e. the artifactual object which users interact with, either physically or electronically.

It must be noted that while outcome fairness deals with the object itself, and may thus be seen to be more central to user concerns, a suitable definition of fairness needs to also take into account procedural concerns. This is especially pertinent in the case of government forms, which may suffer — *viz.* IRS report, and the case studies in Chapter 4 — as a result of neglecting a form's authorial elements. In any case, the merits of this distinction are attributable to the potential for users and issuers to enter into a cooperative process — thereby establishing the promise of a community of practice, with mutual benefit for each — where users gain better reading of the issuers' intention, and issuers are able to adopt a more rigorous assumption of readers' requirements. The ability for forms users and issuers alike to cooperatively assess what makes a form fair, or unfair, through reciprocal acceptance of procedural and outcome rules provides greater opportunities for articulating how fairness may be facilitated in government forms.

5.7 A premise for fairness in Singapore's government forms

This chapter has so far explored various concepts of fairness in law, political philosophy, economics, and morality. Table 5.1 on the following page identifies relevant keywords that are most suited to a model of fairness within the scope of forms design in Singapore: these terms offer a lexicon that is consistent with extant design vocabularies, notions, and concepts reviewed in Chapter 3.

It must be noted that while all the terms in the table are applicable to the wider concept of fairness, in one area or another, there is a need to prioritise certain terms to establish a definition and inform the fairness model when analysing issues with digital government forms design. The list of terms in Table 5.1 are thus responsible for fusing the concepts of fairness in other areas specifically with the field of forms design.

To this end, Table 5.1 contains three key terms: (i) clarity; (ii) literacy; and (iii) technology. These terms constitute the foundation for the fairness model, owing to their prevalence in information design literature, as well as their flexibility in capturing the primary concerns of fairness particularly in forms design. Chapter 6 expounds on these terms, and applies their concepts to a fairness model for analysing digital government forms. This is achieved by equating effort needed to create and fill in a form, against the opportunities needed to fulfil this purpose. Moreover, these terms are used repeatedly in discussions around forms design, as well as in cognate disciplines on fairness discussed here and in other chapters. Accordingly, the intersection of terminology between the field of design and other disciplines gives these terms particular relevance when framing an overview of the fairness model.

The chapter also recognises the limitations of this approach to other areas within the discipline of design, and therefore seeks to frame a premise for fairness that is focused enough to fit the scope of this thesis while also offering avenues for further expansion of the definition to future research. The selection of terms has also been based on each term's applicability to the typographic decisions, content analysis, and issues affecting explicit and implicit user journeys, which influence the design of digital government forms.

Terms identified as vital to building a framework for analysing fairness	
Clarity	✓
Collaboration	✓
Compromise	✓
Cooperation	✓
Effort	✓
Equality	✓
Literacy	✓
Reciprocity	✓
Opportunity	✓
Optimisation	✓
Ought vs. can	✓
Participation	✓
Procedures and outcomes	✓
Technology	✓

Table 5.1: List of keywords and concepts discussed together with the identification of terms suitable for a definition of fairness within the context of information design processes in digital government forms.

Based on the discussions in the chapter, this research submits the following premise for why fairness can be used as a framework to analyse government forms in Singapore, discussed in the case studies in Chapter 4: in the context of document design, fairness marks the zone where user needs and issuer responsibilities meet. In other words, fairness marks the boundaries where the opportunities required by users, and the opportunities required of issuers, is congruent so as to optimise the form. Such optimisations ought to benefit both groups. This is because a form, unlike other documents, is a co-authored object, which remains incomplete without the participation of either party in the exchange. The exchange, however, is not balanced since issuers hold greater power over the forms environment since issuers largely

determine both, the quality of responses and the appearance of the responses from users. The imbalance is not necessarily deleterious since perceptions of power are implicit in government exchanges. However, the issue of trust and comfort when dealing with government is central to facilitating fairness in digital interactions. Hence, fairness does not only concentrate on the allocation of power, but also the alleviation of bias, specifically towards less advantaged users of processes, through well-being and trust discussed here and within the context of Singapore’s government, in Chapter 2.

Bias exists in different forms, and is extant to an extent in every system worldwide. But in systems that actively want to create conditions of fairness for all parties, it is reasonable to assume that parties would want to eliminate as much bias as possible. Accordingly, the focus narrows to implicit bias, i.e. “people can act on the basis of prejudice and stereotypes without intending to do so” (Brownstein, 2019). Brownstein’s observations on implicit bias are thus not only confined to Singapore, but apply to cultures around the world where digital-first and digital-only movements are gaining traction.

The findings from the case studies in Chapter 4, and fairness discussions in this chapter, are applicable to other e-government regimes where digital exclusion – albeit unintended – is exacerbating the issue of unwillingness to adopt e-services without greater transparency, comfort, and trust in their government (Lips, 2014, p. 191). As such, I posit that the fairness model in Chapter 6 is not feasible without satisfactory levels of trust in e-regimes, discussed in Chapter 3. High levels of trust in Singapore’s government by its citizenry⁸¹ therefore serve as a model of relevance and necessity for other nations hoping to utilise e-government in fairer ways that improve participative equality and reduce implicit bias.

But implicit bias is problematic since it is difficult to separate from cultural and social perceptions. This was also discussed in Chapter 4. As such, fairness requires that issuers identify instances of implicit biases within a forms environment, and offset these as much as possible by applying the principles of “good” document design discussed in Chapter 3, and later in

⁸¹ High levels of trust in Singapore’s government was discussed in Chapter 2.

Chapters 5 and 6. This is especially important when cooperation is needed from the largest possible group of users at a time of crisis. Chapter 4 discussed the Singapore government's efforts to mobilise its entire citizenry behind its contact tracing form. Issuers may therefore find it in their own interests to eliminate implicit bias in order to achieve active cooperation from users, rather than a reaction to coercion.

But cooperation requires compromise. van Someren Greve has noted in the "Ought vs Can" approach that an agent has a duty to perform a moral action even if that action cannot be realistically performed. Rawls takes a gentler approach to such obligations: "fair terms of cooperation specify an idea of reciprocity, or mutuality: all who do their part as the recognised rules require are to benefit as specified by a public and agreed-upon standard" (Rawls & Kelly, 2001, p. 6). Indeed, the notion of mutuality and reciprocity are more akin to cooperation as described by Cudd and Eftekhari. Writing on participation in social contracts, the authors assert:

The crucial fact about humans [is] that we are able to cooperate to produce more than each working alone, thus making it rational to cooperate under at least some terms. Self-interest and rationality imply a desire to cooperate provided that cooperators can do so without sacrificing their self-interest (Cudd & Eftekhari, 2021).

This assertion has two parts. The first part deals with the notion that cooperation comes about due to knowledge — or at least suspicions — that working together yields better overall results in some cases than if an individual were to attempt it by themselves. This makes cooperation not only possible but desirable under these circumstances. The second part suggests that a rational desire to cooperate comes about so long as the individual interests of parties is not affected. The statement may initially appear as contradictory to compromise, since it prioritises self-interest as a driver of cooperation. But this is not the case.

Cudd and Eftekhari's observations are directed namely towards socio-economic interactions. However, there are strong applications for document design policies. Within a government forms environment, there is little choice

for users to opt out if the exchange is mandatory. But this does not mean the environment itself cannot be made more cooperative, given the co-authorial nature of forms. This has been the impetus of past and present design works to improve user experiences.

However, the second part of Cudd and Eftekhari's observations is equally valid: participants typically do not enter a forms environment for the act of filling the form itself, but rather for what the action leads to, i.e. a desired outcome such as banking a cheque, receiving a tax benefit, or being granted a visa to enter a country. "Purposive behavior by individuals" writes Niskanen of bureaucratic objectives, "is the essence of social behavior" (Niskanen, 1971, p. 36). From this perspective, users are willing to go through the often tedious process of form-filling in order to achieve their purpose; they recognise not only the rules of the exchange that Rawls refers to, but also the purpose of the exchange itself.

The same applies to issuers. From an issuer's perspective, more effort is required to enhance the user experience, including making the form fairer. This can be seen as an "Ought vs Can" situation for issuers. However, this increase in effort for issuers should not go unaddressed; nor should a rational user in a cooperative exchange expect that user enhancements be carried out solely as determined by user experience. This is where fairness in design, and legal design diverge. Instead, fairness in design requires that issuer exigencies be treated as an equally valid variable in the cooperation calculus. It follows that issuers should only reduce the efforts of users to that point which is rationally feasible for both parties.⁸²

Hence, fairness – within the context of design – may be defined as the perceived optimisation of the user experience, which is regulated by implied or stated rules between users and issuers, but also in consideration of issuer exigencies such as distribution and data collection, production costs, and access to technology. Facilitation of fairness in government forms, then, is that extent to which mutually accepted rules of fairness ought to be applied in

⁸² The fairness model in Chapter 6 provides a framework to identify and achieve this point.

a cooperative process, which balances outcomes for participants against the procedural needs of issuers expressed throughout the form's overall design.

This premise, together with the terms identified in Table 5.1, allow for a qualitative approach to measuring fairness in government forms. These terms appear frequently in research on document design and legal design, as well as in other subject disciplines such as law and justice, economics, trade, and social policy which are included in this chapter. In defining fairness within the context of document design, it is important to frame the concept in a wider sociological context since government forms typically work across communal, political, and judicial spheres. This premise recognises the contributions of these terms towards greater appreciation for the role of fairness in designing digital government forms.

Similarly, the exclusion of certain terms in Table 5.1 does not imply these are irrelevant to fairness. Instead, they are framed as secondary terms in this thesis, and will be used in this research as a corollary to further discussions of fairness in government forms, as the need arises. Thus, having established a premise for fairness in digital government forms, this chapter provides a suitable framework for: (i) analysing digital government forms, in Chapter 4; and (ii) developing a fairness model, in Chapter 6.

5.8 Chapter conclusion

Previous chapters showed that document scholars have, to varying extents, advocated the need for forms to account for factors other than simply getting users to enter data. It would therefore be presumptuous to claim fairness has been absent from past works. However, fairness has not been contextualised or formalised to the extent where it can function as a framework and policy layer for designers of digital government forms.

This chapter discussed the need for a definition of fairness suitable to the study of government forms, which provides a framework for analysing forms and the processes by which they are created. The chapter established the need to focus on users, and defined the differences between implicit and explicit users to better understand which participants qualify as users, and how their roles differ along the form-filling process. In discussing relationships between users and issuers, the chapter looked at the differences between forms owners i.e. the issuing authority, and form authors i.e. the creators of the form. This led to identifying problems of accountability, which arise from not being able to identify and assign blame for development errors.

The chapter analysed the power dynamics that exist between forms users and forms issuers, which suggested a need for fairness not just in the design of forms but also in the process or environment in which a form fulfils its purpose. This led to an examination of legal design principles, which emphasise user needs and behaviours that issuers ought to consider when designing contractual documents. The chapter then looked at roles of legal design in modifying user behaviour through simplicity and “easification” approaches, as well as mitigating comprehension issues in complex documents.

These qualities formed the precedent for defining fairness in terms of user experience, while also considering the exigencies of form production. A discussion on existing definitions of fairness followed, to ascertain theories and vocabularies that would be useful in initiating a definition of fairness, including procedural and outcome fairness. The discussion concluded with a collective examination of the discourse and findings that emerged from each

section to establish an updated definition of fairness specifically applicable to digital government forms. The chapter also generated a table of terms relating to fairness, which are common to the varying disciplines examined here. These terms offer a framework for a fairness model – within the context of digital government forms design – which is discussed next in Chapter 6.

6. Fairness in design: a model to analyse digital government forms

6.1 Chapter overview

Previous chapters have discussed the role of fairness in other disciplines, and explored the benefits of applying the principles to forms design. Chapter 5 provided a framework for how such fairness principles can be merged with information design concepts such as literacy, clarity, and technology, to analyse digital government forms. This chapter attempts to frame these ideas within a qualitative model. Accordingly, the chapter attempts to answer three key questions: (i) What is the purpose or telos of a form within the context of fairness? (ii) How is the application of fairness in forms design different to fairness in other disciplines? (iii) Since fairness in design is an optimisation process for users and issuers alike, to what extent should issuers be obligated to provide literacy, clarity, and technology opportunities for users when designing digital government forms?

In this chapter I utilise the term **fairness in design** to describe a model in which to critically analyse how government forms are designed and deployed. The fairness model: (i) considers the intersection of roles between forms users and issuers within an information exchange environment; and (ii) facilitates

equitable participation for all parties through the provision of opportunities that reduce user efforts, but without placing unreasonable demands on issuers. In other words, the fairness model mediates the relationship between effort and opportunities. The model also marks the point at which opportunities required by users, and opportunities provided by issuers, is congruent so as to optimise forms for conditions of cooperation.

Additionally, this chapter locates the fairness model within the wider scope of information design, and introduces the model's qualitative aspects that create fairer outcomes for users and issuers of digital government forms. A short discussion on the nature of forms is useful to understand: (i) a form's purpose, or *telos*; and (ii) the role of fairness in design for achieving this *telos*.

The chapter then proceeds to unpack and present the model, thereby establishing a qualitative approach to fairness in design. The concepts of literacy, clarity, and technology – discussed in Chapter 5 – are applied within the approach, to express 'effort' and 'opportunities' as a set of simple equations. These equations are then graphed to visualise the relationship between "effort" and "opportunities." Plotting these two variables reveals key points in the design process at which fairness can be applied. The SG Arrival Card and *TraceTogether* forms, from Chapter 5, are tested in this model.

This chapter concludes with a list of fundamental principles for applying the fairness model to digital government forms. These principles form the basis for the model's qualitative aspects, provided in this thesis. They also comprise the building blocks for future quantitative modelling and applications. Accordingly, the extrapolation and implementation of fairness model for quantitative reasoning are also briefly discussed in the chapter's conclusion, and is expounded on in the thesis' final chapter.

6.2 Teleological nature of forms

From the creation of a form onwards, there is an inherent expectation by its issuers that a user will interact with it through: (i) reception, i.e. reading or listening to pre-filled data; and (ii) response, i.e. writing or speaking. This duality of functions distinguishes a form from all other document genres: if, for example, a form is not filled in as directed, it fails in its purpose to capture information required by the issuer. Likewise, forms with unclear explanations, poor navigation, or lacking in technical support fail to reassure users and thus tend to create heightened anxiety, particularly for less advantaged users.

Writing about immigration and information in the United States, Gadarian and Albertson noted that migrants affected by public campaigns and policies will not only encounter degrees of anxiety but may also “seek information that they expect will help resolve the uncertainty underlying anxiety and thus dissipate the unpleasant emotion” (Gadarian & Albertson, 2014, p. 134). Much of the information sought by affected parties will be in government documents.

Consequently, the same circumstances apply: inadequate literacy, clarity, and technology opportunities not only affect information flows negatively – for users, and to an extent for issuers – but increase confusion and the risk of errors. Worse yet, the consequences of these errors are almost always borne by users. This leads to an “obstacle course of gobbledegook” (Waller, 1984, p. 36) that Waller describes. This description is reflected in Finn et al.’s analyses on the impressions citizens typically harbour about public documents and forms:

Government documents don’t have a good reputation: they have been variously perceived as instruments wielded by the state to “see” its population and control it better; as creating inefficiencies and structural violence; and as an endpoint to justify the existence of bureaucratic agents (Finn et al., 2014, p. 1515).

Chapter 3 discussed the literature on government documents, and forms in particular. Most of the research pointed in one way or another to Waller and Finn et al.’s observations. Extending these scholarly works to the purpose of

forms, however, reveals some interesting insights into why these documents are considered burdensome, and how fairness could mitigate some of the complexities associated with their design.

Designing a form means far more than just arranging the content on a page. It also entails designing a means of communication. The first question is therefore not: what should a form look like? It's: what is the form meant to do? (Schwesinger, 2010, p. 122).

The appearance of forms is an important aspect of fairness and has been discussed in Chapters 3 and 4. But the second part of Schwesinger's about what a form is meant to do raises three queries: (i) what is the purpose of a form? (ii) how is this purpose achieved? (iii) how is this purpose affected when the government issues the form?

In discussing the creation of any artefact, Kantian philosophy points to the telos of that artefact, i.e. its end goal or purpose (Ginsborg, 2013). Writing about teleological structures, Baker also refers to aims, ends, or goals to be realised; however, the author includes the notion of a scale, i.e. options and outcomes are not necessarily binary, but better or worse (Baker, 2018, pp. 570–571). This is an important observation for fairness in forms design, since the model is built on normative rather than absolute values. It follows that the purpose or task of forms design is to “create effectively the means by which the conversation between individuals and organisations can take place” (Sless, 1999, p. 136). Citing Grice, Holland and Reddish reinforce Sless' point, noting that forms are cooperative contracts in which issuers and users “enter into a tacit agreement to cooperate, and for each to assume that the other is cooperating toward the purpose of communicating” (Holland & Redish, 1981, p. 208).

In other words, the purpose of a form is to facilitate a transaction between users and issuers. The transaction between the parties is either enhanced or diminished by the form's design. This highlights the co-authorial nature of forms; the transaction cannot be completed without the user's or

issuer's input. Such is its importance, that the United States Code of Federal Regulations does not classify unfilled forms as copyrighted materials:⁸³

§202.1 Material not subject to copyright: Blank forms, such as time cards, graph paper, account books, diaries, bank checks, scorecards, address books, report forms, order forms and the like, which are designed for recording information and do not in themselves convey information (Commerce Department, 2011, p. 570).

While such a perspective on blank forms may not extend to every global jurisdiction, it draws attention to the prominence of co-authorial relationships in forms, and the liminality of such documents. When a user completes a form the document itself transitions from one state to another. A blank cheque, for instance, remains incomplete until a user acts upon it and thereby changes the state of the document from form to cheque. Likewise, an empty sheet with unpopulated fields remains in its present unfinished state until a user fills in the sections, following which the sheet transforms into what all the parties intend for it to become, i.e. tax filing, arrival card, or health declaration. Till then, the form remains in its original state of impermanence. And in this current position, the form conveys an intention of its purpose.

This liminal quality reveals the teleological structure of forms in achieving a desired goal. There is a direct correlation between the transactional and the transitional qualities of forms: any transaction for which a form has been created is underpinned by that form's ability to transition from its current intended position – as a variable document – to a final static state of realisation. This ability is determined *inter alia* by how effectively a form's design mediates co-authorial actions. Much of the research on forms reviewed in Chapter 3 deals with this concern. Fairness in design, however, specifically evaluates how this co-authorial relationship can be made more cooperative by adapting and applying fairness principles from the various disciplines

⁸³ The 1879 case of *Baker v Selden* brought this issue to light when Selden acquired a copyright to produce accounting ledgers for record-keeping purposes in 1859. In 1867, Baker created a similar system and began selling the ledgers. Selden's estate sued Baker for copyright infringement and initially won. But the verdict was overturned by Justice Bradley who stated that "blank account-books are not the subject of copyright" (Legal Information Institute, no year).

discussed in Chapter 5. Chief among these principles are Rawlsian notions of fairness in socio-political contexts which are mapped onto the discipline of document design.

It is also important to note that like forms, the fairness model has an inherent teleological structure as well. This structure is grounded on the premise that fairer design benefits users and issuers through increased cooperation, resulting in reduced effort for users via increased provision of opportunities by issuers. The fairness model is discussed in detail next in Section 6.3.

It should also be mentioned that Rawls, within the context of fairness in socio-political communities, was against teleological approaches to justice due to the threats such approaches posed to the basic rights of citizens, especially the right to freedom and to choose freely (Sandel, 2009). However, in the context of government forms, it has already been established by Schwesinger et al. that there is little choice for citizens in such mandatory processes. In addition, citizens have also agreed to abide by the rules of the obligatory processes in the hopes that their desired outcome can be achieved (Rawls & Kelly, 2001, p. 6). Moreover, issuers can simply – and have done so in the past – ignore design opportunities needed by users to fulfil a form's purpose. This may arise from the embodied authority of governments in such circumstances to compel users into action with little regard for “good” design.

Nonetheless, the blueprints of e-government in many nations, including Singapore, contain strong service elements with design policies that promote better cooperation with users, despite the obligatory and legal nature of the exchange.⁸⁴ This means enacting policies that gain the trust and buy-in from users needed to encourage a cooperative exchange environment.

Policies, the action plans of government, may be the result of legislation or executive action through the workings of various government agencies. The implementation of policy requires the ability of government to secure appropriate

⁸⁴ The blueprints for Singapore's e-government, and its concomitant services, standards were discussed in Chapter 2.

behaviours of citizens, businesses, and government officials alike (Little, 2020, p. 127).

Consequently, such policies are contingent on governments gaining a better understanding of the nature and purpose of forms, and how these facets ultimately influence the actions of users. This chapter thus accounts for the telos of forms in framing a fairness model that performs as a policy layer for the creation and issuance of digital government forms.

6.3 Overview of the fairness model

The fairness model is predicated on extant and established notions around user-centred design, i.e. that every user filling out a digital government form ought to have the same possibility of success in completing the process as every other user. The design opportunities afforded to users should therefore be independent of the presence of immanent abilities that more advantaged users will possess, such as better digital literacy, default language fluency, or greater access to advanced digital infrastructures. In other words, these opportunities should give every user the same chance of completing the process, regardless of any individual capabilities or handicaps.

Assuming also users and issuers are seeking to participate cooperatively within a process in order to achieve their goals, then all parties must agree to the rules of that process and make certain compromises in order to mutually facilitate fairness for everyone. These acts of cooperation and compromise can be expressed in two variables: (i) effort required of users; and (ii) provision of design opportunities afforded by issuers to counterbalance this effort. As such, the model does not seek to eliminate effort, since this would neither be possible nor practical. Instead, the fairness model assesses and adjusts this relationship based on providing opportunities equally for all users, but determined by the needs of the least advantaged users. This is weighed against the load placed on issuers. Hence, the model follows an optimisation process to achieve scenarios of parity for all participants.

The objective can also be expressed as an analogy to help readers better comprehend the model: if the process of filling in a form were a marathon, then fairness would be designing the form such that every participant in the marathon is afforded an equal chance of completing the course. The intention is not about which participant reaches the finish line first, but how many are able to cross the line regardless of the number of participants.

This entails providing every marathon participant with the best possible opportunities so that everyone, from the least-skilled to the most-skilled participants, may complete the course without needing to rely on extraneous support. This does not mean participants are not allowed to use their own

competencies, but rather that participants should not have to — especially if such competencies are only available to a select few. Similarly, the marathon’s organisers should not be responsible if a participant cannot complete the course due to factors outside of the organisers’ control. Instead, participants can rely fully on the internal opportunities provided by the organisers in their attempts to complete the course.

