

Middlesex University London



Study on risks and opportunities of digitalisation for financial inclusion

The perspective of vulnerable users in Estonia, Italy and UK with a focus on groups covered by the European Accessibility Act

Final report

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1. Executive Summary

The digitalization of financial services presents an unprecedented opportunity to increase the financial autonomy of millions of vulnerable people across the European Union. Implemented carefully, with reference to their needs, digitalization can benefit vulnerable groups, society as a whole, and - not least - the financial services organizations, which stand to gain from attracting more customers. But vulnerable people are not currently benefiting from this digitalization as best practise design and specifications are not always followed. There appears to be a lack of commitment on behalf of the financial institutions to use this opportunity to benefit the most vulnerable in society.

This report aims to describe how digitalization, in the form of online banking services, is affecting end-users in vulnerable groups. It was commissioned by the European Commission for the Financial Service User Group (FSUG) and examines the state of financial inclusion of vulnerable people in the United Kingdom, Estonia and Italy. The report deals with view of the end-users, in particular it presents detailed information from the point of view of people with disabilities given the current context of the European Accessibility Act. Relevant responses were received from a range of end-users and organisations of end-users. In particular detailed comments were received from end-users and organisations of people with a sensory impairment.

The report focuses on the provision made by the financial sector for accessibility to services, in particular through ticket machines, Point of Sale machines (PoS terminals), Automated Teller Machines (ATMs) and personal devices such as mobile phones.

The study involved extensive qualitative research with people at risk of digital exclusion, due to the introduction of digital financial systems. We also spoke to representatives of organizations which act on behalf of vulnerable groups. The study also made use of quantitative secondary statistics from existing studies on technology and services.

The results present a mixed picture of the current situation to financial inclusion. The results show that many of the respondents (both individual users and representative organisations) reported that some systems were useable but added that if a particular user could not use them a third party would act on their behalf. The use of carers and

other intermediaries is problematic as it can both remove the autonomy of the end-user and facilitate financial crime against them.

Meanwhile many end-users expressed fear of digital financial systems when they were not accessible and when they did not provide information in the form that the end-user could understand.

On a positive side, the report found some reassuring information on how digital financial systems could enable vulnerable end-users to use and access their money in a time and place that was suitable for them. This was particularly true for deaf or hearing-impaired ATM users.

The report also highlights that despite there being legislation in all three countries it is adopted in very different ways. This includes access to information provided by government departments' online services and by banking service providers. The use of best practise approaches to assist vulnerable people was found to not be used consistently resulting in different levels of accessibility in all three the countries for different users. The research identified a number of positive examples of alternative practise that enabled safe and practical access to digital financial systems. But the main findings were that there is a lack of knowledge about accessible systems and processes among financial services institutions together with a lack of knowledge of the demand for these systems from users. Knowledge-sharing among institutions and countries could be of great value here to assist in inclusion in financial digital services.

Results of the findings suggest that there is further work that can be done in this area for financial inclusion of vulnerable people. The comparison of the three countries in the study found that whilst technology can assist these people, it is often used by the financial sector to provide efficiency in business processes, often at the cost of access to those that are vulnerable.

The following recommendations are based on the research findings carried out in the study.

- 1 The financial sector should consider the impact of change, innovation in technology and access to technology when providing:
 - a. New services
 - b. Amending services

- c. Curtailing services due to the adoption of technological solutions and efficiency driving measures
- d. Training for employees administering the services
- e. The sector should anticipate vulnerable people's requirements for assistance, training and accessibility.

Investment in new innovation should not be at the expense of exclusion of any sector of the population. The advancements in financial services and increasing use of alternate financial systems should be recognised by the regulated sector and provisions be made to assist all users and vulnerable users. This includes the training of employees to anticipate the requirements and difficulties that vulnerable persons may experience.

Protection of vulnerable peoples should be at the forefront of those in the financial sector and the consideration of increasing lifespan of people globally means that vulnerability changes over a lifespan. Therefore, a concerted effort should be made for users that are currently vulnerable, those that may become vulnerable by ensuring security measures are safe but do not exclude this user group. This may be achieved developing technology, improving usability methods, recognition and secure measures for third party carer givers.

- 2 Financial service providers should ensure that technology and services are accessible (online and in person), that they meet local and EU accessibility legislation and best practise criteria and that they adopt the recommendations of organisations such as the W3C. This would ensure all users would experience similar security and autonomy when accessing services.
- 3 Interest groups that represent vulnerable persons should consider more effective strategies to represent the concerns of the vulnerable at national levels in Estonia and Italy, whereas such groups in the UK have more direct involvement with providers of financial services. Such concerted co-ordination will increase the recognition of how financial service providers should meet their obligation of inclusivity and accessibility.
- 4 Information on alternative ways of accessing services including the use of talking ATMs should be published by both the financial institutions and local and regional support groups to enable end-users to make informed decisions about their use of digital financial services.