Fairness in this context thus emphasises that a form be designed such that every user is given *an equal chance to complete a process*, which leads to the desired outcome. Returning to the marathon metaphor, parity is achieved by giving each participant the same — i.e. best possible — opportunities to cross the finish line. To achieve this, the level of opportunities provided by issuers ought to be congruent to the amount of effort needed by the least advantaged users.

I use the term “congruent,” and not equal, throughout the fairness model. This is due to differences in the nature of effort and opportunity. Both parties expend effort in the forms process, but not in the same way. Users expend effort in completing the form and therefore rely on opportunities to reduce this effort. Issuers, on the other hand, expend effort in creating these opportunities for users by drawing on more resources.

Referring again to the marathon analogy, the event organisers (i.e. issuers) and the event runners (i.e. users) participate in the process but with varying agendas and expectations. Nonetheless, organisers and runners still need to cooperate and cohere to an overarching system of fairness — i.e. the *equal treatment of all runners*, while also balancing the organisers’ burdens — so that all parties reach their desired objectives. The distinction between “equal” and “congruent” also explains the differences between equality, inequality, fairness in general, and fairness in design. This is discussed in Section 6.3.2.

In order to achieve this parity, fairness in design begins by accounting for the needs of the least advantaged users, per Rawlsian notions of fairness, but without penalising other users with stronger inherent abilities, and by acknowledging the strains on issuers in providing opportunities for the least

advantaged users. This is to optimise the supply of design opportunities against the exigencies of production, costs, distribution, data collection and extraction, processing and replying, and other miscellaneous overheads. Thus, the intended outcome of fairness in design is for users to benefit from enhanced form-filling experiences, and issuers to leverage greater resource efficiencies.

As discussed, the fairness model does not ensure that every user actually completes the process. This would be impossible to achieve, given the number of variables that may prevent a process from being fully discharged. Moreover, many of these variables are beyond the purview of document design. For instance, a tourist intending to visit Singapore may not be allowed entry if they are unable to show sufficient funding to cover their trip. Likewise, a visitor to a mall may be denied access if a temperature scanner detects a fever. Such circumstances have little to do with the design of the form itself.

Fairness in design therefore does not – and cannot – warrant that users will be able to achieve their desired outcome by participating in the forms process. Instead, the goal of the model is to make form-filling processes fairer through design-led interventions. Consequently, the model is not aimed at altering the speed, pleasure, or necessity of form-filling activities, although these may well be incidental outcomes; thus the fairness model treats such effects as ancillary to its primary objectives.

6.3.1 Least advantaged user

Previous discussions from Chapter 3 have shown that forms users come from varied backgrounds, and consequently have diverse needs. Oftentimes, such users have little control in determining their circumstances and are thus compelled to accept the terms of the exchange laid upon them. On the other hand, the state can be assumed to be a stable and sustained nexus in the daily affairs of government-citizen exchanges. Indeed, the idea of continuity of government (COG) is premised on the state being able to function in the aftermath of total warfare (Larson & Peters, 2001, pp. 100–101).

Ake observes that “political stability is the regularity of the flow of political exchanges. The more regular the flow of political exchanges, the more stability” (Ake, 1975, p. 273). Even in times of flux, government agencies are authorised to regulate the behaviours of their citizens (Little, 2020, p. 131) to ensure stability. Such regulation underpins the nature of transactions between the state and its citizens. Accordingly, the onus of making an exchange fair falls to the government as the chief architect of instruments of information. This raises an interesting philosophical query about who deserves to gain maximally from the design of these instruments. Put another way, who should benefit the most from a well-designed government form?

Among the responses to this question there may be an impulse to answer that all users should benefit from well-designed forms. This certainly appears to be the case for many information design scholars discussed in Chapter 3. While the thesis agrees with this observation at a fundamental level, the notion of “beneficialness” needs further refining within the context of designing a fair form based on user needs.

The Aristotelian stance on “beneficialness” adopts a different position, focusing instead on user abilities. This is demonstrated through an analogy of flutes: the best-made flutes should not go to those with more resources, but to “superior performers who ought to be given the superior instruments” (Aristotle, in Frank, 1998, p. 788). In other words, a well-designed instrument should be provided to those who are in the best position to play it, by virtue of their talents.

This proposition is valid across several instances of fairness that reward users for their innate abilities. However, in the case of a government form the argument would not hold because government forms are meant to be designed for use by everyone. Thus, users of varying abilities and talents ought to be able to participate in and benefit equally from a well-designed form. It would be inconceivable then if usage entailed setting up a fee system, for example, so that those who could afford to pay more would have access to more design opportunities. Likewise, if the form were produced along

Aristotelian rules, then only users with superior literacy and technology skills, for instance, would be taken into account in the form's design.

Yet, this is precisely what government forms are culpable of when issuers make assumptions about users with regard to digital literacy, clarity concerns, and access to technology. Poor design and implicit bias, discussed in Chapter 4, inevitably lead to forms like the SG Arrival Card becoming more exclusive to select users with superior skills to navigate the form and apply external tools to overcome translation problems. Accordingly, to achieve the desired outcome of a form there has to be sufficient opportunities given such that everyone equally enjoys the best possibility of completing the process. Otherwise, a form that is well-designed only for some users is, in the main, a fundamentally poorly designed form.

Sless points out that badly designed forms tend to favour issuers at the expense of user comprehension. (Sless, 1999, p. 149). To this comment I add that badly designed forms not only serve the interests of the issuer but also the narrow sectional interests of users with greater inherent abilities. This propagates situations of unfairness for less advantaged users, i.e. those with little to no say over their situation. Therefore, any model for fairness needs a bottom-up approach in order to prevent – or at least mitigate – the exclusionary effects of poor design discussed above. That means grounding the model in the position of the least advantaged user.

Revisiting Rawls, the author frames the term “least advantaged” as a representative position that a person occupies within a defined order. Any notion of fairness is applied to persons as they are ranked in this order, but not because of compassion or pity, or the person's individual characteristics (Voice, 2015, p. 420). Instead, the least advantaged users are those facing the greatest volume of obstacles – imposed through a number of causes or circumstances – when participating in a process.

Lips cites examples of this in the context of e-government services, noting that in order “to ensure fair access to public services for all individuals entitled to them, countries like the UK, Norway, and Denmark recognise the importance of actively supporting people who are not online or are less

capable of accessing digital services” (Lips, 2014, pp. 186–187). In Singapore, the number of people online is relatively higher than in these countries.⁸⁵ But the issue of those facing limited capabilities is similar across these nations. To give affected users additional opportunities, then, is to reduce not only their cognitive loading but also that of more advantaged users. To an extent, this ties in with Rawls’ “difference principle” which broadly states that if there are inequalities present in a society, these should be arranged such that those who are least advantaged benefit the most, especially if the ones who are better off also gain from the inequality (Rawls, 1999, pp. 65–66).

This seems a fair approach to government forms design whereby increasing design opportunities for the least advantaged users will also help the rest. Interestingly, the difference principle does not account for those who are naturally more talented. Writing on the principle, Laden observes that while “fair equality of opportunities offsets advantages in one’s social origins... it does not, however, correct for differences in people’s natural talents or levels of motivation” (Laden, 2015, p. 212).

The naturalness of one’s abilities, though, is accounted for in forms environments. This is because, unlike wealth, resources, and employment, which are subject to redistribution in order to create more social equality, a form does not penalise those with greater literacy, clarity, and technology abilities. Instead, the fairness model posits first evaluating the needs of the least advantaged user, then supplying corresponding design opportunities to all users. If done properly and without excessive loading placed on issuers, the model ensures that every user has the same chance of completing the process. This approach distinguishes fairness in design from related analogues such as inequality, equality and fairness in general. This is the subject of the next section.

⁸⁵ Please see Chapter 2 for information on online access and digital participation in Singapore.

6.3.2 Inequality, equality, fairness, and fairness in design

Equality is an expansive topic, encompassing multiple interpretations and implementations of its virtues and limitations in social, political, and economic settings. However, in discussing social justice, Wilkinson makes a poignant statement about the effects of income on equality: “It is unrealistic to pursue greater equality of opportunity without at the same time moving towards greater equality of outcome” (Dorling, 2012, p. 308). The idea of a better chance at achieving a desired goal or outcome is central to the fairness model. The basic concept is better expressed by outlining what inequality entails in social interactions:

Social inequality is about disadvantage. People are unequal when one has an advantage over another. Advantage and disadvantage are social relationships. People are not said to be disadvantaged because they are worse off, or in a less desirable state than others, but because their social relationships make them worse off (Spicker, 2006, p. 65).

Spicker emphasises the importance of relationships when dealing with inequality; the author gives an example of two patients, claiming that if one is suffering from a fatal disease and the other is not, then inequality is not present (Spicker, 2006, p. 65). The same example can be extended to forms users: just because User A has greater digital skills than User Z does not imply inequality. However, if User A is able to leverage that skill to complete a poorly-designed form — and User Z is unable to purely because of the form’s paucity — then inequality has occurred within that form’s environment. This is because the issuer has not supplied sufficient opportunities that give User Z the best possible chance to cross the finish line. Such a scenario is not only unfair to User Z, but also to User A since they are unreasonably compelled to rely on inherent abilities and external mechanisms, regardless of whether or not they are able to do so.

This is not to suggest that a fairly-designed form will not ask users to rely on their own abilities to some extent. A user with absolutely no knowledge of bureaucratic procedures, for instance, will be unable to complete a form no matter how well it has been designed. Indeed, any expectations of completing

the form in such a scenario would be unfair to issuers. It follows then that issuers are justified in assuming a basic threshold of knowledge, beyond which a person may reasonably qualify as a forms user. But how does an issuer determine where this threshold should start? And what qualifies as basic knowledge? Both questions are addressed by focusing on the needs of the least advantaged user.

Writing on democratic equality, Rawls rejects notions of efficiency and instead prioritises the virtues of the “difference principle”, discussed above. By focusing on the needs of the least advantaged members of a society, there is potential for fair equality of opportunity. Martin outlines the objectives of “democratic equality” in clear terms:

The point of democratic fair equality of opportunity is to try... to make people less unequal at the point where they actually enter into adult life, as citizens and as workers, and to make sure that everyone there, so far as possible, has the basic capabilities required to be contributing members of society (Martin, 2015, p. 263).

Martin’s view of adulthood, and Spicker’s notion of relationships, are a useful combination to determine how and where the basic threshold should be set, as well as the minimum knowledge required to participate in an information exchange. Hence, an individual entering adult life with the ability to create and participate in meaningful relationships with other members of an exchange is a reasonable minimum expectation of what a forms user ought to be. Setting this limit also frames how inequality and fairness can be defined within the context of forms design. Complexities beyond this threshold can then be categorised as unequal, equal, fair, and fairly designed.

More complex forms are typically perceived as arduous to complete, thus warranting the need for better design opportunities that counterbalance these perceptions. Jansen and Steehouder, for example, note that badly designed government forms are detrimental to both issuers and users, observing in one instance that just 18% of users in The Netherlands were able to complete an Individual Rent Subsidy form without help from family, friends, or relatives (Jansen & Steehouder, 2001, pp. 11–12). While individual difficulties

are harder to pin down – owing to variegations in each user’s preferences and background – the complexity of forms that lead to greater effort from users are intrinsically linked to the design considerations given by issuers. This determines where and how opportunities ought to be supplied for the least advantaged users.

Figures 6.1–6.5 on the following pages, extend the marathon analogy to different types of vehicles travelling over the same terrain, with all of them attempting to cross the finish line. Larger vehicles have bigger fuel tanks and therefore have an inherent advantage; correspondingly, the smallest vehicles represent the least advantaged users. The analogy illustrates the differences between inequality, equality, fairness, and fairness in design. Figures 6.4 and 6.5 particularly highlight the function of fairness as a systemic layer through which to evaluate the design of digital government forms.

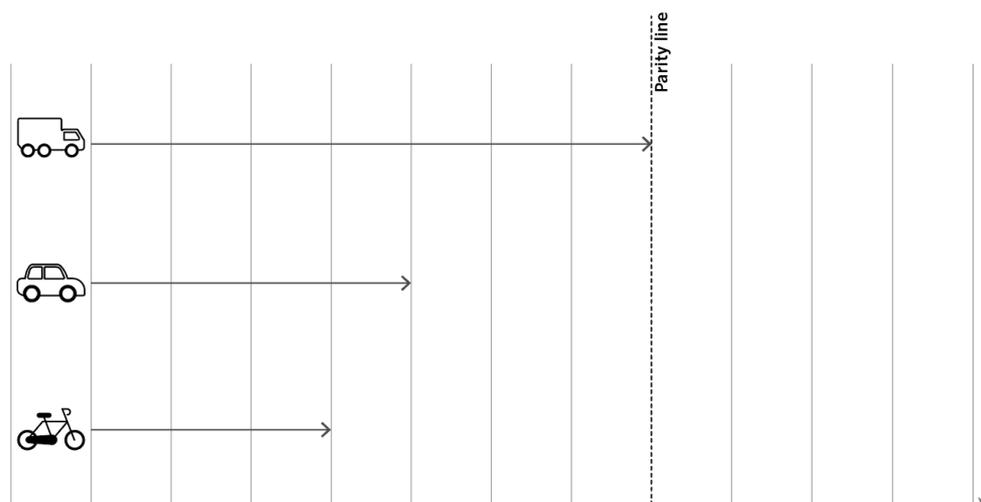


Figure 6.1: Inequality: users rely on their own circumstances in order to complete the task. This results in an unfair relationship between all users and the issuer.

Figure 6.1 above shows three vehicles, representing users, from the most advantaged (truck) to the least advantaged (cycle). The dashed vertical rule represents the parity line⁸⁶ i.e. the finish line which all users ought to be able to cross as a result of the design opportunities afforded in the form.

⁸⁶ The parity line is established at the point where issuer loading intersects user loading on the Effort/Opportunity graph. This is further elaborated in Section 6.3.4.

Figure 6.1 illustrates conditions of **inequality**: there are no opportunities provided and so each user has to rely on their inherent circumstances in order to complete the task. The result is an unequal scenario since users with greater inherent abilities, i.e. the truck and to a lesser extent the car, have a greater advantage. However, the less advantaged and least advantaged users, i.e. the car and the cycle respectively, lack the abilities needed to reach the parity line without additional design opportunities from the issuer. Nonetheless, all three user types have an unequal relationship with the organiser, i.e. the issuer.

Such inequalities, at least in society, are typically fixed by governments providing equal opportunities for all users. But supplying equal opportunities does not necessarily help less advantaged users, as illustrated in Figure 6.2 below.

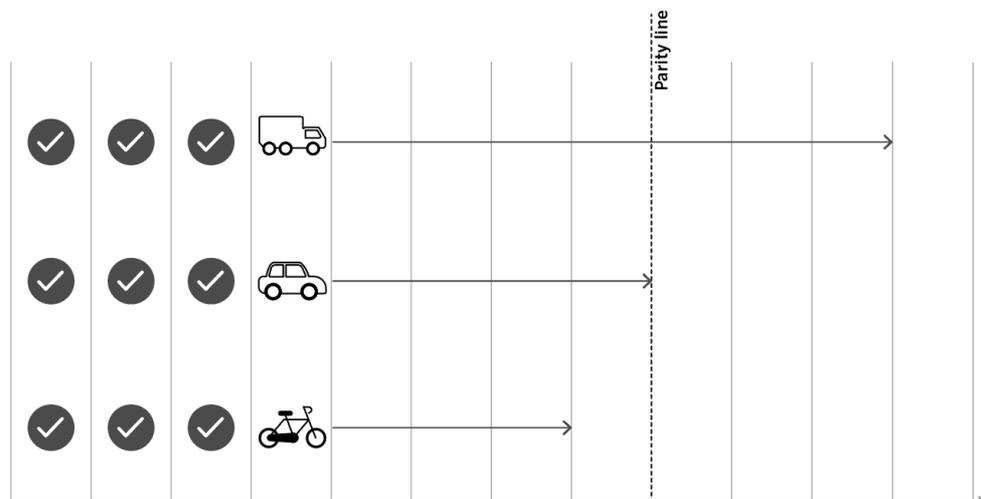


Figure 6.2: Equality: each user is given the same opportunities as all other users but without regard to the needs of the least advantaged user. This results in an unfair relationship between less/least advantaged users and the issuer.

Figure 6.2 illustrates a scenario of **equality**: all users are given equal opportunities, regardless of their individual or inherent circumstances. The result, however, is an inequitable possibility of outcome for every user. This is because some users still lack the necessary abilities and are consequently unable to reach the parity line without additional opportunities.

The diagram shows that the provision of equal opportunities attempts to reduce inequality by giving all users added help. But without considering the

needs of the least advantaged user, this provision ultimately risks becoming an exclusionary policy for those facing the severest limitations. The relationship between the least advantaged user and the issuer therefore remains unfair.

Another way then to create conditions of fairness would be through the allocation of opportunities relative to each user's individual needs. This corresponds with Rawls' principle of allocative justice, i.e. "when a given collection of goods is to be divided among definite individuals with known desires and needs" (John Rawls, in Murray, 2015, p. 7). Figure 6.3 below illustrates this scenario under conditions of fairness.

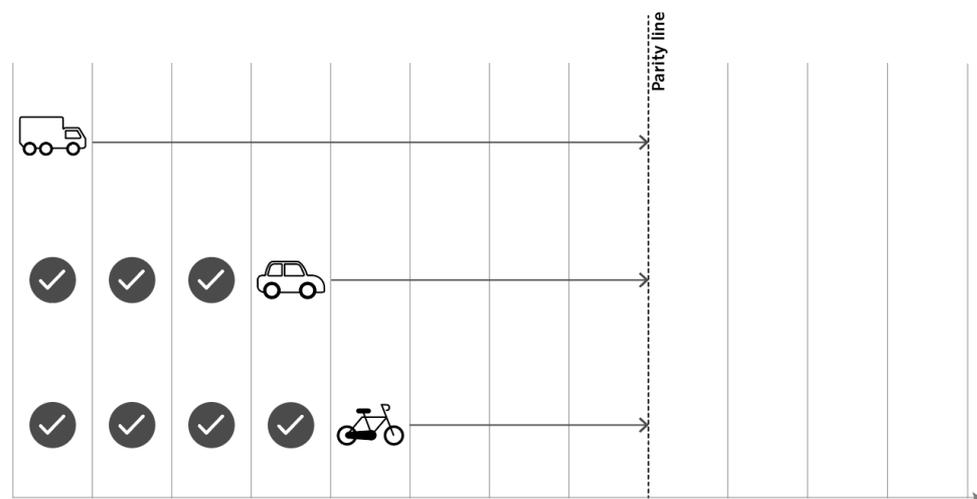


Figure 6.3: Fairness: opportunities are allocated according to individual needs. This results in a fair relationship between all users and the issuer. However, this scenario does not apply to forms design since users with greater inherent abilities cannot be penalised.

Figure 6.3 illustrates a scenario of **fairness**: each user is provided with opportunities commensurate with their inherent circumstances. The result is equitable participation for all users since every user has been allocated the opportunities needed to be able to reach the parity line.

In this scenario, allocation appears to be the ideal solution to achieve a fair outcome for all users. But this situation is suitable for addressing issues related to gender, racial, and wealth disparities, whereby resources may be accordingly reallocated to create more equality. This cannot be the case for forms design since — unlike wealth or employment, where taxation and hiring policies are used to reallocate resources — a user cannot be penalised for

possessing a greater level of inherent abilities than another user. This is the same scenario as Spicker's example of the two patients, discussed above, whereby one has a lethal disease and the other does not (Spicker, 2006, p. 65). No inequality has occurred and therefore it would be wrong to handicap the healthier patient. Similarly, when completing government forms there is no rational reason to penalise users with stronger skills. Hence, the notion of allocative efficiencies is not applicable to form design. Instead, fairness requires an approach that considers the needs of the least advantaged user, as shown in Figure 6.4 below.

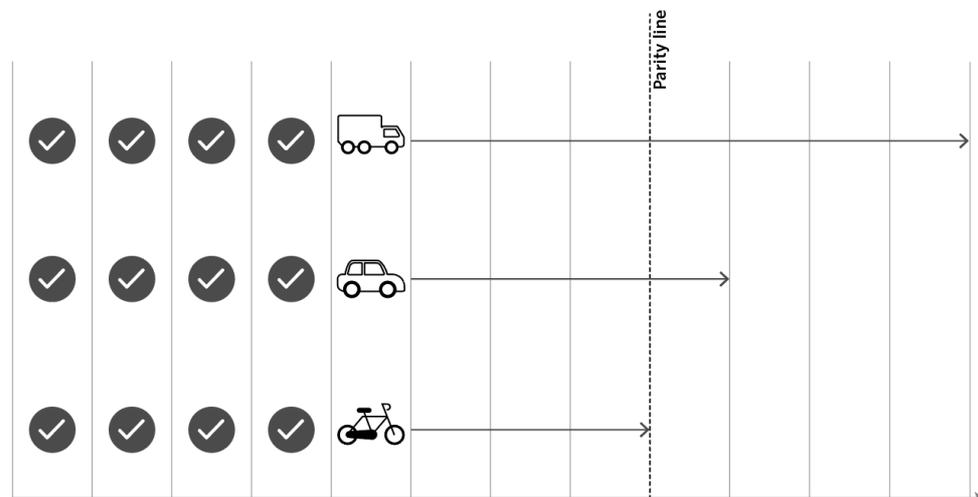


Figure 6.4: Fairness in design (user-only perspective): opportunities are given to each user based on the needs of the least advantaged user. However, this scenario assumes opportunities are limitless and therefore does not take into consideration the needs of issuers. This results in unfairness to issuers.

Figure 6.4 illustrates a scenario of user-driven **fairness in design**: all users are given the same opportunities, regardless of their inherent circumstances. The quantity of opportunities is decided based on the needs of the least advantaged user, i.e. the cycle. The result is that every user is given the same chance to reach the parity line.

Moreover, no penalties are levied on users possessing inherent abilities. In a sense this represents the ideal scenario for fairness from a user's perspective. However, this scenario gives no consideration to issuer loading since it assumes issuers are able to provide limitless design opportunities. This

makes the process unfair for form issuers. Additionally, supplying excessive opportunities risks raising complexity levels by increasing cognitive loading among more advantaged users. This is discussed in detail in Section 6.3.4.

It follows then that both, user and issuer needs be taken into account for the fairness model to be effective. This means setting the parity line at a position in which the provision of opportunities meets the effort required by the least advantaged user, but which also balances out issuer exigencies.

Figure 6.5 below thus illustrates the best-case scenario for fairness in design.

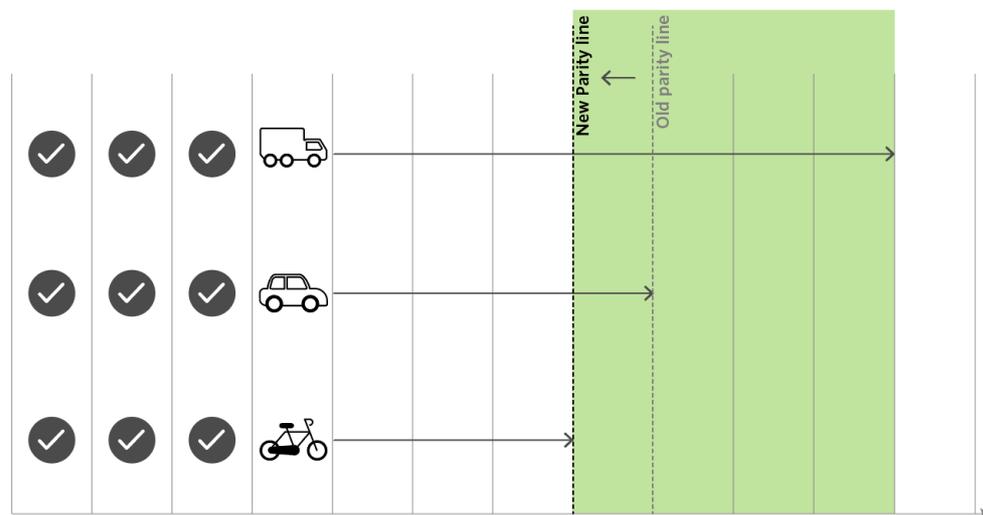


Figure 6.5: Fairness in design (balanced user-issuer relationship): opportunities are given to each user based on the needs of the least advantaged user. This scenario also accounts for issuer exigencies. Users and issuers agree to a cooperative exchange, resulting in a new parity line and fairness zone. This results in fairness for all parties.

Figure 6.5 illustrates a scenario of **fairness in designing digital forms**: every user is given equal opportunities – regardless of inherent circumstances – but allocation is based on the needs of the least advantaged user. The result is that each user is given the same chance to reach the parity line, with no penalties being levied on users who possess greater inherent abilities.

Consideration is also given to issuer loading. Users and issuers reach an agreement under cooperative conditions that balances design opportunities – rationally needed to reduce effort – against what issuers are realistically able to provide. Thus, optimum provision of design opportunities is supplied which saves resources for issuers while helping the least advantaged users reach the

parity line. This approach also prevents greater cognitive loading among most advantaged users. Consequently, a fairness zone – shown in green – is established. The fairness zone is discussed in detail in Section 6.3.4.

The scenarios presented in Figures 6.1–6.5 thus illustrate the differences between inequality, equality, fairness, and fairness in design. Figure 6.5 shows the optimal conditions under which the fairness model operates. However, these figures do not discuss the essence of the relationship between users and issuers. This relationship is defined by equating effort needed to opportunities provided. The results of this equation are a set of expressions that plot Effort (E) against Opportunities (O) – thus forming the basis for the fairness model – and are discussed in the next section.

6.3.3 Equating Effort (E) to Opportunities (O)

The fairness model correlates effort against design opportunities needed by the least advantaged user to ensure an equitable chance of success for all users to compete the process. In the context of government forms, unfairness is the incongruence between the effort needed, and the availability of design opportunities to reduce this effort. Effort refers collectively to the amount of work and resources needed by users to complete the form. Likewise, effort also includes the output required of issuers in providing design opportunities in the form. Barton et al. for example observe that to make a document easier for users, “information designers employ simplified language, usable information architectures, thoughtful layouts, charts, graphs, or other images to render prose and data appealing, functional, and above all comprehensible to humans” (Barton et al., 2019, p. 64). The authors here are referring to contracts. But such design opportunities are similarly required in forms and thus are encompassed within the literacy, clarity, and technology framework detailed in Chapter 5. However, such design opportunities expected of issuers requires both, manual work and the use of digital resources, especially in producing online forms. Provision of these opportunities reduces the effort required by users, but increases the workload of issuers; conversely, the absence of opportunities makes it easier for issuers but more arduous for

users. As such, Effort (E) and Opportunities (O) encapsulate the relationship inherent between forms issuers and users. Accordingly, a balance is required between these two variables in order to establish fairness for both parties.

This relationship manifests itself in five scenarios whereby effort equals to, falls short of, or exceeds design opportunities. Table 6.1 on the following page shows this relationship expressed in five possible scenarios. These scenarios mediate the interactions between issuers and users and thus form the basis for applying the fairness model, discussed in Section 6.3.4.

Five possible Effort/Opportunities scenarios			
Scenario	Description	User Experience	Issuer Actions
$E = O$	Effort required by the least advantaged user is congruent to opportunities provided by the issuer, without increasing cognitive loading for other users, or placing unreasonable demands on issuers. This is the ideal scenario for.	Stable user experience Opportunities afforded to the least advantaged user are commensurate with effort needed such that all users have the same best chance of completing the process.	None required
$E \neq O$	Effort required by the least advantaged user is not congruent to opportunities provided by the form issuer.	Unstable user experience Lack of opportunities results in some users being unable to reach the parity line, and must thus rely on their own inherent abilities. Users are not given the same chance to complete the process. Excess opportunities may result in clutter for more advantaged users, leading to greater effort on their part. This creates unstable user experiences.	Opportunities need adjusting, based on $E > O$ or $E < O$
$E > O$	Effort required by the least advantaged users exceeds opportunities provided by the form issuer.	Unstable user experience Lack of opportunities results in some users being unable to reach the parity line, and must thus rely on their own inherent abilities. Users are not given the same chance to complete the process.	Opportunities need to be increased to help disadvantaged users reach the parity line
$E < O$	Effort required by the least advantaged users is less than the opportunities provided by the form issuer. This may lead to more advantaged users becoming overwhelmed by excessive design.	Unstable user experience Excess opportunities may result in clutter for more advantaged users, leading to greater effort on their part. This creates unstable user experiences.	Opportunities need scaling back to avoid overwhelming other users.
$E \sim O$	Effort has a negligible correlation with opportunities.	Undefined user experience	Undefined

Table 6.1: List of five possible Effort/Opportunities scenarios, with various outcomes for fairness in design and user experience.

6.3.3.1 Fairness in design leading to $E \approx O$

This is the ideal situation where effort required by the least advantaged user is congruent to design opportunities provided by issuers. Issuer exigencies have also been taken into consideration in determining the position of the parity line. Users and issuers are thus expected to respond to the form cooperatively and in an agreed upon manner, which yields a fair forms environment. It must be noted that the $E \approx O$ scenario is not as much a point in the relationship but a zone of fairness. Applying the discussions from Chapter 4, it can be concluded that *TraceTogether* most closely exemplifies a digital government form that fits with this scenario.

6.3.3.2 Failure of literacy opportunities leading to $E \neq O$

Poorly designed forms have been the topic of much of the scholarship reviewed in Chapter 2. These problems can be expressed in an $E \neq O$ scenario, whereby effort and opportunities are incongruent. The literature showed that in most cases forms lack the opportunities needed by the least advantaged users. Accordingly, most cases of $E \neq O$ are in effect $E > O$. On the topic of immigration and information literacy practices surrounding refugees, for example, Lloyd et al. found that:

refugees encounter complex and challenging information landscapes that present barriers to their full participation in their new communities. Social inclusion becomes possible where information is provided via sharing through trusted mediators who assist with navigating the information landscape and information mapping, and through visual and social sources.

Immigrants and refugees with limited literacy skills and language fluency are therefore at greater risk of encountering problems with government offices. In this case, without literacy opportunities designed into government forms — via auto-translations or supporting literature that offers options for assistance — the possibility of a $E > O$ scenario is high. The absence of such opportunities compels additional effort since users need to rely on external

mechanisms to complete the forms process. It follows that opportunities of literacy for refugees become these trusted mediators. It follows then that the SG Arrival Card, discussed in Chapter 4, is an example of a form that exerts more effort from the least advantaged users owing to assumptions about digital access and literacy in mandatory questions about email and mobile phone numbers.

To a lesser extent there are also cases where excessive opportunities threaten to overwhelm users, leading to $E < O$ scenarios. In this thesis, the closest example is the UK-PLF, which forces users to check their phone number three times on one screen, and once again at the end of the process.⁸⁷ Excessive amounts of information lead to not only clutter but a greater possibility of errors owing to cognitive overloading for users.

6.3.3.3 Failure of clarity opportunities leading to $E \neq O$

An analysis of the breadcrumb trail in the SG Arrival Card case study revealed considerable gaps in accessibility, notably for visually impaired users. This is namely due to the titles in the breadcrumb trail which are not links and so will not be inferred by screen readers as a trail. Likewise, the text size remains fixed across all screen widths; there is no built-in feature to adjust the size of the form's textual elements, other than relying on browser controls. This causes clarity problems for visually impaired users who rely on screenreader and voiceover technologies, and larger type sizes – thereby leading to an $E > O$ scenario.

Other problems identified in the SG Arrival Card included dense language in the declaration section for health, failure to implement proper navigation for users to track back and forth across different sections of the form, and intense colour-coded error messages that overwhelm the screen. Collectively, these discrepancies risk causing confusion and thus exert a greater toll on users. This also causes reputation problems for issuers since “failures in the presentation layer of a web application can negatively impact its usability and

⁸⁷ Case studies dealing with the SG Arrival Card, *TraceTogether*, and the UK-PLF are discussed in Chapter 4.

end users' perception of the application's quality" (Mahajan et al., 2016, p. 361).⁸⁸

6.3.3.4 Failure of technology opportunities leading to $E \neq O$

The technology issues in the SG Arrival Card focused namely on the form's lack of navigation and data saving abilities. While the case study established that the need for data saving features had arguments on both sides, the lack of a consistent navigation raised clear concerns. This is yet another reason why the SG Arrival Card cannot be considered in an $E = O$ scenario. However, a deeper issue was pointed out by Lee and Lee in *TraceTogether*, i.e. lack of transparency in the mobile app over how user data was stored and used.

Writing about technology and social exclusions in the United Kingdom's government policy-making criteria, Selwyn makes reference to the digital divide and how the UK is using technology to meet its socially inclusive aims (Selwyn, 2002). This observation has key implications on the information design landscape, and on fairness in particular, evinced in Chen, Vogel, and Wang on mobile government interactions to create fairer processes:

[The] information services of mGovernment are expected to facilitate information flow between government agencies and citizens. This is critical for creating a fair and transparent decision procedure. It is the procedural fairness of government decision making that is expected to improve user satisfaction (Chen et al., 2016, p. 48).

While governments may strive to facilitate greater accountability and ease of clarity, the technology factors within the user's domain – including bandwidth speeds, modern browsers, and security, privacy, trust, accessibility and service quality – can affect the satisfaction felt towards e-government services. Users with modern browsers, for example, may benefit from updated scripts and greater integrations with online tools, thus reducing complexity

⁸⁸ Mahajan points about visual inconsistencies are discussed in the case studies in Chapter 4. Conversely, *TraceTogether's* redesigned check-in screen with animations significantly increased clarity for implicit users tasked with ensuring that all visitors to malls have followed the proper procedure. This is a positive example of implementing clarity in forms design, which reduces user effort and leads to better prospects for fairness across all parties

issues. Digital forms optimised for such environments, however, need to also function in slower or outdated browsers through backward compatibility and improved technical processes that bring about fairer conditions for all users.

6.3.3.5 Summary of the five Effort/Opportunities scenarios

The five scenarios represent the possible states in which interactions between issuers and users are mediated. They also offer a framework for assessing the effectiveness of a form's design through the lens of fairness. The next section examines the inherent relationships contained within each of these scenarios. This is achieved by graphically expressing Effort (E) against Opportunities (O). The results from this graphical expression visually reveal several correlations between users and issuers, design discrepancies, extent of cooperation, and user experience. Above all, the graph points to the optimum relationship conditions for fairness to occur in the design of digital government forms.

6.3.4 Graphing the relationship between Effort and Opportunities

Following from Table 6.1, the relationship between effort needed and design opportunities provided can be plotted on a graph. This graph, shown in the following pages, visualises how this relationship affects: (i) Issuers who design the form; (ii) Users of the form; and (iii) Parity point where issuers and users can expect maximum fairness to occur within a digital forms environment.

Figure 6.6 below shows a graph with two variables: Effort (E) required by all parties is on the vertical y-axis; Opportunities (O) provided by issuers is on the horizontal x-axis.

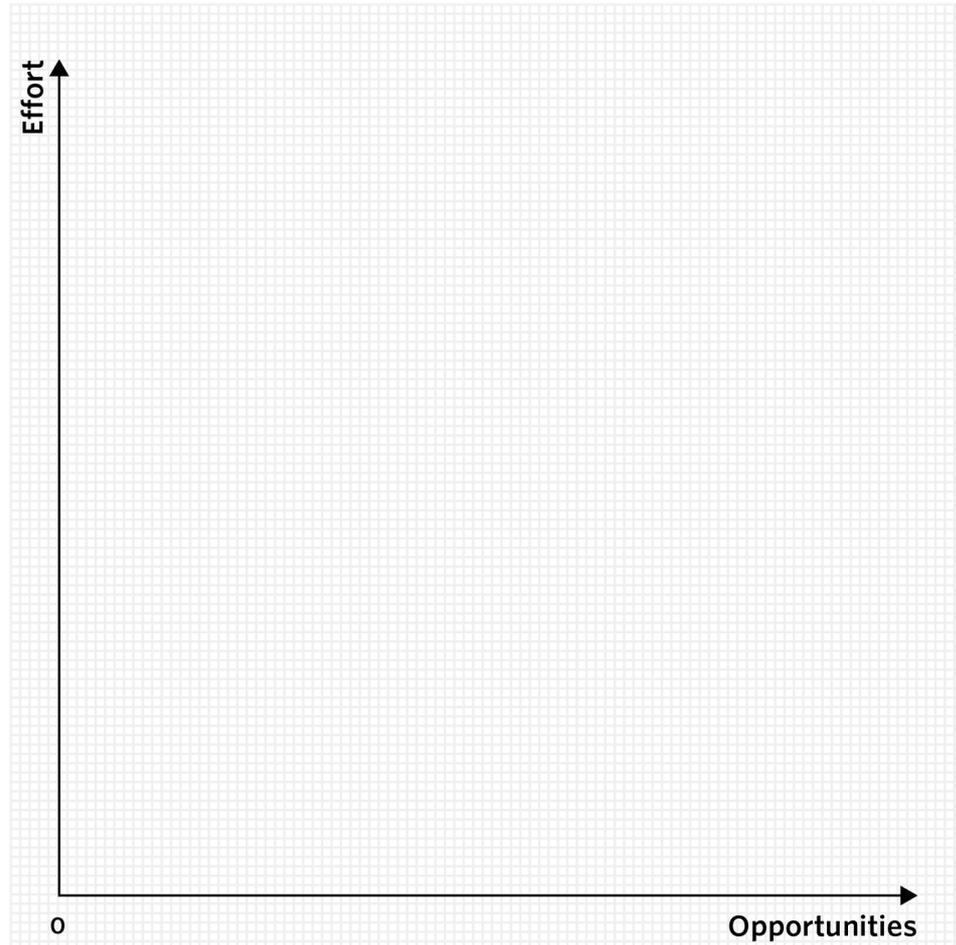


Figure 6.6: Graph showing Effort (y-axis) against Opportunities (x-axis).

E and O are hence functions of one another: either variable is affected by any changes made to the other. However, these changes affect issuers and users in different ways. Mapping their differences reveals how cooperation and fairness are established. Accordingly, the graphs on the following pages show E and O relationships for issuers and users and, critically, how their intersection points reveal where fairness, user experience, and exclusion occur. The graphs collectively represent the workings of the fairness model.

Figure 6.7 below shows how issuer loading typically correlates to E and O.

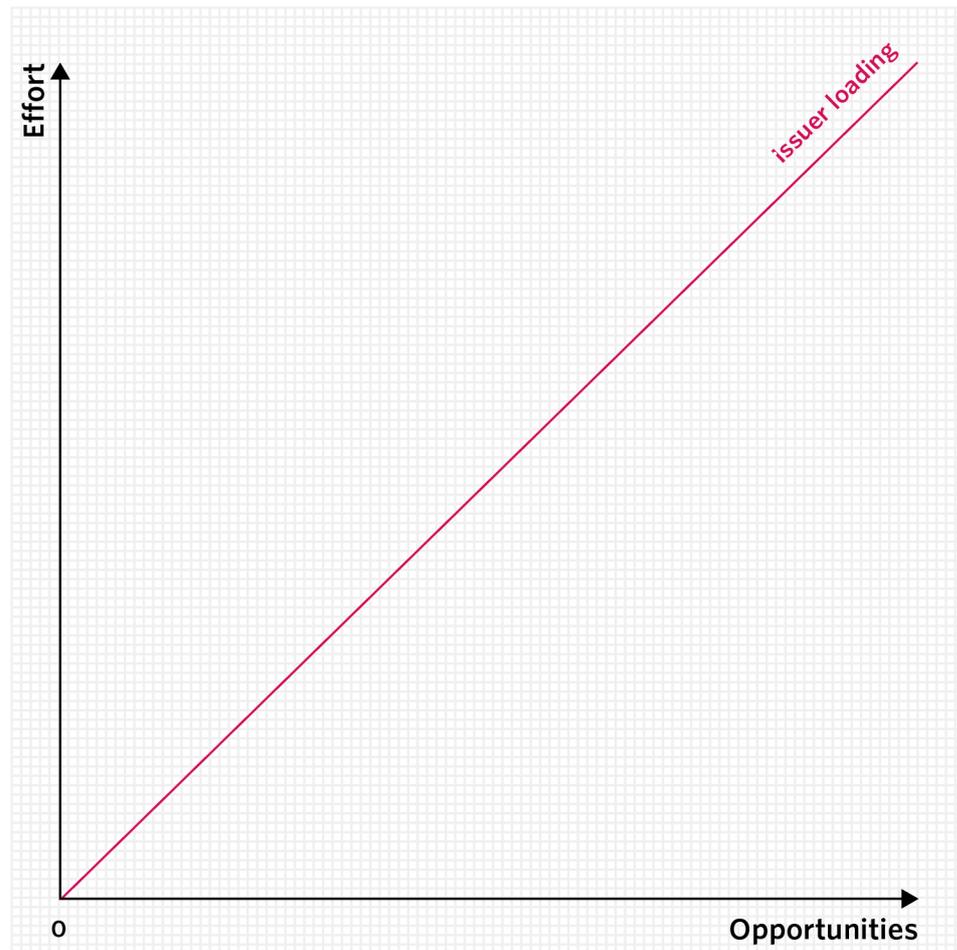


Figure 6.7: Issuer loading line (pink). More effort is required by issuers as more opportunities are supplied. Thus, when $O \uparrow$ then $E \uparrow$ and vice versa. Hence, the relationship between E and O for issuers is directly proportional. **Note:** This is considered the typical issuer position; please see Section 6.3.6 for how this position changes across countries with different digital skills.

The provision of opportunities requires effort from issuers. For any given form, the amount of opportunities required by users will depend on that form's complexity. The model hypothesises that as more opportunities are needed from issuers, more effort is proportionally expended to supply these opportunities. Theoretically there is no limit to either the quantity or types of opportunities that issuers can provide. Thus, issuers are confined only by the quantity of resources available to them. The relationship between effort and opportunities for issuers is taken to be proportional at this stage of the model.

Figure 6.8 below shows how user loading typically correlates to E and O. More opportunities supplied results in reduced effort for users, up to a point.

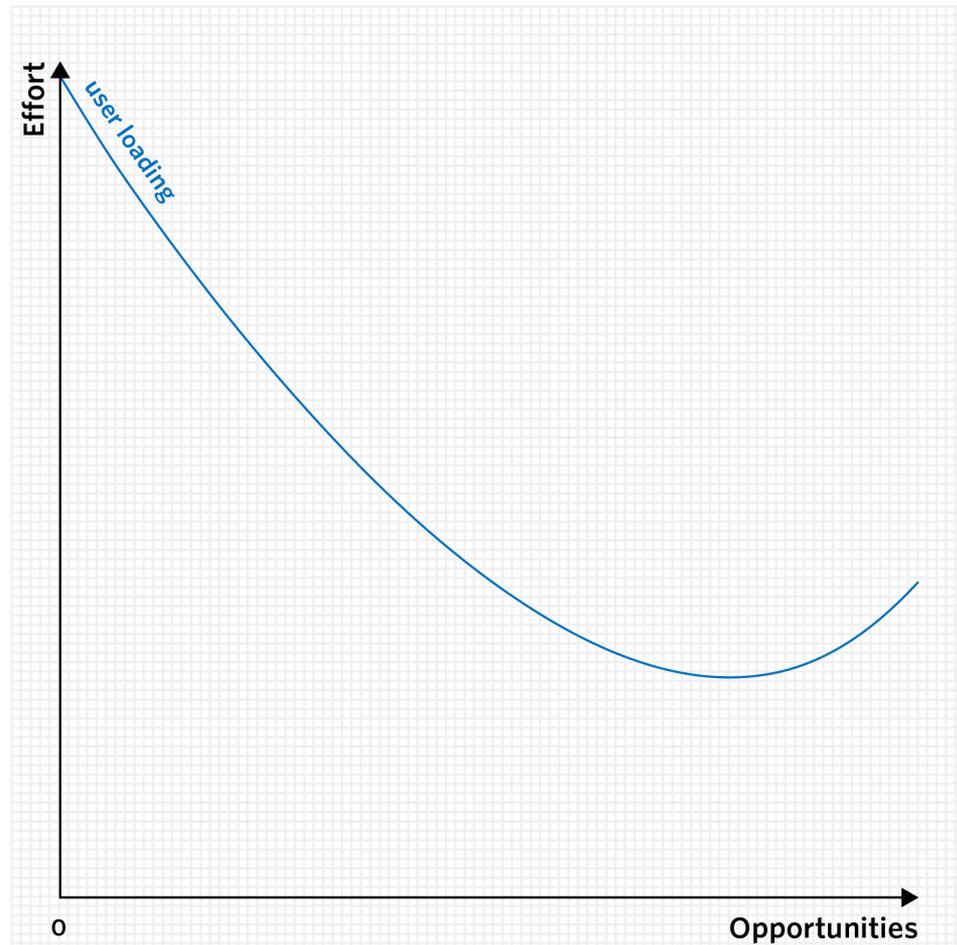


Figure 6.8: User loading line (blue). Less effort is required by users as more opportunities are supplied. Thus when $O \uparrow$ then $E \downarrow$ and vice versa. Hence, the relationship between E and O for users is inversely proportional, but only up to a point. **Note:** This is considered the typical user position; please see Section 6.3.7 for how the model shows users with different abilities, i.e. more advantaged and less advantaged users, represented by multiple user loading lines.

For any given form, there will be users with varying abilities. Users with more advantages will be further down the user loading line, whereas those with lower skills will be further up and will therefore need more opportunities to reduce their effort. The provision of opportunities reduces effort for users, but only up to a certain level. The model posits that as more opportunities are provided by issuers, less effort is proportionally needed by users to complete

the process. However, supplying excessive opportunities – for example, lengthy explanations, too many prompts, and an inordinate amount of error checking and confirmation – can backfire, creating additional problems of clutter and frustration for users.⁸⁹ Thus, opportunities beyond a critical level cease to be useful and so begin increasing effort for users. This is why issuers need to understand the mindsets and abilities of their users for every digital form that is designed. This is expounded on later in Sections 6.3.6 and 6.3.7.

Figure 6.9 below shows both relationships, i.e. issuer loading and user loading, plotted together on the same graph.

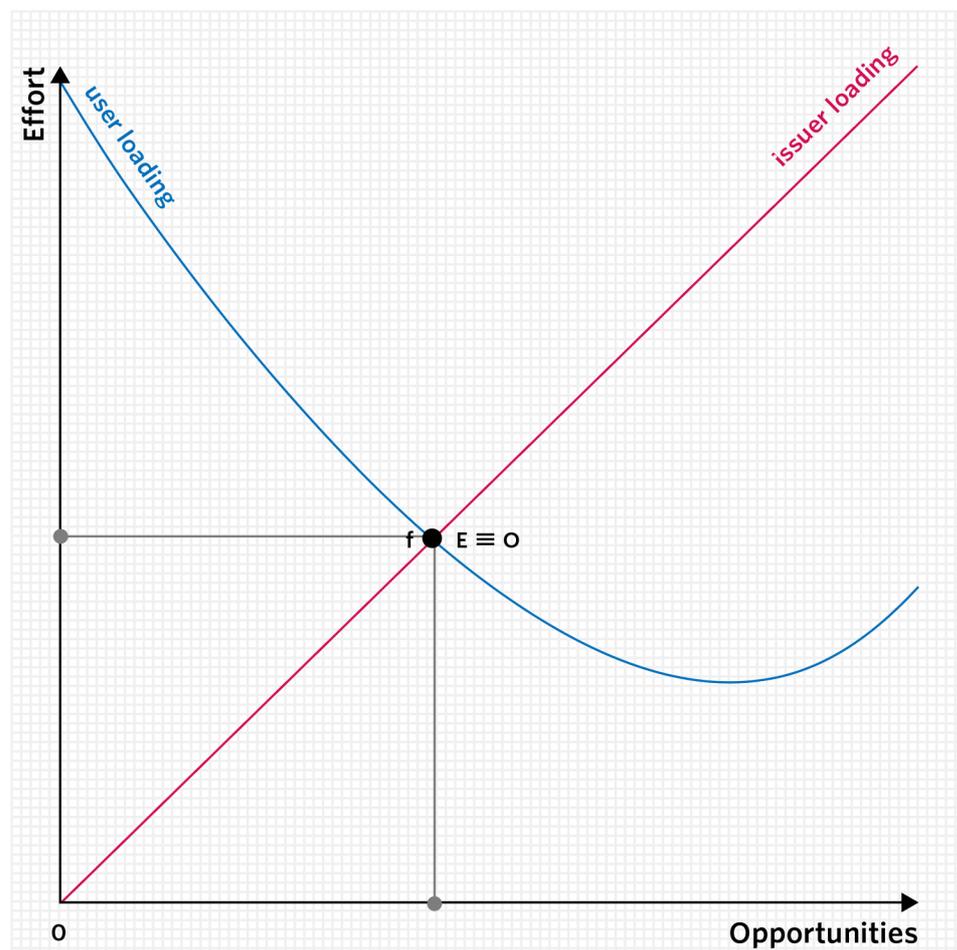


Figure 6.9: Issuer loading line (pink) and User loading line (blue). Point f marks the point at which both lines intersect, i.e. the minimum amount of opportunities needed for $E \equiv O$.

⁸⁹ The UK-PLF in Chapter 4 is an example where the form required three checks of the phone number.

Plotting issuer loading and user loading together on the same graph shows the point at which the two intersect, i.e. point **f**. This is the point at which E and O are congruent for all parties. In other words, point **f** marks the minimum level of design opportunities that issuers ought to provide in order to sufficiently begin meeting their users' needs. Point **f** is also the point at which the effort needed by the least advantaged user ought to be reduced to. Thus, point **f** marks the parity line, and the start of the fairness zone, shown in Figure 6.10 below.

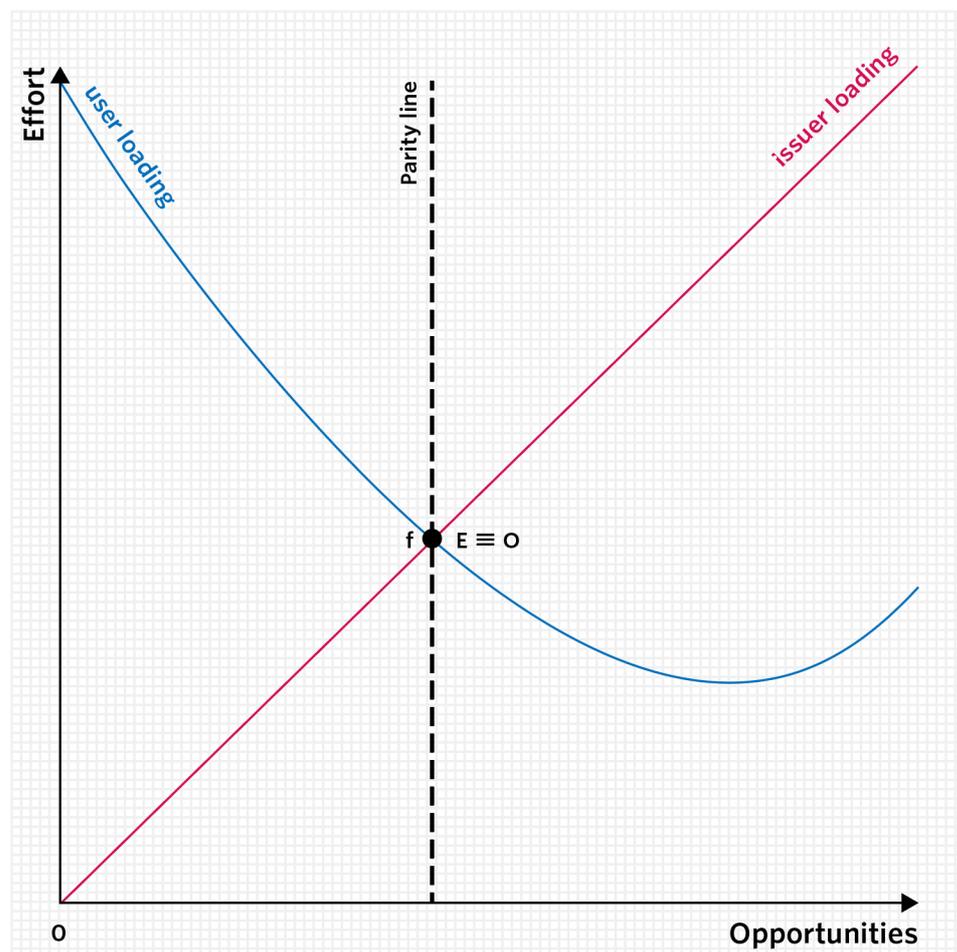


Figure 6.10: Issuer loading line (pink) and User loading line (blue). Point **f** marks the point at which both lines intersect, i.e. the minimum amount of opportunities needed for the least advantaged users ($E = O$). The parity line (dashed back line) running through point **f** marks the beginning of the fairness zone, shown in Figure 6.13.

As shown in the transportation metaphors in Figures 6.1–6.5, the parity line is the boundary beyond which effort is justifiably reduced so that the least advantaged user has the same chance at completing the forms process as everyone else. However, consideration must also be given to keeping excess opportunities within manageable limits for other users. Figures 6.11–6.13 below, and on the following pages, show these zones where $E > O$ and $E < O$.

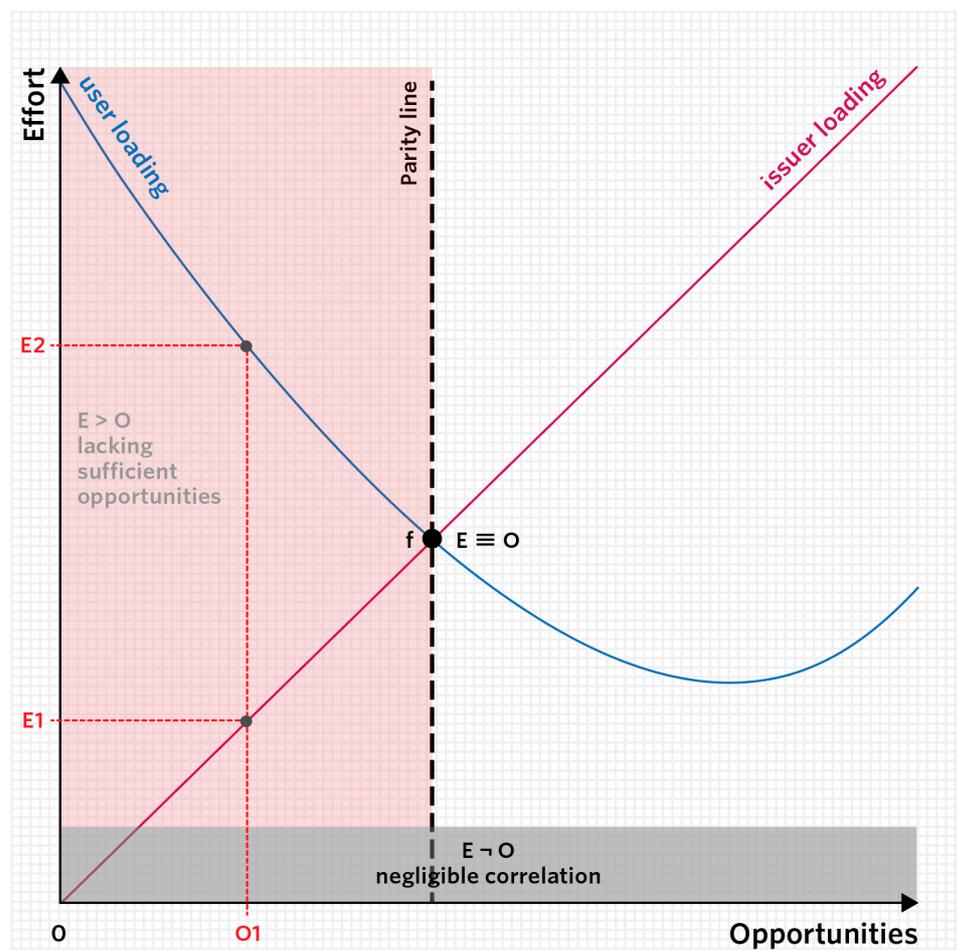


Figure 6.11: The red zone to the left of the parity line marks the area where opportunities provided by issuers is less than what users require. Hence, users need to expend additional effort to complete the process. This situation is unfair to users. The zone at the bottom (grey) represents forms that cannot show a sufficient correlation between effort and opportunity.

The red zone to the left of the parity line indicates a situation where opportunities provided by issuers are insufficient to counterbalance the effort expended by users ($E > O$). This situation is unfair to users, since they need to

rely on inherent abilities or external support to complete the process. This is illustrated in Figure 6.12 below. In providing opportunities O_1 , issuers expend a corresponding amount of effort, E_1 . However, this causes users to expend more than proportional effort E_2 . Hence, the red zone marks all the conditions between E and O that are unfair to users. Issuers need to therefore provide more opportunities to make up for this discrepancy.

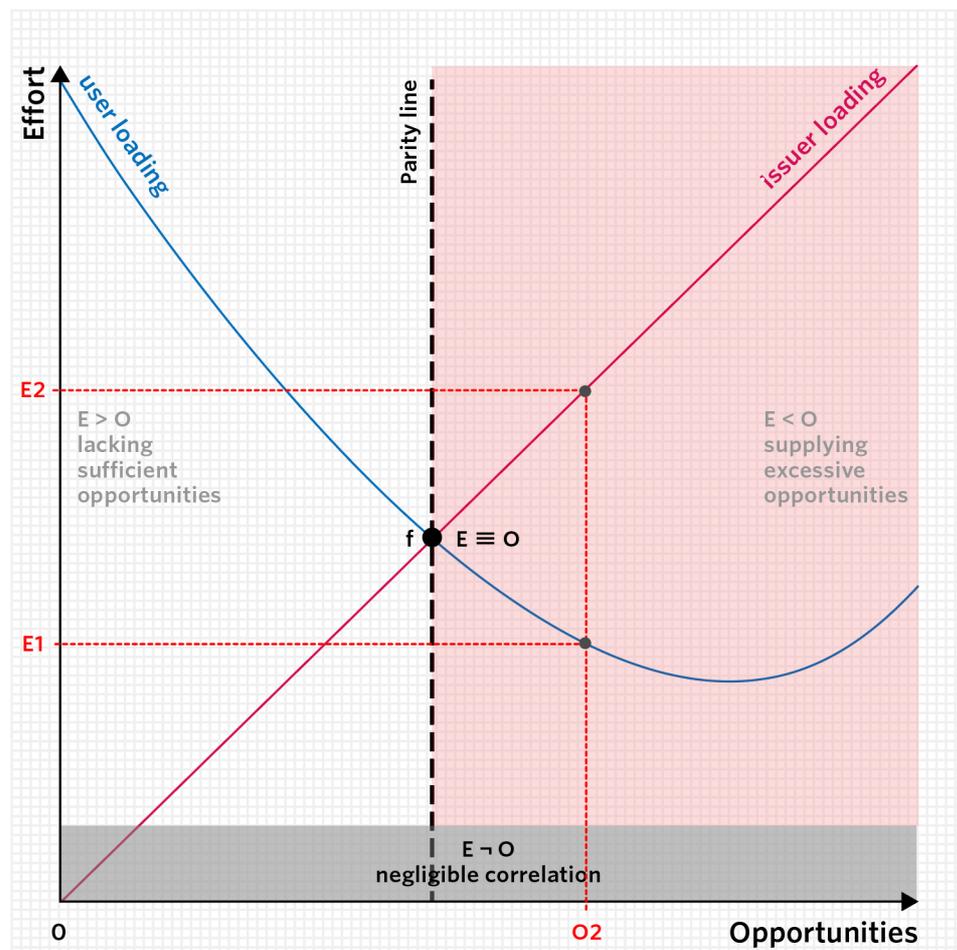


Figure 6.12: The red zone to the right of the parity line marks the area where opportunities provided by issuers is more than what users require. This situation is technically unfair to issuers.

The red zone to the right of the parity line indicates a situation where opportunities provided by issuers exceed what is required by users to complete the process ($E < O$). This situation is technically, but not always, unfair to either issuers or users.

In providing opportunities O_2 , issuers expend a corresponding amount of effort, E_2 . But as discussed in Table 6.1, a certain level of surplus opportunities beyond what is minimally required by users will not necessarily have negative consequences for users, so long as (i) issuers are able and willing to provide this surplus, and (ii) the surplus does not contribute to overcrowding, clutter, and additional cognitive loading for users. The $E < O$ zone can therefore be sub-divided to better express where excessive opportunities beyond a critical point become more burdensome rather than helpful. This is shown in Figure 6.13 below.

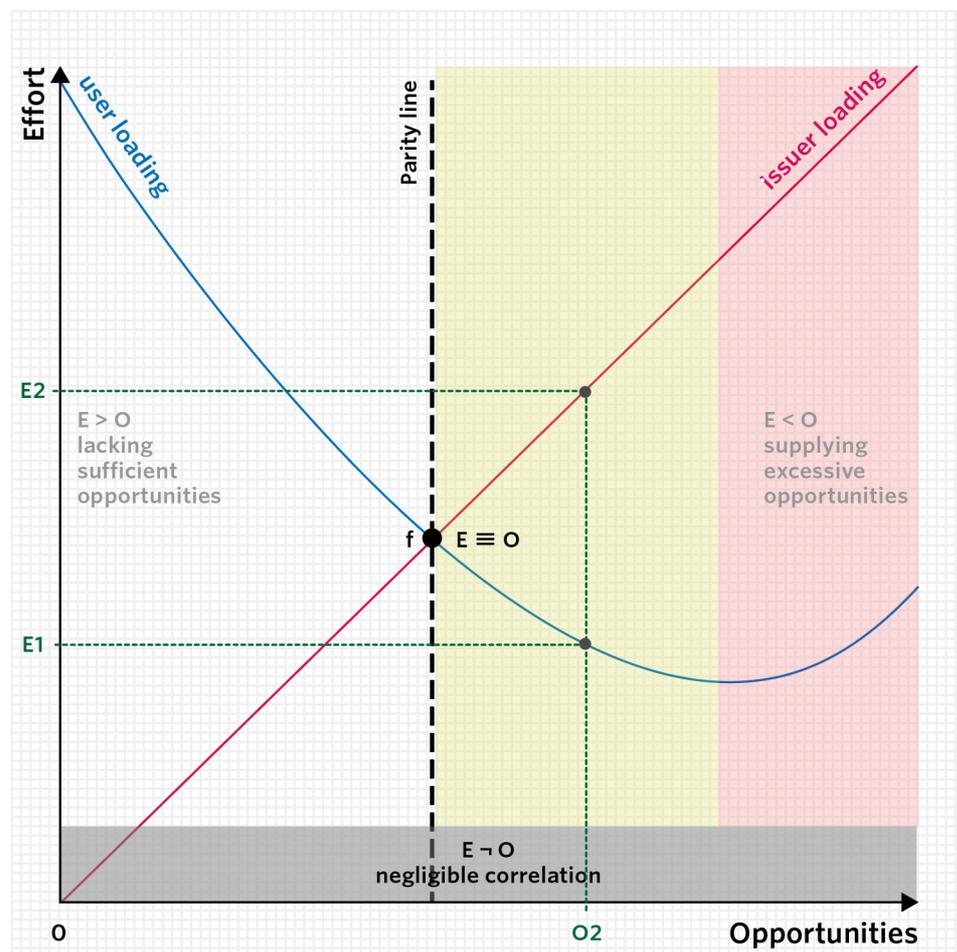


Figure 6.13: The pale-green zone to the right of the parity line marks the area where excessive opportunities provided by issuers continues to benefit users. Beyond this zone, the surfeit of opportunities begins to negatively affect users. This situation is unfair to users and issuers. **Note:** interestingly, these zones also indicate the stability of user experience, discussed in Figure 6.17.

The pale-green zone to the right of the parity line indicates a situation where surplus opportunities provided by issuers exceed what is required by users to complete the process ($E < O$). Nonetheless, this surplus continues to provide additional advantages beyond what users minimally require.

But beyond a critical point – where the user loading line begins to swing upwards – this surplus will have an overwhelming effect on users. This is indicated by the red zone to the right. Moreover, providing opportunities at this level is a waste of resources, even if issuers are able to do so. This is why the point at which the user loading curve swings upwards is an important marker for how the fairness zone is mapped, and is shown in Figure 6.14 below.

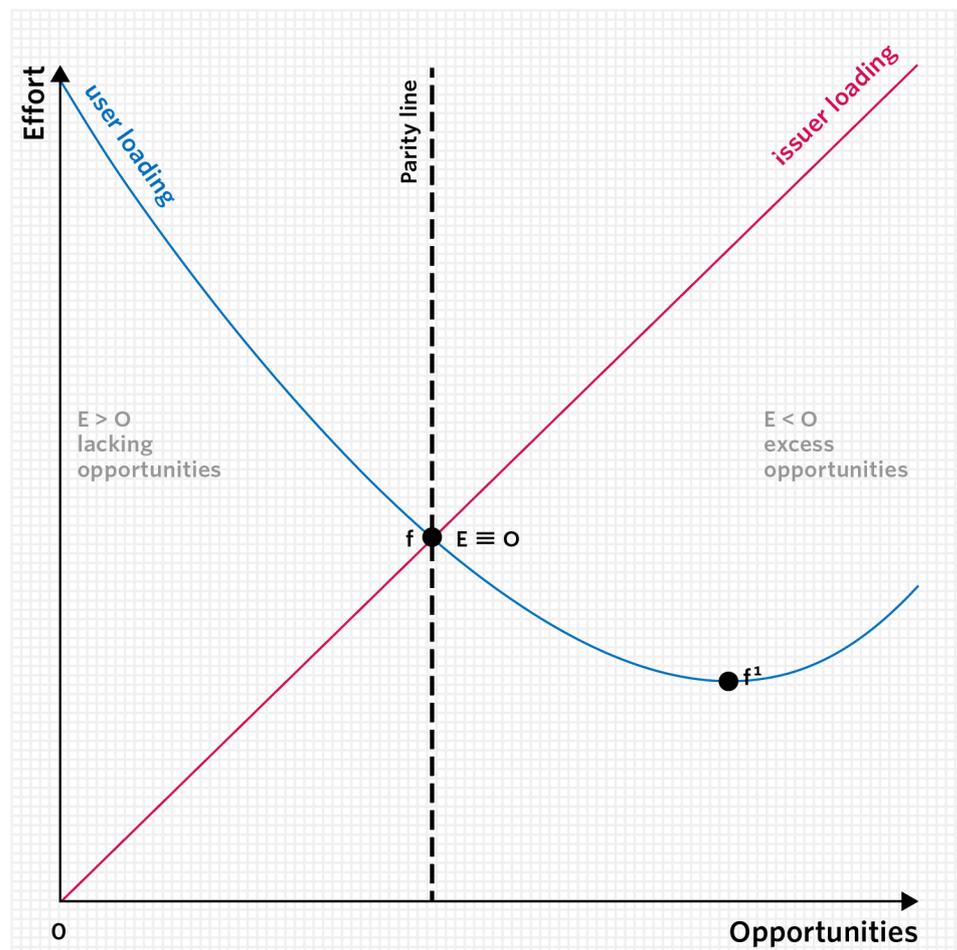


Figure 6.14: Point **f1** on the user loading curve marks the turning point after which additional opportunities will begin to increase effort for the most advantaged users.

As discussed, issuers can neither be expected to, nor should they, provide opportunities past the point at which user loading becomes overwhelmed. This point on the graph is marked **f1**. There are disadvantages for users and issuers respectively, since excessive design opportunities beyond point **f1** will diminish the effectiveness of the opportunities and once again raising levels of effort. Likewise, there is additional loading on issuers due to scarcity of resources, as well as the risk of wastage. It would therefore be unfair to expect opportunities beyond point **f1**.

Thus, if point **f** is the start of the fairness zone, then **f1** marks its end. With these points plotted, it is possible to circumscribe the fairness zone on the graph. Figure 6.14 below shows the boundary of the zone.

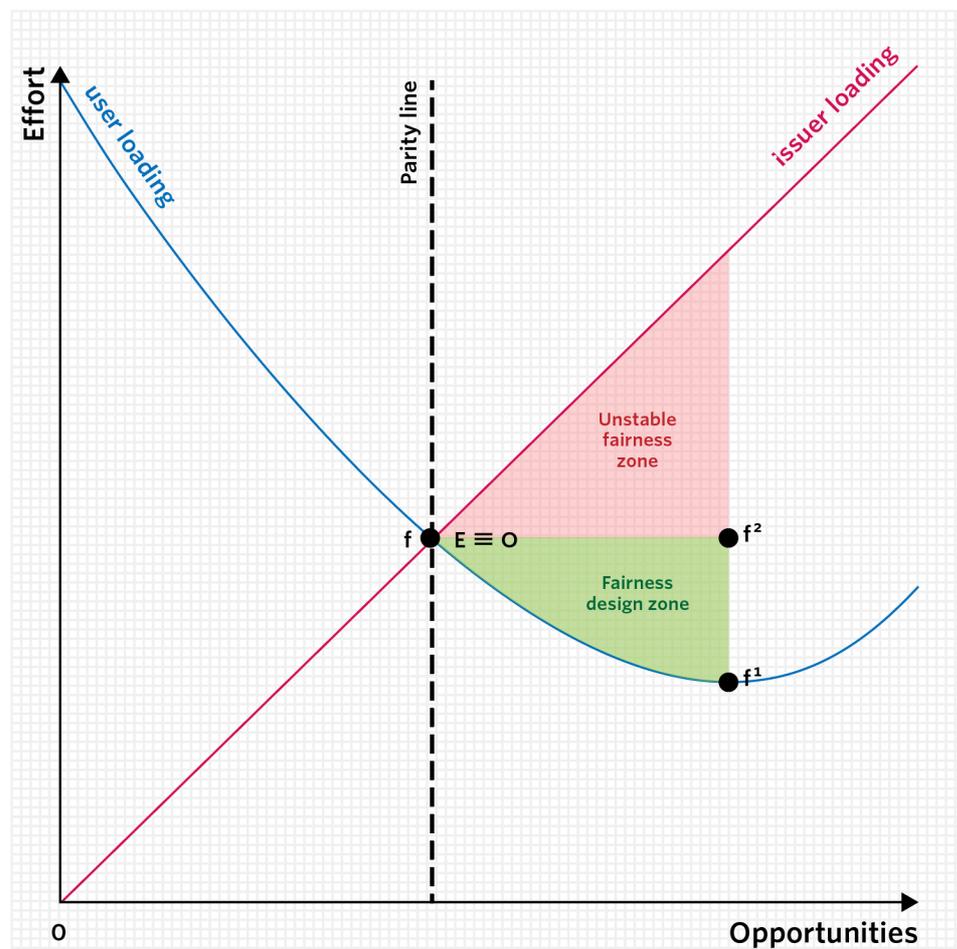


Figure 6.14: Fairness zone (green) bound by points **f**, **f1**, and **f2**, and unstable fairness zone (red).

The fairness zone (green) is thus defined by points **f**, **f1**, and **f2**. Point **f** marks the point at which opportunities and effort are congruent for the least advantaged users. The vertical border created by points **f1** and **f2** marks the boundary beyond which surplus opportunities begin to affect users.

The horizontal border created by points **f** and **f2** mark the limits of fairness for issuer exigencies. Any expectations of opportunities beyond this horizontal limit will be unfair to issuers, unless these can be provided without overtaxing the issuers in a rational cooperative exchange. The red shaded triangle marks *only the possibility of added fairness* and is therefore an unstable fairness zone.

Forms that reduce user effort through design opportunities within the green zone are thus considered to have met the criteria for fairness in design. The fairness zone is also an indication of the extent of compromise needed between issuers and users to ensure satisfactory cooperation by all parties.

The area of the zone will change depending on the abilities of users, and the level of resources available to issuers. Developed countries, for instance, typically comprise populations with relatively higher digital skills, compared to emerging economies. These factors change the way issuer and user loading lines are plotted on the graph. This is discussed in more detail in Section 6.3.6.

6.3.5 Graphing users' abilities, design gaps, and user experience

Interestingly, the model also reveals additional insights into the design of forms discussed in this thesis. The notions of reliance on inherent abilities, gaps in design, and the stability of user experiences can be mapped onto this graph. Figures 6.15–6.17 on the following pages offer further visualisation of the relationships between issuers and users.

Figure 6.15 on the following page shows the level of reliance users place either on inherent abilities, or outside support if a digital form does not contain adequate literacy, clarity, and technology opportunities. Likewise, the extent of discrepancies in the form's design – that issuers need to bridge in order for it to be considered fair – are also illustrated in the model.

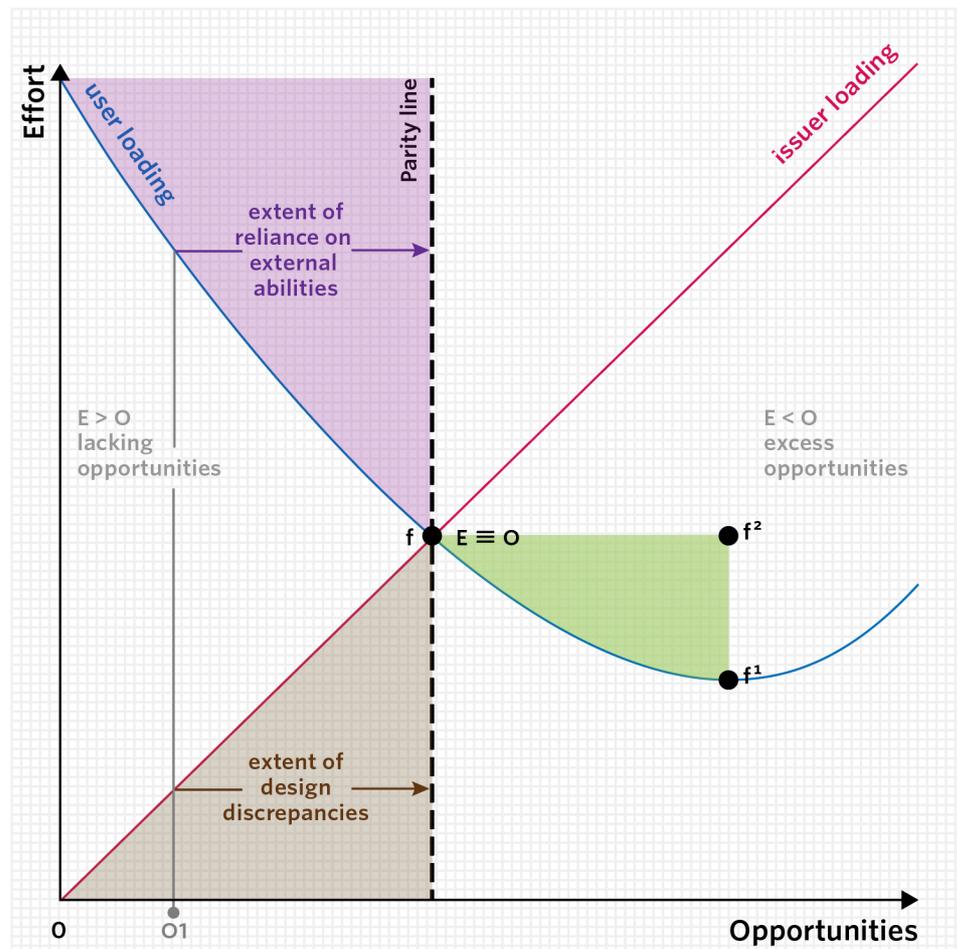


Figure 6.15: Visualisation of the extent of reliance on external abilities and outside support for users (purple) and the level of discrepancy in opportunities that ought to be supplied by issuers (brown).

For users, the purple zone in the upper section of the graph shows the extent of reliance on external abilities and outside support. For issuers, the brown zone in the lower section of the graph shows the level of discrepancy between the opportunities being provided, and those that are needed for fairness to occur. For any given level of opportunity, in this case $O1$, the graph also shows the overall disparity between what users require and what has been provided by the issuer. The gap between $O1$ and the parity line also highlights van Someren Greve's "Ought vs Can" approach (van Someren Greve, 2014, p. 913) to fairness, discussed in Chapter 3. Figure 6.16 on the following page shows how this can be visualised on the fairness model's graph.

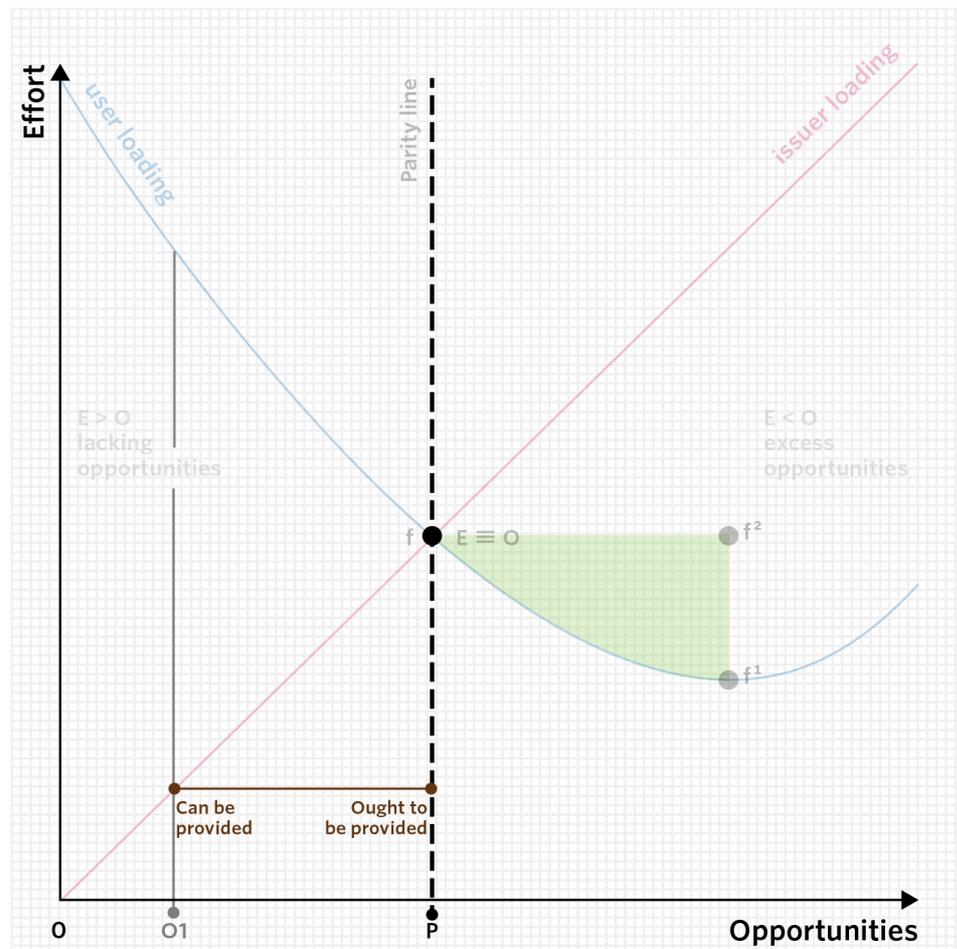


Figure 6.16: Visualisation of design discrepancies which correspond to the “Ought vs Can” approach to fairness.

Assuming $O1$ marks the maximum possible opportunities that an issuer is able to provide in a given circumstance, then $O1$ becomes what the issuer can provide, whereas the parity line indicates what ought to be provided. Hence, the gap between $O1$ and P illustrates the “Ought vs Can” fairness argument, i.e. an obligation does not always translate into action, even if morality requires that such an action ought to be performed. Therefore, if the provision of opportunities either falls short of or heavily exceeds what is needed by the least advantaged user, then user experience is affected. Consequently, the quality of user experiences can be mapped using the fairness model, shown in Figure 6.17 on the following page.

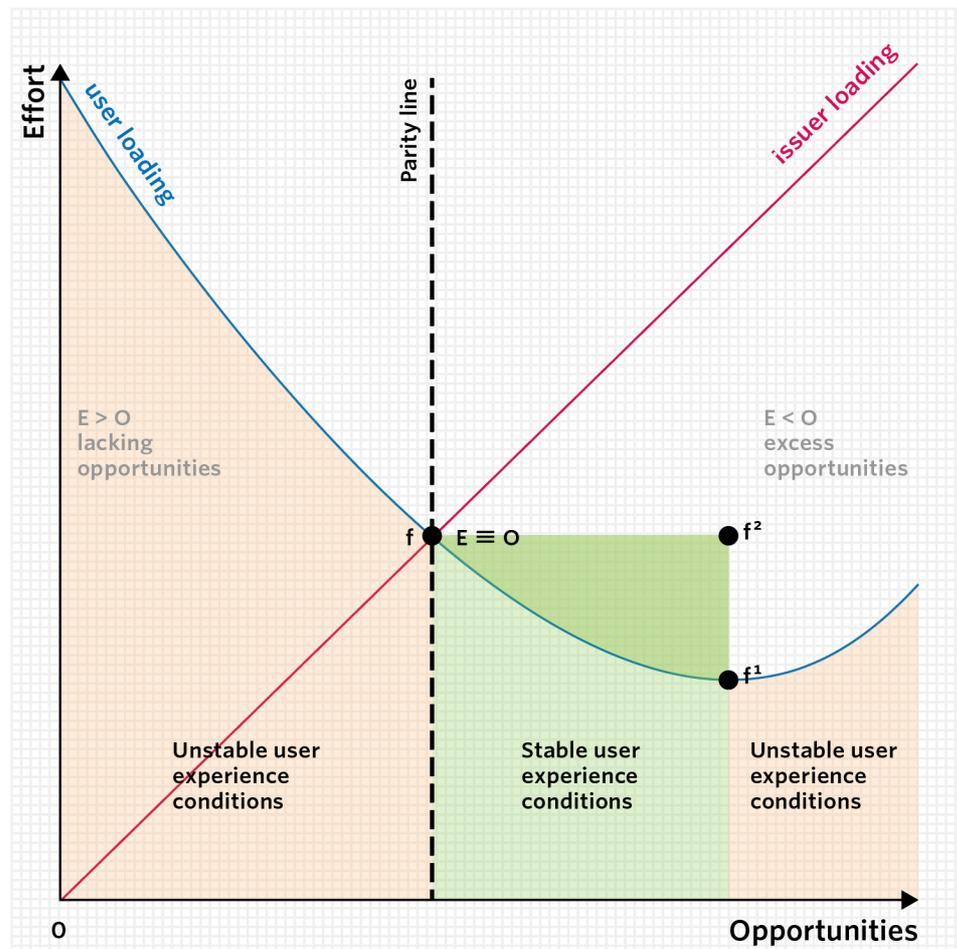


Figure 6.17: Visualisation of user experience: the graph identifies zones of stable (green) and unstable (orange) user experience.

By pegging user experience to notions of fairness, the graph shows three zones of stability that affect overall user impressions of the process. The amount of space occupied by each of the zones, under the user loading curve, relate a priori to conditions in which user experiences occur. The largest zone on the left (orange) is indicative of the most common conditions whereby forms fall short of providing sufficient design opportunities for users, even though issuers are able to bridge this gap. The stable zone in the middle (green) denotes a relatively smaller number of forms that meet the criteria for fairness. The smallest zone on the right (orange) signifies an even smaller quantity of forms that suffer from excess opportunities, resulting once again in instability.

As opportunities are supplied user experience continues to improve up to the parity point f where it stabilises, i.e. becomes an optimum user experience. From there, user experience is considered to be in a stable state up to point f_1 , since all users are able to reach the parity line and therefore continue to enjoy equitable chances of achieving their desired goal within the fairness zone.

Beyond point f_1 , user experience starts to destabilise. This is due to a surplus of design opportunities that threatens to overwhelm user loading. While less advantaged users may still benefit from these excesses, other users may find the process becoming increasingly complex. Hence, this condition can also be described as an unstable user experience. By accounting for changes in the area under the user loading curve, and highlighting conditions in which user experience moves from stable to unstable states, the model reveals new possibilities to evaluate user experiences in digital forms.

6.3.6 Graphing technology and compromise

This thesis deals mainly with digital forms in developed countries, with a focus on Singapore. Chapter 2 discussed some of the new technologies which the government has integrated into its documents and administrative processes. Thus, a discussion on how emerging technologies affect fairness in forms – and how some resulting problems might be overcome – is therefore useful.

The Government Technology Agency in Singapore (GovTech) has unveiled plans for the use of artificial intelligence in its products and services. GovTech's manifesto states an intention to use "data science and artificial intelligence (AI) to extract data-driven insights and build smart platforms that help improve the delivery of citizen-centric services and ultimately support government policy outcomes" (Government Technology Agency of Singapore, 2021). But users' preferences between online and in-person interactions with the government is not as straightforward.

Citing the usefulness of Media Richness Theory (MRT) Androusoy et al. observe that the choice of channels which citizens use to transact with governments depends on the complexity level of that transaction. The authors also state that richer channels, such as face-to-face meetings, are generally

preferred over e-services for tasks of higher complexity (Androutsopoulou et al., 2019, p. 359). These tasks including lengthy transactions and interactions, many of which are mediated through forms.

This trend in seeking out alternative means to digital communication is something the Singapore government is attempting to reduce in the wake of *Smart Nation* initiatives. Ng writes that *Smart Nation*, which includes “no-regrets” digital initiatives, is needed to “accelerate the process of integrating technology into our collective efforts to improve lives, lest Singapore fall behind relative to other global cities;” arguments for integrating artificial intelligence and data analytics have also been forwarded as factors that create personalised and anticipatory services for Singaporeans (Ng, 2019). Baum and Mahizhnan, however, take a critical view of these arguments, noting that the benefits of e-government in Singapore are not always positive. Moreover, such arguments directly impact fairness concerns for users:

In adopting an E-Government philosophy or framework, governments proclaim an intention to be inclusive and equitable in providing e-services to its public. However, as with many social and economic policies and processes, outcomes may be far from equitable....Segments of populations are [thus] excluded from the use of and benefits from E-Government services for a variety of reasons (Baum & Mahizhnan, 2015, p. 711).

Indeed, there is a tendency for emerging technology to disrupt familiar processes and interrupt routine digital behaviours. The resulting confusion has negative ramifications for participation by the least advantaged users. Many of the causes and consequences of these inequalities have been discussed at length throughout this thesis. However, the growth and proliferation of newer technologies inevitably also deliver benefits to users and issuers – evinced in the case study of *TraceTogether* – thereby leading to an increase in fairer digital exchanges. But while debates around the morality and practicality of emerging technologies both encompass and extend beyond this thesis, it is useful to determine how the fairness model incorporates such changes.

This is relevant because improvements to forms technology not only impacts how issuers provide opportunities, but also determines the extent of the digital divide. This is because more advantaged users, with greater capabilities and access to resources, are able to adopt such technologies faster. This in turn affects the level of exclusion which occurs for less advantaged users.

Greater motivation to use ICTs may lead to more possession of technological equipment resulting in better material access that encourages the development of higher-level skills, which in turn leads to more intense and diverse ICT uses. van Dijk also argues that the relationship between socioeconomic status (SES) and the possession of digital resources is reciprocal, indicating that digital inequality and existing forms of social inequality may reinforce one another (Hargittai & Hsieh, 2013, p. 131).

Hargittai and Hsieh's observations are echoed in Will's statement: "The very technology that has the power to empower us all also has the potential to increase the problems of social exclusion unless we act to bridge the digital divide" (Michael Wills, in Selwyn, 2002, p. 1). In a similar vein, Selwyn refers to the term "digital exclusion" when describing Holderness' view of disparities between digitally advanced nations and poorer counterparts (Holderness, 1998, pp. 35–56). Selwyn extends Holderness' notions to digital exclusion within countries, citing the Central Office of Information: "to ensure a 'fair' information society in the Information Age the many must benefit, not just the few. A society of 'information have-nots' would not just be unfair – it would be inefficient" (Central Office of Information, in Selwyn, 2002, p. 4).

Accordingly, the tendency of issuers to improve digital forms through technology before considering *inter alia* literacy, clarity, and technology concerns for users, has often resulted in swathes of users being excluded from participating fully in the process; many in this swathe will comprise the least advantaged groups. This compels users to either acquire the relevant digital skills or remain left behind, which leads to greater exclusion. The effects of exclusion are illustrated in Figure 6.18 which shows an overall reduction of the fairness zone.

Writing about why issuers need to respond more effectively to the issue of internet and digital exclusion, van Deursen and van Dijk contend that “it is important for designers to understand that a significant number of people, especially those with lower levels of educational attainment and the elderly, possess insufficient levels of operational and formal Internet skills to guarantee a successful Internet session” (van Dijk & van Deursen, 2014, p. 94).

In other words, if new technology is introduced to digital forms without considering the needs of the least advantaged users, then fewer overall users are given the chance to achieve their desired goal. This contributes greatly to unfairness in government digital forms. Conversely, if new technologies are introduced alongside considerations of the least advantaged user’s needs, then the fairness zone is maintained, and in some cases is hypothesised to grow.

This links with Schwesinger’s insistence that all who create and redesign governments forms must show empathy for the needs of every type of user. (Schwesinger, 2017, p. 613). Figures 6.18–6.21 on the following pages illustrate how Schwesinger’s assertion can be implemented in the fairness model. Figure 6.18 shows the typical position of the issuer loading line. The original position assumes that effort and opportunities are proportional to each other. That is, for every unit of design opportunities provided, issuers expend a commensurate unit of effort in supplying those opportunities. The process is illustrated in Figure 6.18 on the following page, whereby the quantity of opportunities provided by issuers, O_2 , are proportional to the effort expended by the issuers, E_2 .

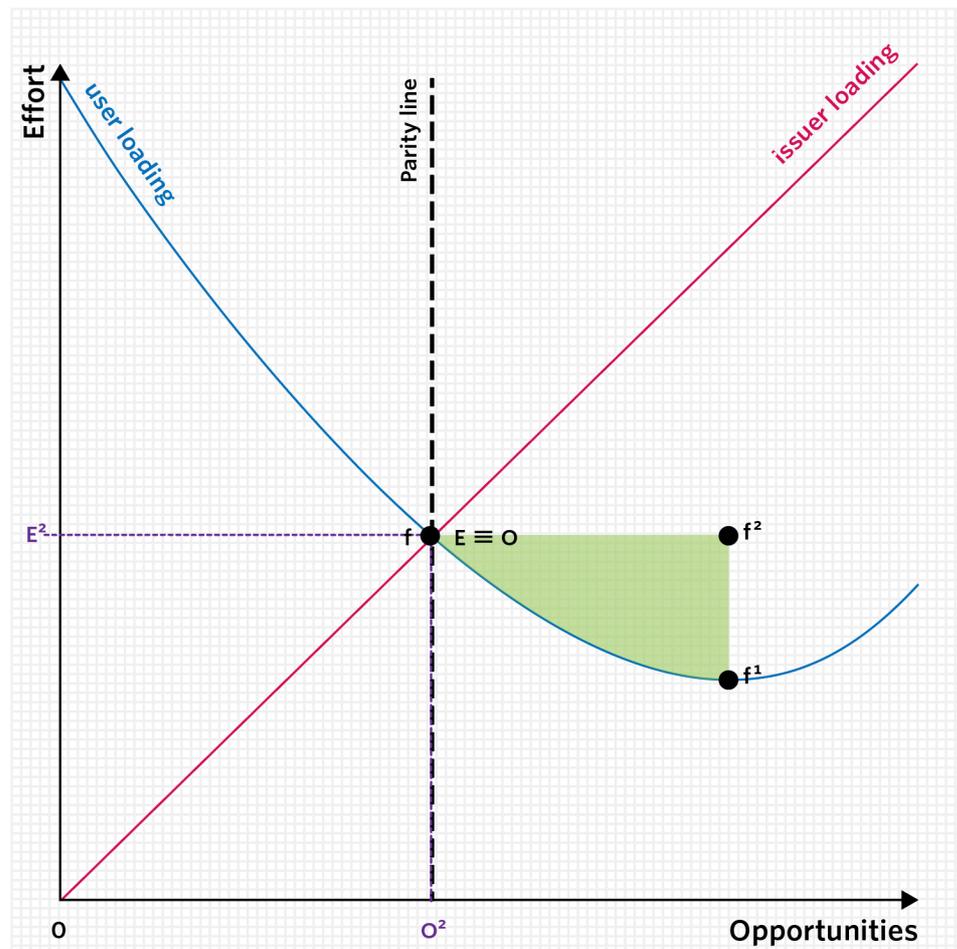


Figure 6.18: Typical position of issuer loading line (pink) and user loading line (blue).

New technology, however, can make it easier for issuers to deliver the same level of opportunities but with reduced effort on their part. For instance, adding artificial intelligence to *TraceTogether* hypothetically could provide issuers with cost savings in designing and updating the check-in process. This would eliminate the need for manual design iterations thereby saving resources for issuers. However, unfairness is likely to occur if this benefit is not shared with all the users participating in the process.

Figure 6.19 on the following page shows the new issuer loading line and parity line, i.e. Issuer loading 1 and parity line 1, respectively. It also shows how the model responds accordingly when new technology is implemented by forms issuers.

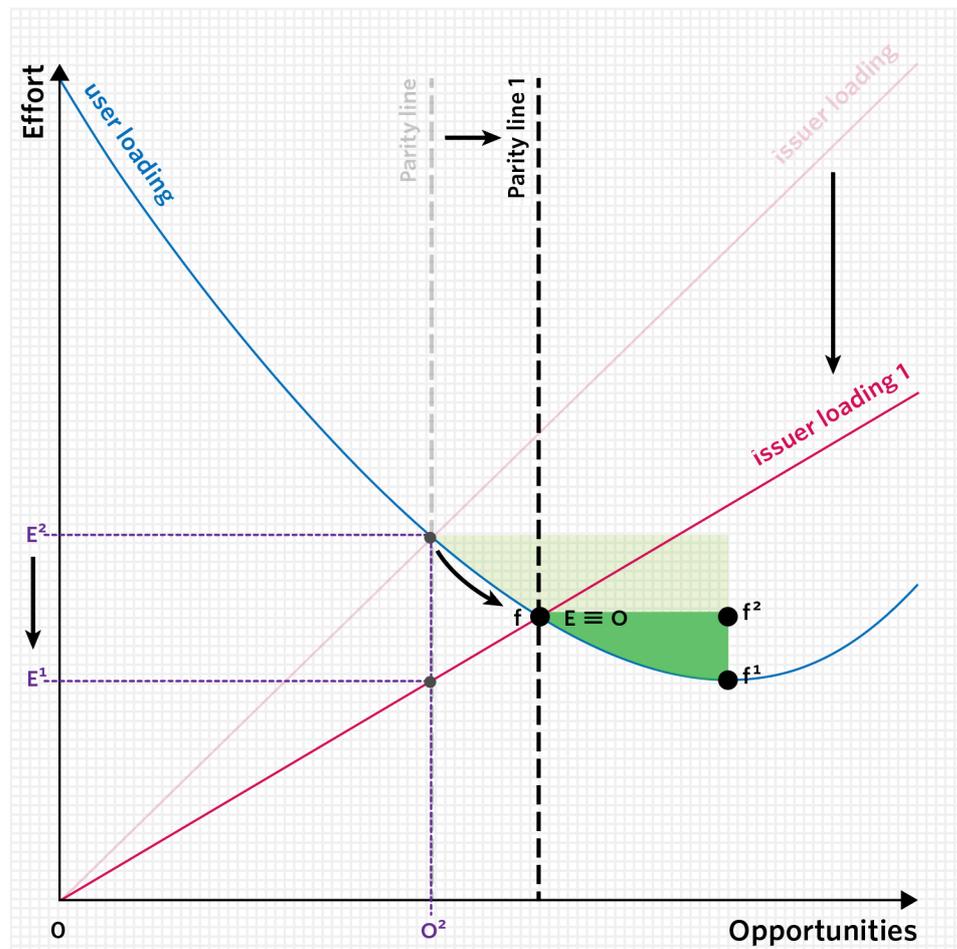


Figure 6.19: Amended position of the issuer loading line (pink). The integration of a new technology results in less effort for issuers to provide opportunities.

With the integration of new technology, issuers expend less effort to provide the same amount of opportunities. This is shown in the graph whereby the original amount of opportunities, O_2 , corresponds with lower expenditure of effort, E_1 . The advantage given to issuers as a result of the new technology is marked by the disproportional reduction of effort: this is indicated by the distance between E_2 and E_1 in Figure 6.19 above. This establishes a new parity line, i.e. parity line 1. As a result, the situation reduces the extent of the fairness zone (shown in darker green). This reduction occurs because the advantages of the technology currently only benefit the issuers.

Rawlsian notions of reciprocity are no longer maintained as users are no longer accounted for in this design decision. As a result, users have to rely on additional opportunities in order to reach the new parity line, thus leading to

diminished perceptions of cooperation. The new smaller fairness zone reflects the overall net decrease in fairness for all parties. Consequently, forms that fall within the old fairness zone, but remain outside the new smaller area are therefore considered unfair. In summary, while there are several benefits to technological integration, the particular situation in Figures 6.18 and 6.19 illustrate the consequences when such integration is solely issuer-led. The reduction in the fairness zone correlates with the notions of forms benefiting issuers at the expense of users, discussed in Chapters 3, 4, and 5.

Figures 6.20 and 6.21 on the following pages show the possibilities for issuers to rectify the situation using the fairness model to visualise a strategy. The model encapsulates three ways to re-establish fairness. The first requires issuers to forgo their technological advantage. This would result in the issuer loading line reverting to the original position, shown in Figure 6.18. However, this policy would be irrational by most accounts as it penalises issuers for having an advantage which goes against the principles discussed in Figures 6.1–6.5. Accordingly, such policies may be safely ignored.

The second requires users to catch up to the new technology by acquiring relevant skills. This may work in the long-term but is not helpful in the initial stage of design.⁹⁰ Furthermore, such a scheme risks creating a “dichotomous divide between those citizens who are ‘connected’ and those citizens who remain ‘disconnected’ thereby “potentially creating a new form of exclusion as well as reinforcing existing patterns of exclusion” (Selwyn, 2002, p. 4). In this instance, such a policy can also be disregarded as a viable solution.

The third relies on “Ought vs Can” fairness and entails compromise.⁹¹ Under these conditions, issuers ought to offset their unfair advantage by expending additional effort on backward compatibility or legacy support. In the context of this discussion, this entails providing active support for users with older devices, and little to no abilities with the new technology.

⁹⁰ Section 6.3.7 graphically represents the problems of exclusion that come from designing with more advantaged users in mind, i.e. those with better digital literacy and technology skills.

⁹¹ Chapter 5 discussed compromise as a criterion in Rawlsian ideas of cooperation, and “Ought vs Can” fairness outlined by van Someren Greve.

Figures 6.20 below and 6.21 on the following page show how the implementation of legacy support can be graphed by the fairness model. Figure 6.20 below shows the current situation whereby point **a** indicates the old parity point.

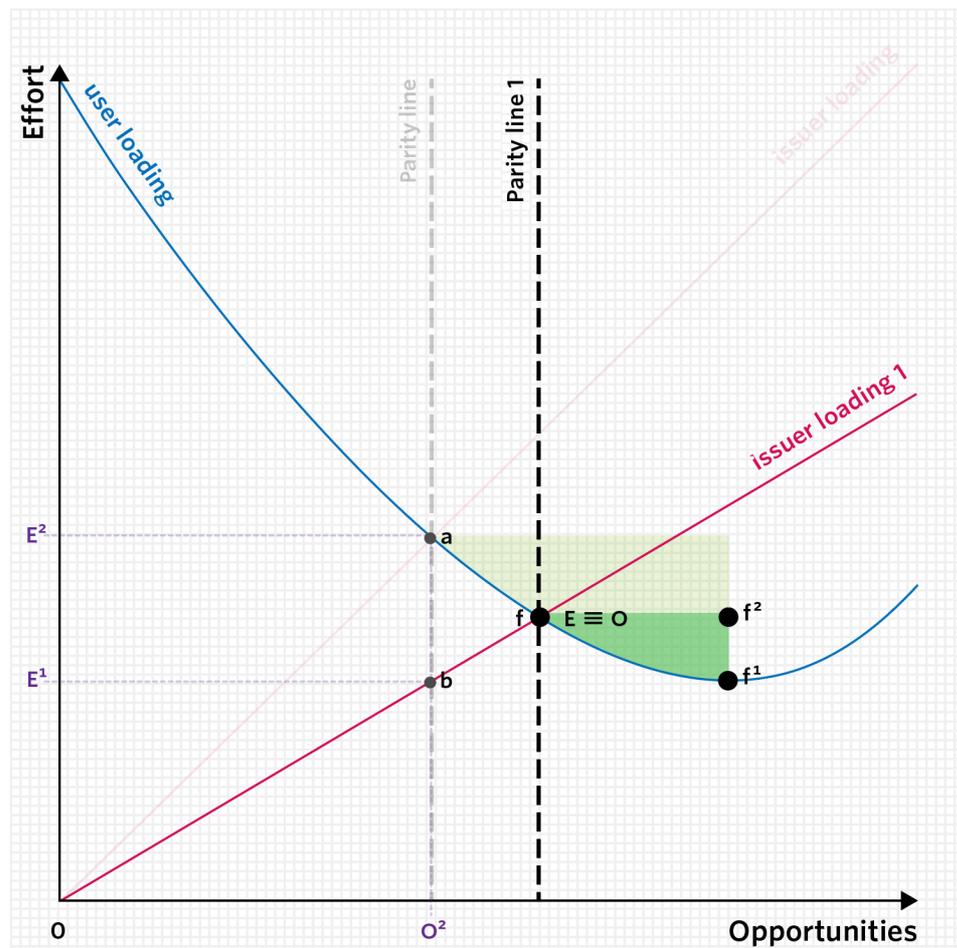


Figure 6.20: Advantages given to issuers by the new technology is circumscribed by the triangle **a,b,f**.

To recap, fairness in design requires that the least advantaged user be given the best possible chance at completing a process. However, any existing advantages enjoyed by more advanced users of the new technology must not be sacrificed. Likewise, issuers must not be put in a position that forces them to give up their technological advantage; instead, as the more advantaged

party, issuers ought to make a rational compromise by providing a technology opportunity, i.e. legacy support. This is illustrated in Figure 6.21 below.

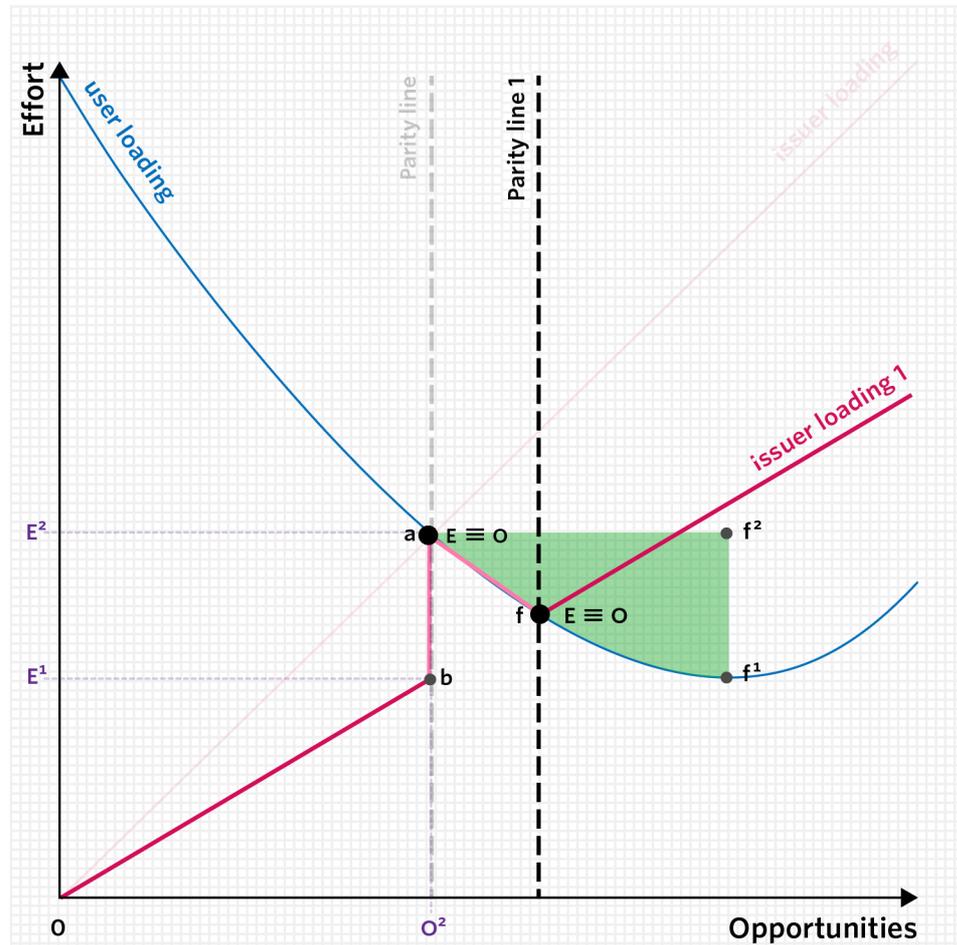


Figure 6.21: At O^2 , along the old parity line, issuer effort is split. Line segment **b,a** represents legacy support. Line segment **a,f** represents normal conditions in the process.

Figure 6.21 above shows the new issuer loading line after a compromise has been made according to Rawlsian notions of cooperation and reciprocity. Issuers continue to retain their new technology advantage up to point **b**. From point **b** to point **a**, issuers provide legacy support. The effort expended to provide legacy support – indicated by the line segment **b,a** – does not create additional opportunities, but rather maintains the current opportunities (O^2) at existing levels. This fits well with the notion that to make technology compatible for previous versions of the form, extra effort needs to be

expended by issuers but which only benefits the least advantaged users. Parity is thereby re-established since $E = O$ at point **a**.

From point **a** to point **f**, additional opportunities are provided for users and issuers alike, thereby reducing effort for both parties. This phenomenon can be attributed to the new technology. This ties in with predictions about the benefits of emerging digital tools to make electronic forms processes easier to use and manage. Subsequently, a second parity point is established but the extent of the fairness zone is extended to once again include the maximum number of users possible.

6.3.7 Problems of designing with the most advantaged users in mind

As discussed in Section 6.3.6, when a new technology is first introduced into a digital form, users will need time to learn and adapt to such disruptions. Thus, the onus is on issuers initially to provide legacy support to account for users as well as for older devices and browsers. In other words, issuers ought to provide opportunities for device compatibility.⁹²

But eventually, devices may also be upgraded to integrate with newer systems. Likewise, many users are able to catch up with the technology by acquiring the relevant knowledge. van Deursen and van Dijk describe several ways of how people acquire digital skills, such as learning by doing, learning from other people, formal education, and community-driven initiatives (van Dijk & van Deursen, 2014, pp. 113–138). Many of these methods are used by the Singapore government to help elderly and lower income groups acquire digital knowledge.⁹³ When successful, such programmes translate to higher overall digital literacy rates within a population.

This impacts the fairness zone, since more digitally literate users will require relatively fewer opportunities to reduce effort, compared with less digital counterparts. However, this still does not mean that issuers should design, or redesign, forms with the most advantaged users in mind owing to

⁹² Device compatibility is one of the functions listed under Technology opportunities in Table 4.1.

⁹³ Digital education for elderly and lower income groups in Singapore was discussed in Chapter 2.

problems of exclusion, discussed above. Figures 6.22 and 6.23 on the following pages illustrate the affects of this problem on fairness. These figures also help explain why the SG Arrival Card – analysed in Chapter 4 – is deemed to be unfair to less advantaged users. Figure 6.22 below shows the original position of user loading, i.e. the least advantaged group, when a new technology has been introduced by the issuer but without legacy support, as discussed in Figures 6.20 and 6.21.

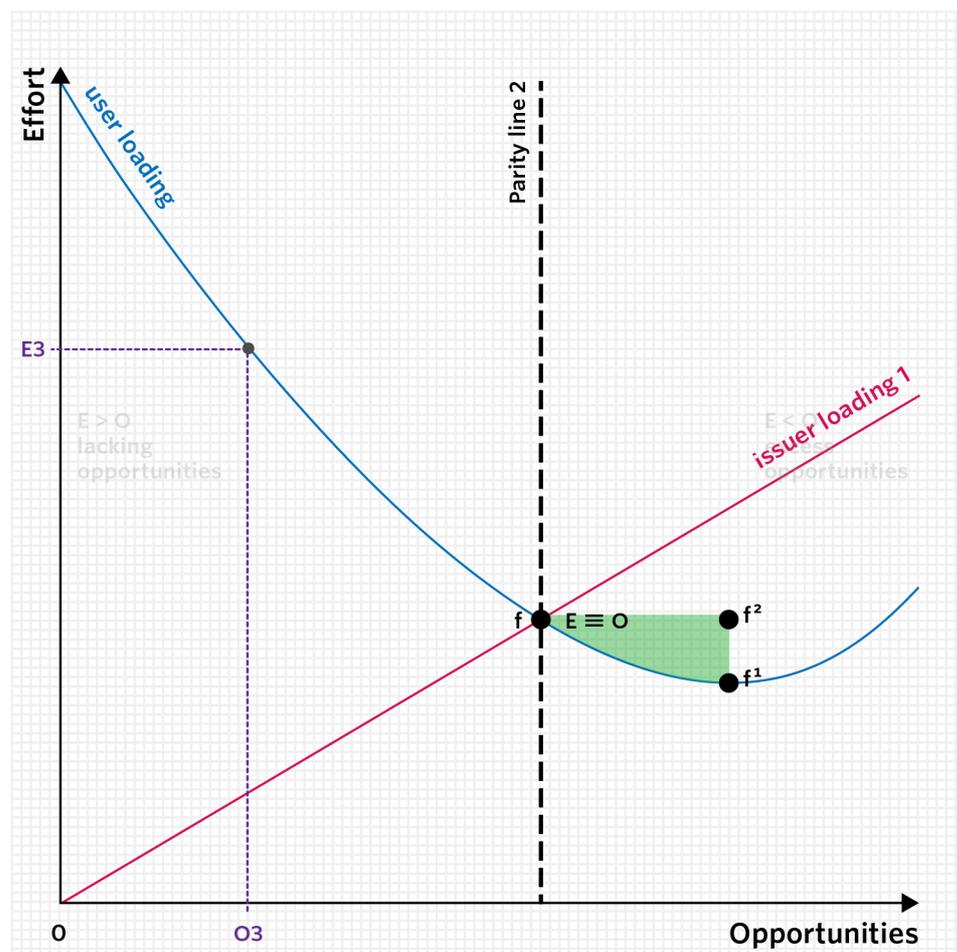


Figure 6.22: Situation in which a new technology has been introduced by issuers, but no legacy support has been provided.

Nonetheless, a proportion of users will eventually acquire the digital skills to understand and adapt to the new technology. This results in such users needing fewer opportunities in order to reduce their effort, since the benefits

of the new technology now apply to this group. If enough of the population acquires these skills – as is the case with digital literacy in Singapore – then a new user loading line can be drawn to reflect this group.

Figure 6.23 below shows two groups of users: those who have acquired sufficient digital literacy skills (new user loading line 1, i.e. more advantaged users) versus those users who have not (original user loading line, i.e. less advantaged users).

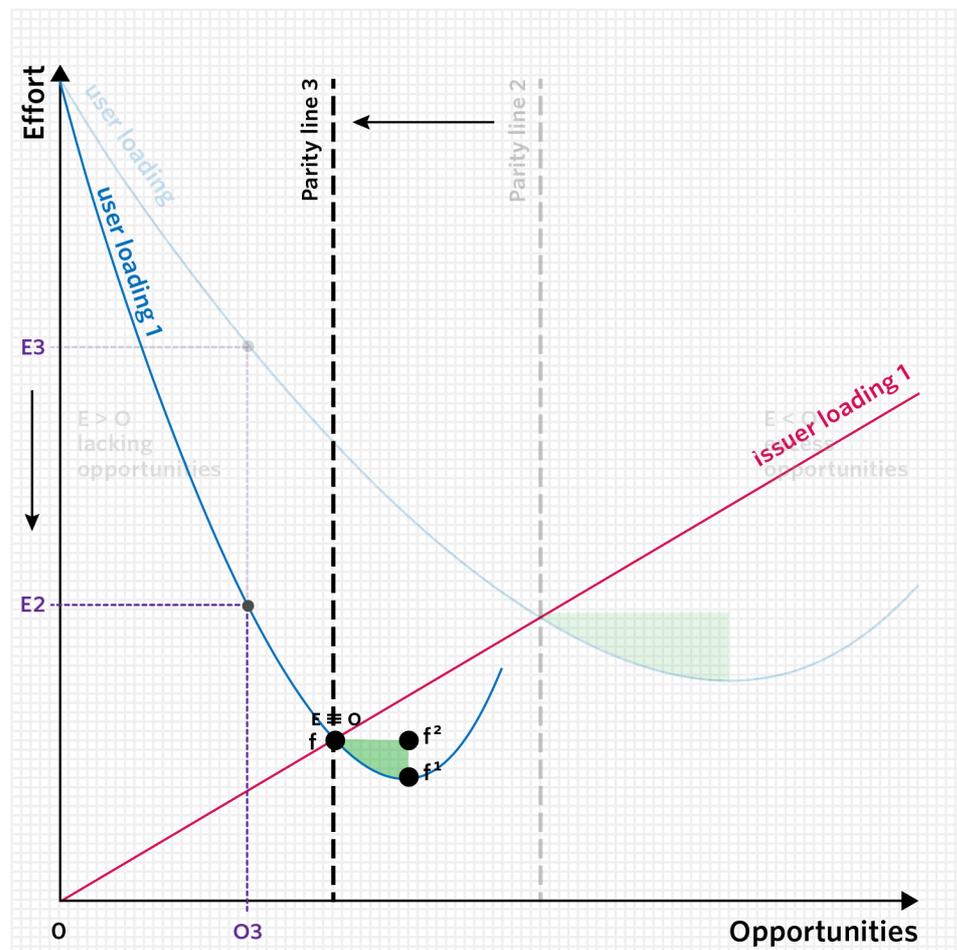


Figure 6.23: Situation in which the design of forms is pegged to the needs of the most advantaged users in the process, instead of the needs of the least advantaged users.

The graph visualises the disparity in effort required by each of these groups. The same level of opportunities, O_3 , results in a larger reduction of effort for digitally literate users, E_2 , compared with those lacking these skills and who thus need to put in more effort, E_3 . It must be noted that there is no

inequality has taken place at this point, since users are different and thus entitled to use their abilities as they see fit.

However, the problem of unfairness occurs when issuers design a digital form with either themselves, or the more advantaged groups in mind. The result of such design policies is exclusion; less advantaged users are not getting sufficient opportunities to reduce their effort to fair levels. This is illustrated in Figure 6.23 by the smaller fairness zone. Figures 6.22 and 6.23 also visualise the problems with the SG Arrival Card. The analysis from Chapter 5 revealed that several aspects of the form had been designed against the needs of more advantaged users – i.e. those with greater access to mobile phones, emails, and third-party translations.

For a population like Singapore, where digital literacy rates are high, the problem is relatively less serious though exclusion is still present. However, the SG Arrival Card is also meant for travellers across the world, including those from emerging economies with less access to digital resources. Such groups are excluded to a larger extent by digital forms that fail to take their needs adequately into account.

Singapore is not alone in this challenge. The discussions in this thesis revealed that poor forms design is a ubiquitous issue, stretching around the world, back in time, and across different media. Given the severity and extent of the problem, it follows that forms issuers could benefit from an approach that integrates design decisions with policies of fair and equitable treatment. This is the *raison d'être* for my fairness model. Table 6.2 on the following page lists the main principles of the model.

6.3.8 Fundamental principles of the fairness model

Table 6.2 is a compilation of the fundamental principles of the fairness model to design fairer digital government forms for all parties.

Fundamental principles of the fairness model	
1	Forms are co-authored and purpose-driven documents. Hence, the design of forms should first and foremost facilitate the fulfilment of this purpose, i.e. not only co-authoring but designing for fairness across users and issuers.
2	Digital forms ought to be aligned around the needs of the least advantaged user.
3	Issuer loading should be plotted first since the relationship between Effort (E) and Opportunities (O) is assumed to be linear at the outset. This is also known as the original position of issuer loading.
4	User loading should be plotted next, bearing in mind that the shape of the line follows the behaviours of the least and most advantaged users.
5	The parity point and parity line are determined where the issuer loading and user loading lines intersect. This is the point at which $E = O$ for the least advantaged user.
6	Users ought not to expend effort beyond what is required at the parity point.
7	Issuers ought not to expend effort beyond what is required at the parity point.
8	Issuers should also not have to provide opportunities beyond what is required at the parity point, unless conditions are reasonable for this to occur.
9	If issuers are providing additional opportunities beyond what is required by the least advantaged user these should not cause confusion or clutter for any users, especially for more advanced users.
10	Issuers should gain from emerging technologies, but these advantages should not be applied solely for the benefit of issuers. Instead, issuers should expend the necessary effort needed to include users as much as possible.
11	There will always exist a theoretical zone of fairness in digital government forms, so long as all parties are willing and able to rationally cooperate and compromise in order to achieve their desired objectives.

Table 6.2: Compilation of the 11 fundamental principles of the fairness model.

6.4 Chapter conclusion

Government forms ought to facilitate fairness for all users, from the least advantaged to the most advantaged user, while managing the exigencies of form issuers. This challenge is exacerbated by the ubiquity and unavoidability of forms administering government-citizen interaction; lack of proper graphic and typographic measures means users are often compelled to accept the design decisions – good or poor – made by form issuers. Fairness in design helps overcome perceptions of complexity in government forms. However, there is a dearth of adequate models and frameworks that address this gap.

The fairness model – extrapolated chiefly from Rawlsian notions of cooperation, reciprocity, and compromise – is built on the premise that form issuers ought to provide equal design opportunities for every user of a process – from the least advantaged users to the most advantaged users – to achieve equitable participation for all users of that process, but without placing excessive demands on form issuers. The model does not seek to eliminate complexity, nor provide limitless opportunities, but rather regulates the exchanges between users and issuers as rule-abiding participants of a process who are willing to cooperate and compromise in order to reap their own particular benefits.

The model correlates the effort needed by users and issuers in a process, respectively, against the design opportunities provided by issuers for users. The aim of the model is to provide every user with same best possible chance to complete the process. This is why maximum attention is given first to the needs of the least advantaged user. The commensurate opportunities supplied are then provided equally to every user in the process. This is to ensure that users do not need to rely on inherent abilities or external support, although they are free to do so.

This correlation yields five scenarios which identify whether or not a form has been fairly designed. Each scenario is analysed individually, and collectively to rectify shortcomings and optimise a form's design in order to ensure fairness for all parties involved in the process. Unlike fairness considerations in gender disparity, income, wage discrimination, or taxation

matters – where resources are redistributable and benefits commensurately awarded according to individual circumstances – fairness in design operates within the wider context of document design. Thus, the model proposes that the same opportunities be given to all users, regardless of individual abilities. As such, fairness in design does not deprive any user with excess abilities, but instead advocates for the provision of equal opportunities for all users so as to allow every user equitable participation in any given process.

At the time of this writing, the fairness model was deemed to be best expressed in a series of graphs that plot effort against opportunities, to identify the locus at which effort needed by users is congruent to the opportunities supplied by the issuer. This process establishes a parity point and fairness zone in which (i) the least advantaged users have the same chance of completing the form as the most advantaged users; (ii) the most advantaged users do not risk facing cognitive overload by the supply of excess opportunities that lead to clutter and confusion; and (iii) the issuer is not placed in a situation of having to provide design opportunities that unnecessarily increase costs and other difficulties.

In addition to these fundamentals, the fairness model can also be used to visualise related phenomena. These include the extent to which users rely on their own abilities or external help; design discrepancies that highlight what an issuer ought to supply and what the issuer has actually provided; and zones of user experience stability, i.e areas in which users are more likely to complete the forms process. Law and van Schaik observed that user experience “does not only include usability, but also other cognitive, socio-cognitive and affective aspects of users’ experience in their interaction with artefacts, such as users’ enjoyment, aesthetic experience, desire to repeat use [...] and enhanced mental models” (Law & van Schaik, 2010, p. 313). These aspects have been discussed in previous chapters, and contribute to what defines user experience within the context of design opportunities afforded by issuers. Therefore, by evaluating efforts against opportunities, the model evaluates aspects which also improve or diminish user experience as a result of varying fairness conditions.

Interestingly, the model also shows how the implementation of new technologies in online forms can lead to situations of digital exclusion. This problem is mapped onto issuer loading, whereby the advantages of new tools only provide advantages to issuers, but at the expense of users. This leads to a reduction in the fairness zone. Consequently, issuers ought to correct such flaws by expending additional effort on legacy or backwards-compatible support. This is done namely to meet the needs of the least advantaged users, i.e. those lacking digital abilities or access to devices and infrastructures. Providing legacy support entails establishing more than one parity point so as to allow for the contingencies of the least advantaged user but without penalising those with the relevant digital skills and capabilities. Achieving these outcomes ties the design of government forms to the concepts of cooperation, reciprocity, and compromise. This is why the fairness model can exist as a policy layer for governments to qualitatively understand the needs of their citizenry and consequently respond with fairer digital forms.

Apart from its purpose as a qualitative framework, I posit that the model also has potential to provide quantitative insights of effort, opportunities, and user experiences. A quantitative model is currently beyond the scope of this thesis, though preliminary studies and tests were conducted as part of the research. Nonetheless, the development and applications of a quantitative framework, in addition to this current qualitative model, is outlined next in this thesis' concluding chapter.

7. Conclusion

7.1 Summary of research questions

The impetus for this research stemmed from the assertion by Schwesinger: “Government forms must work for everyone, and facilitate fairness” (Schwesinger, 2017, p. 613). The thesis responded to this assertion by asking why government forms needed to facilitate fairness for everyone, and how forms issuers can achieve this goal. The chapters showed digital government forms could be made fairer by adapting principles of fairness detailed in other fields – specifically, Rawlsian notions of fairness in political philosophy. To this end, the thesis aimed to answer five research questions:

- To what extent is design responsible for shaping the attitudes of users and issuers towards Singapore’s government documents, including digital forms?
- What does fairness mean in other disciplines, and can a definition of fairness be constructed specifically for the field of information design?
- How can Singapore’s government forms facilitate fairness for everyone?
- To what extent do digital tools influence fairness in government forms?
- How can the concept of fairness be used in a qualitative framework to inform the design of Singapore’s digital government forms?

7.2 A review of the research

The thesis attempted to answer each of these questions through discussions around past design practices, current attitudes and assumptions towards digital government, and ideas of social exchanges conducted within a cooperative environment. These discussions were situated within a framework that relied chiefly on Rawlsian notions of fairness, and applied to Singapore's digital government forms. The research sought to also combine these notions with insights from information scholars in order to determine the feasibility of a model that adequately captures fairness concerns. The resulting fairness model is a qualitative framework for government forms designers and policy makers to balance the needs of users against issuer exigencies in order to specify fair conditions for all participants.

An examination of fairness was conducted alongside a review of what constitutes "everyone". The thesis found that the labels "issuer" and "user" are well-established terms with specific implications for forms design. This is because issuers comprise forms owners and designers. That is, those who issue the form and those that design the actual document, respectively. Likewise, users comprise explicit and implicit users. Explicit users are those for whom the form has been primarily created. Implicit users are those who subsequently act on the form in response to inputs by the explicit user.

While the fairness model used the terms "issuer" and "user" to refer collectively to both parties, an understanding of each group's nuances was necessary to determine a more meaningful approach to fairness in forms. This determination led to further discussions on the needs of digital forms users, especially those from less advantaged circumstances. Focusing on such users tied in with Rawlsian notions of fairness in political philosophy, while also addressing the concerns of forms scholars to improve the treatment of marginalised users. Consequently, a set of criteria was established to measure fairness in forms through literacy, clarity, and technology concerns. These concerns were framed according to the needs of the least advantaged users participating within a forms process. Moreover, the position of the least

advantaged user provided a logical starting point from which fairness evaluations could be made in the model.

The fairness model was based on research conducted around digital government forms in Singapore. This is because Singapore occupies a unique position among e-government and social concerns. The small island-nation has one of the highest levels of digital infrastructure, and concomitant literacy rates. The government thus relies on ICTs to manage the country's economy and socio-political interactions. Getting this balance correct is a priority for Singapore: on one hand, the nation needs to position itself as an international trading hub that can communicate comfortably in English. On the other hand, the population comprises multiple ethnic groups, each with their own languages and cultures. Furthermore, Singapore has a sizeable proportion of elderly residents as well as low-income migrant workers. These minority groups face greater risks from digital, and therefore social, exclusion — owing to inability or unwillingness to adopt digital communication. Hence, the digital and social circumstances in Singapore provided a fertile research environment in which state-citizen exchanges could be assessed for fairness in design.

The research also suspected that a number of problems with the design of forms in Singapore was due to implicit bias. This was believed to be the case because the shortcomings in one form were not seen in the others. Moreover, the government has demonstrated a willingness to rectify problems when they are brought to its attention, as was the case with *TraceTogether* changing its interface to help checkers better identify fraud across all users. However, the challenges of implicit bias go deeper to the automatic assumptions made by issuers who may not be aware of the problem (Johnson, 2020, pp. 20–21).

Writing about compliance and shirking responsibilities, Wilson gives the analogy of a police officer who makes no arrests during the shift. Wilson states that the reason for this is “either that no crime occurred or that the officer could solve none of the dozens of crimes that in fact did occur” (Wilson, 1989, p. 155). However, Wilson's premise ignores a third possibility: the officer witnessed wrongdoing, or worse committed such an act, but was oblivious to the fact that the act was morally wrong. This is different from

being unable to solve a crime, since the former assumes lack of competency whereas the latter is predicated on unawareness of problems in the first place.

The biases in the forms appeared to be based on unawareness rather than any dearth of expertise. This is not to say that explicit bias can be immediately ruled out. Instead, the thesis based its deductions on Rawlsian ideas of fairness, which assume all participants in an exchange are considered to be participating without malicious intent. Moreover, the premise of fairness itself fails under conditions in which participants are actively seeking to destabilise the process by disregarding reciprocity and cooperation. Hence, any presence of bias in Singapore's digital government forms was assumed to be implicit due to presuppositions that issuers' may have harboured of their digital forms users.

7.3 Findings from the research

I conducted interpretative and autoethnographic field research in Singapore, focusing on digital forms related to immigration and COVID-19 tracing. These topics were chosen because of Singapore's history and current policies that have *inter alia* been strongly influenced by the flows of migrants, temporary workers, and settlers. Since its establishment as a trading post in 1819, administration has shaped, and has been shaped by, the passage of people and information through the island. This trend has continued to this day, and in many ways has intensified as Singapore has found its place as a commercial powerhouse.

The digital SG Arrival Card with Health Declaration form is meant for every person, i.e. residents and foreigners coming into Singapore. Its design therefore reveals some of the government's assumptions and attitudes towards people from varying backgrounds and circumstances. Furthermore, the digital arrival card is the product of Singapore's *Smart Nation* initiative, which seeks to be of service to its citizenry. The features in the form thus reveal the extent to which the government has used ICTs to serve the needs of users. An analysis of these features revealed significant disparities between users with greater access to digital resources and those without. Likewise, the form was shown to clearly favour English-speaking users, despite it having options for other languages. While this thesis posits that many of the shortcomings were due to implicit bias, the case study of the arrival card nonetheless revealed significant gaps in fairness, especially for the least advantaged users.

The SG Arrival Card is somewhat analogous to *TraceTogether* – the national COVID-19 contact tracing app analysed in the second case study – since both forms are used by immigration and health authorities. This provided a more robust comparison to determine the extent of fairness in digital forms across different government agencies. Such a comparison was necessary since the government of Singapore does not have a unified design system like that of GOV.UK, or the government of The Netherlands.

An analysis of the forms used in the app showed that *TraceTogether* was overall more fairly designed, given the clarity of explanations and guidance which was communicated in the phrasing, tone, and generous use of images to orient new users. Additionally, the case study discussed how the app provided extra opportunities in a redesign, which enhanced the needs of implicit users. This was achieved through the provision of visually distinct backgrounds and animations that reduced the effort required by checkers to validate the form.

The importance of literacy, clarity, and technology concerns in designing digital forms was highlighted in the literature review, along with several other recommendations for improving user experience. However, the functions under literacy, clarity, and technology overlapped with empowerment, trust, and well-being. Accordingly, the thesis determined these functions were most suited to a set of criteria for fairness in design. Analysis of the forms in the case studies were thus conducted against these categories, listed in Table 4.1.

It must be mentioned that in establishing these categories, the research relied heavily on the works of Waller, Sless, Frohlich, Jarrett, and Gaffney, which were reviewed in Chapter 3. Jarrett and Gaffney's three-layer relationship-conversation-appearance theory of forms (Jarrett & Gaffney, 2009, p. 6) was pivotal in understanding how forms analysis could be conducted within a user experience framework. Similarly, the works of Sless and Frohlich revealed the dialogic nature of forms as two-way communication artefacts (Sless, 1999, p. 136 & Frohlich, 1986, p. 43). These insights provided a lens through which issuer-user relationship could be assessed. Finally, Waller's survey and critical analysis of government forms, from the 1980s onwards, showed that forms are indeed instruments of power as well as administrative gobbledegook (Waller, 1984, p. 36). The research also scrutinised design flaws, which many designers and scholars have exposed, in order to isolate and collate the three categories of literacy, clarity, and technology.

The identification and assembly of these categories offered perspectives on how existing flaws in digital forms are not only errors of design but also indicators of underlying assumptions and attitudes that issuers have of forms users. These qualities were assessed against fairness standards, discussed in

Chapter 5, to determine the impact of poor design on government-citizen exchanges. While several philosophies around fairness were explored, Rawls' perspective of society as a fair system of social cooperation" (Rawls & Kelly, 2001, p. 6) best reflected the potential applications of fairness to digital forms design.

Having gathered these insights, the thesis then returned to the original premise of government forms needing to facilitating fairness for everyone. The case studies in Chapter 4 demonstrated that this outcome had not been achieved in Singapore. But more significantly, the chapter showed that a new model was required to fulfil this aim – and that it was possible to construct such a model based on a cross-disciplinary approach that merged fairness with design.

7.4 Applying the findings to a fairness model in design

The findings from the case studies revealed areas which were overlooked by the issuers. Traditional approaches to fixing these gaps have relied on user experience alone. However, fairness requires that the concerns of all parties, including those of issuers, are accounted for.

This compelled a re-examination of the factors that affect participation in a forms process. The thesis discovered a correlation between effort, E and opportunity, O. E refers to both, the effort needed by issuers to design the form, and the effort needed by users to complete the form. O refers to the design opportunities, i.e. literacy, clarity, and technology, that issuers ought to provide to reduce effort for users regardless of any inherent abilities. However, the provision of these opportunities also requires more effort from issuers, and so the fairness model sought a way to balance these two variables.

This resulted in a set of equations that correlated E to O. These equations were plotted on a series of graphs to reveal hitherto unexplored relationships between issuer exigencies and user experiences. The graphs visually revealed several conditions in which fairness and unfairness occurred. They also showed where user experience could be optimised, as well as the discrepancies between what users required to complete a form and what issuers actually provided. Equally importantly, the graphs indicated the point at which these discrepancies could be addressed by identifying the point at which fairness occurred for users and issuers. This point, known as the parity point, did not establish a single occurrence of fairness. Rather, it marked the beginning of a fairness zone, and thus revealed that fairness in forms is not necessarily a single point but an area within which the conditions of fairness are satisfied for issuers and users.

In other words, the fairness zone signified where effort needed and opportunities supplied are congruent. The zone also demonstrated the application of Rawls' difference principle to forms design: user experiences of the least advantaged groups are weighed against issuer exigencies to ensure all parties are able to participate fairly within a rational exchange.

The model thus qualitatively proved that key aspects of Rawlsian notions of fairness within social exchanges can be successfully extrapolated to the design of digital government forms in order to facilitate fairness for everyone. Furthermore, the model was also useful in visualising the negative effects of benchmarking fairness against the needs of the most advantaged users. This was shown through the introduction of new technologies that made the forms process easier for issuers but not for all users, which led to greater exclusion. A corrective was also offered, whereby the graphs illustrated the benefits of legacy support for all parties within the context of fairness. Primarily, the fairness model demonstrated that government forms could facilitate fairness for everyone, by qualitatively defining the parameters within which fairness occurs for users and issuers participating in information exchanges.

However, this outcome was achieved under certain limitations. First, the research on digital government forms design was conducted via interpretative and autoethnographic methods, and so remain open to other perspectives of what constitutes fair forms design. Second, owing to COVID-19 restrictions on interactions and mobility, I was unable to interview forms issuers and therefore had to rely on published literature in government websites and repositories. Third, the conditions which least advantaged users encounter — including slow bandwidth speeds, outdated operating systems, and a lack of English knowledge — were simulated and approximated during ethnographic research owing to restrictions on social interactions and mobility.

The results from the research are nonetheless valid and useful, mainly for three reasons: (i) Singapore's government maintains reliable and records of their operating procedures for the production of forms and documents. These are made publicly available on each government agency's respective websites; the quality and veracity of information was weighed against observations of its use and was found to be well within the acceptable limits for academic integrity. (ii) Since government ministries maintain their own design systems and processes for creating forms, each issuer would presumably have their own approaches. This made interviews largely unnecessary since the replies would be confined to individual preferences, rather than providing an overall

picture of the assumptions and attitudes held by Singapore's government forms designers. Hence, an interpretative approach was found to be more useful for analysing the range of digital government forms. (iii) Both forms in the case studies were relatively new at the time of my field research. The combination of interpretative and autoethnographic methods was useful in acquiring insights into the forms as a first-time user; this was also the case for most people which offered an opportunity to analyse largely untested forms.

Additionally, the recent introduction of these forms meant the possibility of bias, which stems from past experiences with existing forms, was reduced. These conditions helped foster a realistic scenario of how first-time and less advantaged users experience these digital forms via their design opportunities and shortcomings. Collectively, these factors contributed to the usefulness of the fairness model in ascertaining how fairness is defined and achieved when producing digital government forms. These discussions make it possible thus to suggest that the fairness model contributes to new knowledge in the field of information design.

7.5 Extending the fairness model

The fairness model is the most practical outcome of this research, having met the aims of the overarching research question. Fairness in design is therefore best viewed as a transversal practice that is developed alongside all the processes of forms creation, rather than as an afterthought once the form has been distributed. Consequently, the fairness model was also considered for its potential to provide quantitative metrics. This opens up future avenues for research and experimentation.

Early investigations into its quantitative applications showed promise in the area of data visualisation. Figure 6.2.2 in Chapter 6 plotted user loading curves for the most and least advantaged users. Given Singapore's inclination to using artificial intelligence as an administrative tool, machine learning might be used to gather user data from *FormSG* and plot a range of user loading curves, from least to most advantaged users. This range could then be used to determine average user ability for that form. The same process could be repeated over several digital government forms to ascertain average user abilities for forms in general. Such data could potentially provide more detailed insights about the literacy rates pertaining to digital government documents in Singapore.

Likewise, plotting the most and least advantaged users in a similar range would theoretically reveal an aggregate starting point for government issuers to begin designing digital forms. This point would also indicate an absolute benchmark for designers to identify the needs of the least advantaged user across forms in general. A quantitative model would thus enable the collation of these data points to generate a report on the health of fairness in design across the country. Matching this report to the qualitative aspects of the model would also allow issuers to implement the concepts of fairness through data-driven design. The prospect of realistically achieving these results leads to three further questions for future research:

- How can the qualitative fairness model begin to use data points to provide quantifiable references of fairness in designing digital government forms?
- To what extent would a quantitative fairness model solve the problem of digital exclusion, and improve the reputation of digital government forms in Singapore?
- How can a qualitative or quantitative fairness model be applied to designing digital government documents besides forms?

The last question speaks to the extensibility of the existing model in this thesis to other documents besides forms. This is important to consider given the normative conditions around fairness in social exchanges. While forms may require active participation from users through co-authorship and cooperation, government-citizen exchanges are also mediated through documents such as electronic circulars, leaflets, phone messages, app announcements, and emails. This elevates the current conversations around participation to concepts of dignity, digital displacement, and belonging. As the research in this thesis has shown, digital exchanges between the state and citizens are discourses in power that is not allocated equally. Furthermore, given the volume of exchanges that governments encounter on a day-to-day basis means there is convenience and cost savings to be had by treating users as faceless statistics en masse.

But surely one of the aims of a networked society ought to be the removal, or at least the reduction, of processes that anonymise and homogenise users. And if not, then what of the human experience? Fairness requires cooperation from willing parties in an exchange that mutually benefits all involved. Is there also a place for dignity and belonging in these exchanges? Should participants ignore these qualities as long as their desired goals are being met? Is fairness the endpoint of “good” design? And if not, then how much agency should be given to issuers to pursue design experiences that enrich the forms experience beyond fairness?

The increasing role of artificial intelligence (AI) and machine learning (ML) in mediating government documents has implications on the nature of forms issuers. Indeed, emerging technology has the potential to alter the role of forms issuers, moving away from human-led design to computer-driven creation. The European Commission's high-level expert group on artificial intelligence defines the concept as follows:

Artificial intelligence (AI) systems are software (and possibly also hardware) systems designed by humans that, given a complex goal, act in the physical or digital dimension by perceiving their environment through data acquisition, interpreting the collected structured or unstructured data, reasoning on the knowledge, or processing the information, derived from this data and deciding the best action(s) to take to achieve the given goal (European Commission's High-Level Expert Group on Artificial Intelligence, in Fjeld et al., 2020, p. 11).

Growing expectations of AI to collate and interpret data – structured and unstructured – in order to achieve a goal, has far reaching ramifications for its use in every process, including digital government forms. Thus, can AI take over the role of forms issuer? Is there sufficient agency to provide users with fairer experiences? Writing about AI in the practice of law, Alarie et al. state that the technology has the potential to predict the results of court cases, improve the efficiency of legal processes, and deliver greater overall value to clients. But it is as yet impossible to foretell the technology's long-term effects on the industry (Alarie et al., 2018, pp. 106–124). The same analysis can be extended to digital government forms design.

Stumpf et al. conducted a recent study into the role of AI in designing fairer interfaces for loan application forms. The authors used an approach titled CoFAIR, which includes “very close involvement of a small number of users in all stages of designing a solution, in which these users are empowered to be on equal footing with researcher and designers” (Stumpf et al., 2021, p. 4). The study asked users to rate their previous experience with AI applications within the context of fairness. Following these responses, the authors conducted iterative testing of simulated loan applications to assess

the level of fairness in the form's user interface in order to determine a successful outcome. These results were then fed into an AI algorithm with the intention of making future processes fairer, while also avoiding bias.

Stumpf et al.'s study is part of a rapidly growing field of research that hopes to eliminate bias in complex decision-making scenarios with structured and unstructured data points. Such studies, while differing in their approaches and findings, assert the need for fairness to take a more central role in design processes. More importantly, there is a need for specific fairness frameworks to address the deficiencies facing institutions that are using technology to achieve their design goals. The fairness model provides a compatible framework to deliver greater fairness in digital government forms design. If indeed the future holds a place for AI to become a forms issuer, then there is even more need to provide algorithms with such qualitative and quantitative models that identify how fairness might be achieved in government forms – and which data points can provide the greatest prospect for achieving parity and fairness – for all parties involved in digital government forms processes.

The use of technology in digital forms design also raises questions of power in user-issuer relationships. Could AI in forms, for instance, be better able to anticipate certain user needs and consequently design a fairer overall process? To what extent would user-driven AI technologies mitigate – or increase – the effort required by least advantaged users? And what are the implications for Rawlsian ideas of cooperation, reciprocity, and trust where greater agency and decision-making powers are afforded to AI-driven forms processes? It is hoped that continued development and further testing of the quantitative model will plug into existing and emerging questions on fairness and bias in AI.

The fairness model is not as concerned with eliminating, or even balancing power structures in government forms; instead, the model focuses on preventing, or at the very least mitigating, its unintended abuse by issuers. Moreover, a power imbalance should be expected since users within a fair exchange choose to give up certain rights or privileges in order to achieve their desired goals. This has been a foundation stone of social contracts and

exchanges, that has remained largely intact in the face of evolving thought and technologies. But the performativity of this power relationship has been the source of ongoing investigation by scholars from varied disciplines who share a common objective to enhance the general well-being of participants in an information exchange. Fairness has proven to be a robust lens through which to observe the results of these investigations, particularly when viewed within the context of information design.

Thus, more needs to be done in order to facilitate fairness for everyone in digital government forms. It is believed that extending this research will open up further avenues and opportunities for governments to approach fairness as a more significant policy in designing digital government-citizen exchanges. This is because the discipline of design has repeatedly shown an ability to integrate with highly complex philosophies such as accessibility, inclusivity, psychology, and service. It has been the keen objective of this thesis to also add fairness to this list. It is hoped that the fairness model will not only extend a government's ability to provide more desirable exchanges for users and issuers of digital forms, but also to serve as a formal policy layer – one that embraces and empowers digital societies through the dignity of design.

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Appendix A: SG Arrival Card App (additional images)

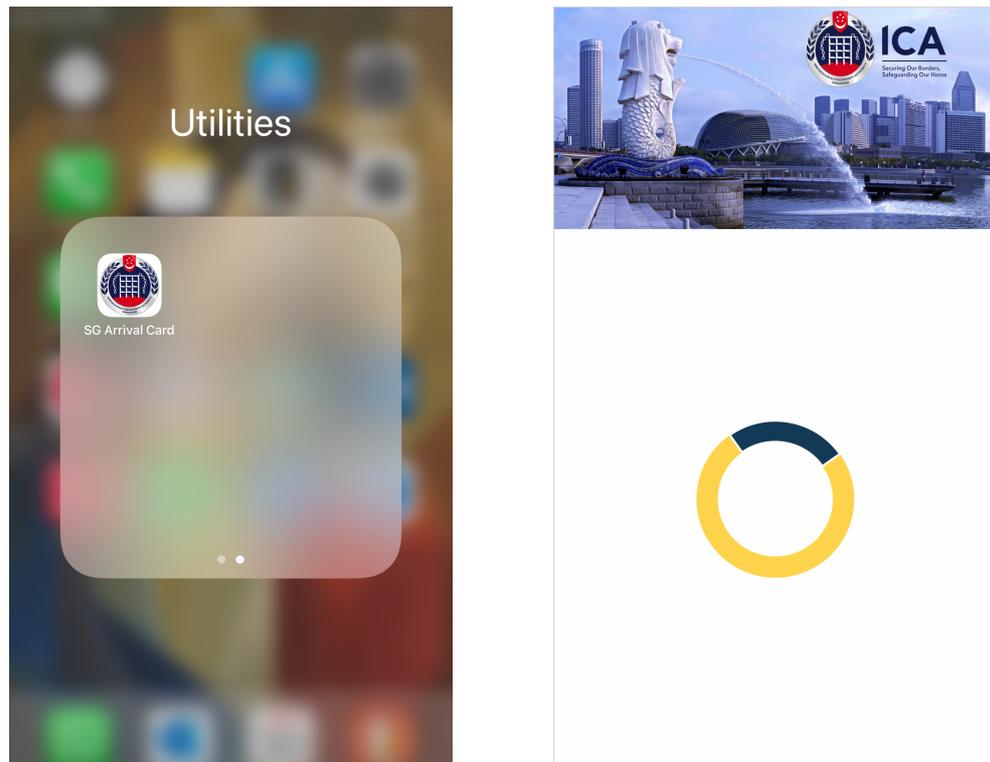


Figure A1: SG Arrival Card app icon (left) and loading screen when the app is clicked (right). The app for the iPhone is freely downloadable from any country and is not restricted to geographical locations. This is not always the case for every government app in Singapore; some are only available for downloading in the Singapore App Store.

The global availability of the SG Arrival Card app is therefore a benefit for local, and foreign travellers who will most likely download and use the app overseas. When tested on an iPhone 8 Plus, the app's loading screen took approximately 8 seconds to display the contents of the first page.

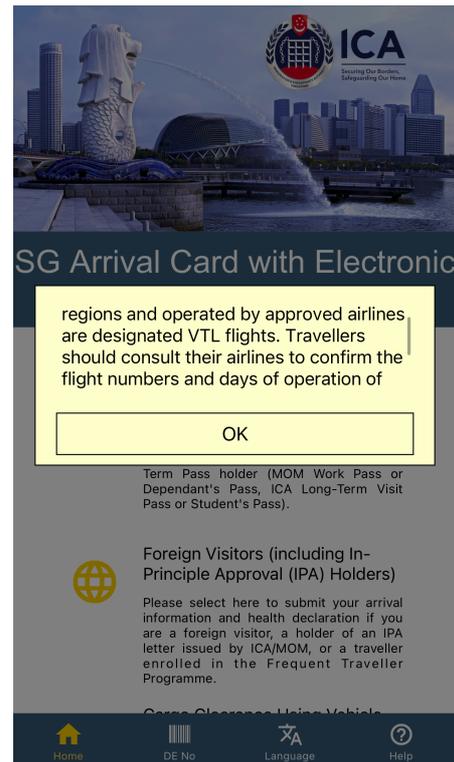
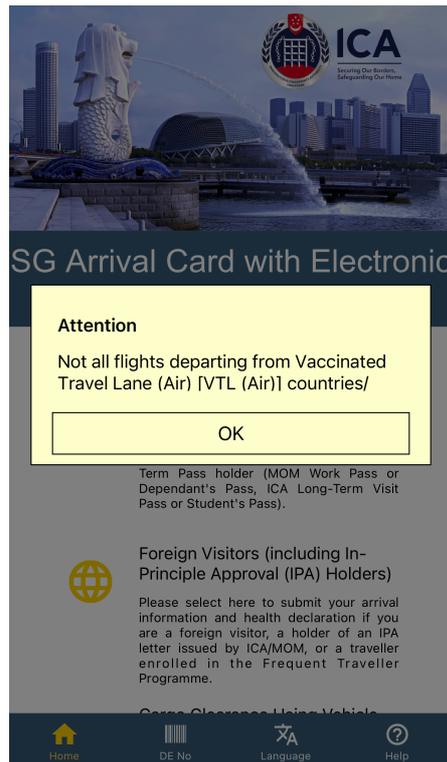


Figure A2: SG Arrival Card app pop-up notice (left) and pop-up notice when scrolled (right). The app immediately displays a pop-up notice when the content loads. However, it is not immediately apparent that the notice is scrollable with additional content hidden below.

This is problematic for users who may assume that is all there is to the notice and tap “OK”, thereby missing important information. Scrolling the notice reveals the rest of the message along with a scrollbar. Tapping “OK” dismisses the notice and allows the user to interact with the app’s features.

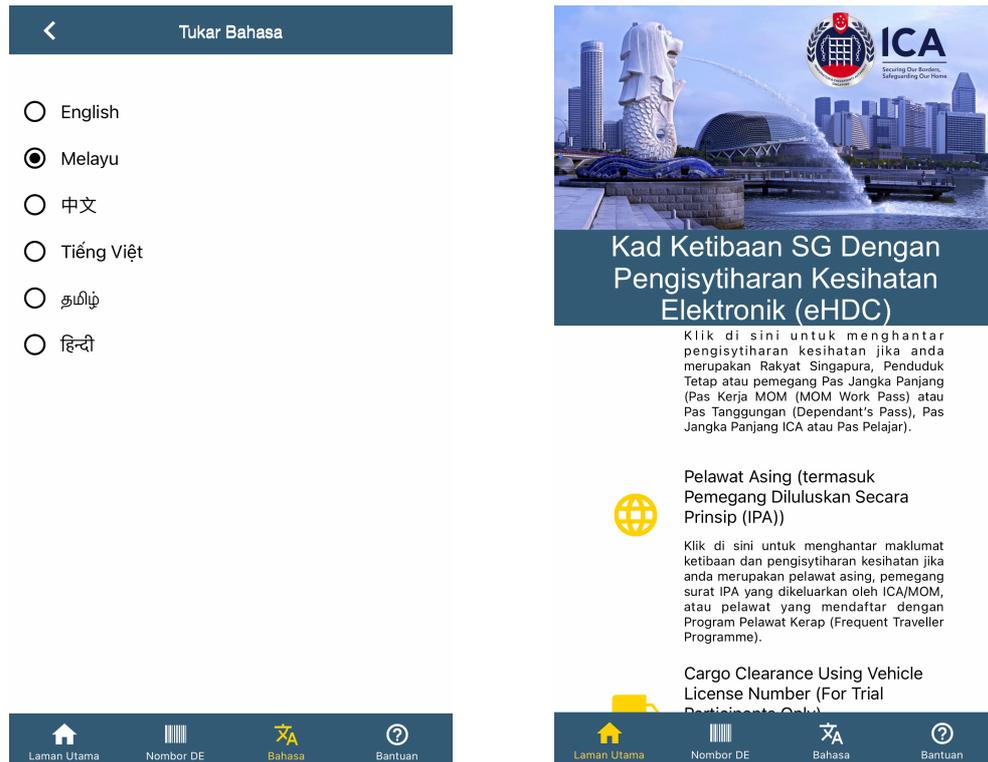


Figure A3: Unlike the SG Arrival Card, the app makes the feature for language translation clear through an icon at the bottom of the screen. Tapping this icon brings up a menu bar (left) which allows users to select a preset list of languages. Tapping on the “Melayu” option displays the contents in Malay (right).

The visual cue for translation is stronger in the app than the electronic form, thereby allowing for a fairer experience for users whose first language is not English. However, as Figure A4 on the following page shows, the benefit of this feature is negated when a user taps on an option to fill in the arrival form.

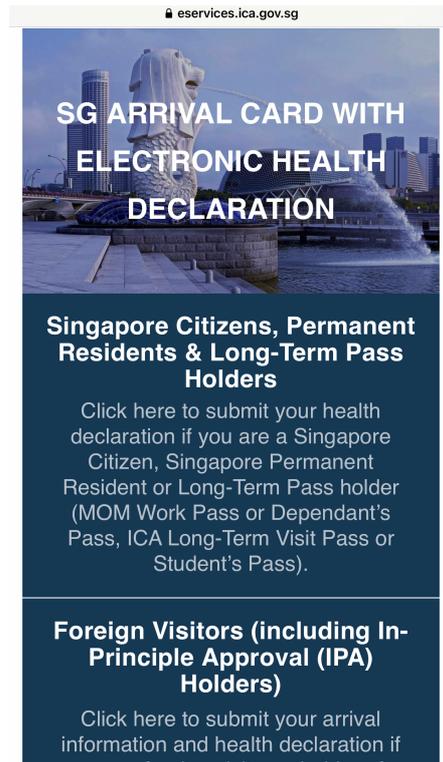
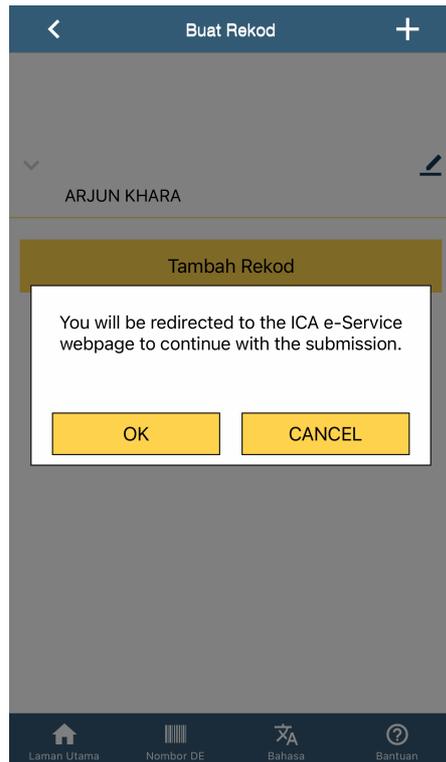


Figure A4: When the option for Malay is selected, the app displays information in Malay but only up to a point (left). When the user proceeds to create a record, the pop-up box displays information in English (left). Furthermore, when a user taps “OK”, the app redirects that user to the same online ICA SG Arrival Card and Health Declaration website (right) discussed in Chapter 5. Thus, while users remain within the app’s environment the website renders in English, thereby abrogating the app’s translation feature.

Appendix B: Other acceptable forms of identification for entry

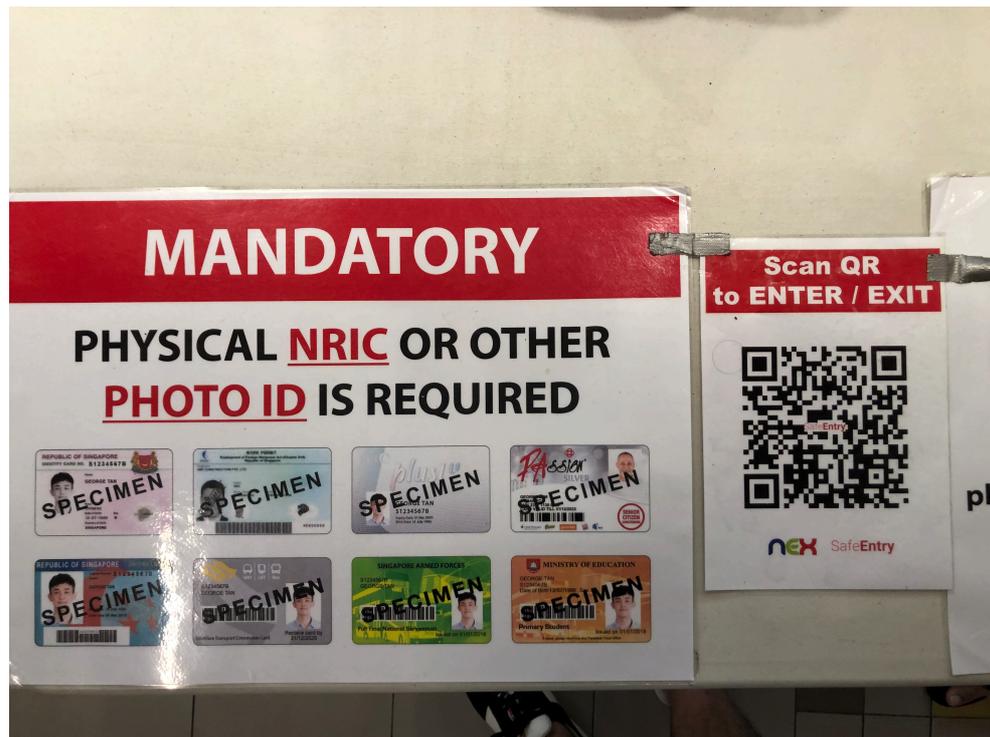


Figure B1: Mall visitors may still enter without *Trace Together* but are required to show physical proof of their identification. This is limited to a few government-issued cards, including the National Registration Identification Card (NRIC) issued to Singapore citizens (pink NRIC) and permanent residents (blue NRIC).

Temporary workers may also show their government-issued identification card (green pass). Other acceptable documents are a valid Singapore driving license, and Ministry of Defence and Ministry of Education identity cards. These details are manually recorded in a ledger by attendants at the mall's entry points — please see B2.



Figure B2: The attendants use their phones to physically scan the barcode on these identity cards. If the attendant does not have a smart phone, the details of the visitor are written into a ledger. The system therefore allows users with limited or no access to smart phones to also access public spaces. However, for foreigners the system is more complicated: passports are accepted but are not shown on the list of government approved documents.

Additionally, many visitors initially do not carry their passports when visiting public spaces and may therefore risk being denied entry if their foreign-issued documents are not recognised by the attendant. I tested this process by showing my passport – instead of using the app – at a mall entry point; my details were manually recorded into a ledger and I was allowed entry into the mall. However, the same process was unsuccessful on a separate occasion when I showed my UK-issued driving license at the same mall.