- 5 Recognition must be given to the use of care givers acting as conduits to financial services. Secure measures must be designed to protect vulnerable persons, care givers and the financial service providers from
 - a. Prospect of financial crime
 - b. Risk in using carers to terms and conditions of these providers

Furthermore, consideration needs to be given as to the transparent response mechanisms to be provided and action to be taken if financial crime takes place, that takes into account vulnerabilities of the user.

2. Introduction and Background

2.1 Explanation of Risks and Opportunities of Digitalization for Financial Inclusion

Before the advent of digital financial services access to financial services including paying bills, obtaining cash and moving money would have involved interacting with a person. This could take place either in a financial institution (for example, a bank) or directly between people who wish to exchange goods, services or money. The communication method and use of terminology could be adjusted to meet the needs of both parties. The change to the use of technology has resulted in the end-user having to interact with a machine using prescribed gestures and language that are specific for each machine. These interactions are not possible for all end-users to successfully transact, as the technology does not adapt to special needs as the human element is able to do, unless these needs have been identified and addressed during the development of the technology.

Digital financial services are evolving. Europe is currently undergoing a change from the use of cash to the use of digital payments for a wide variety of transactions. Contactless payments, and person to person digital payments (or device to device) are becoming widely used. In addition, the cross-border movement of citizens and of financial transactions means that common accessible systems are required. These technological changes to existing methods are having a negative effect on some users who are unable to use alternate technology-oriented methods. This has led to an increase in the use of non-regulated financial systems such as crypto-currencies.

2.1.1 Who can use digital financial services?

To successfully use digital financial services an end-user must have the following:

- A suitable account with a financial institution (bank, building society or an alternative financial institution such as a credit union).

Note: To obtain an account with a financial institution requires identification documents and verifiable provenance of funds being used. The unbanked, displaced and refugees do not always have these verifiable documents or provenance of funds they may hold.

- A suitable payment method (credit, debit or payment card).
Note: Pre-payment cards offer numerous positive services (access to financial systems, international transfers, and instantaneous transactions) for people who may not meet the requirements of traditional financial institutions (travellers, the homeless, the unbanked). However, certain vulnerabilities exist with pre-payment cards: details of the card owner may not be on the card, and in fraudulent transactions there is no recompense from financial institutions, intermediaries, regulators or central authorities.
- Access to and knowledge of the PIN or other required security information (e.g. biometric) to prove identity.
Note: Mobile devices provided with improved security features e.g., longer PIN numbers may exclude those who may find it difficult to remember or enter this information. Alternatively, it may encourage people to use more automated biometric means such as Face ID, Fingerprint ID, which requires limited input from the user after initial set-up. These more automated authentication measures can expose vulnerable persons to the potential of fraud and unauthorised access if accessibility is not considered for every step of the security process.
- The physical, cognitive and sensory abilities to engage with the technology (either directly or via assistive technology) also impacts on access and usage.

2.1.2 Scope of the report

In addressing the issues of risks and opportunities of digitalization for financial inclusion, we have restricted the scope of the report to examining the extent to which digitalization bars access to people in vulnerable groups. We have not included those who take risks as a result of their own behaviour, e.g., people who may display risky online behaviour because of carelessness.

In particular we focus on people with sensory, cognitive and mental health issues (such as memory problems) who may be more at risk of exclusion as a result of the increasing trend to deliver financial services through digital channels.

In focussing on vulnerable groups, we initially adopted the approach of considering the following factors that may result in a person becoming vulnerable¹:

¹ OFGEM, Proposals for a new Consumer Vulnerability Strategy, Consultation, 124/12, 28 September 2012, p.12 available at <https://www.ofgem.gov.uk/ofgem->

- The characteristics and capacity of the individual.
- The circumstances facing the individual.
- The nature of goods or services or the way they were purchased.
- The extent to which the consumer is aware of his or her vulnerability.

The nature of the financial services and the way in which they can be accessed is in the control of the financial institutions. They therefore are in a position to mitigate the effect of the other factors for exclusion.

The personal factors that can make a person more vulnerable include age, disability, literacy and numeracy skills. In addition, factors such as living with physical health issues or mental illness, suffering from a cognitive impairment and living with a learning difficulty can also cause a person to be in a vulnerable position when dealing with financial products and systems.

Young adults could also be classed as vulnerable by various definitions, particularly due to their lack of financial experience. This report does not focus on the general financial awareness training that they may need although it may be in the interest of financial institutions and educational systems to provide this to young adults.

It is worth noting that the EU Directive on Payment Accounts gives people in the EU the right to "a basic payment account regardless of a person's place of residence or financial situation."²

The scope of this report has also, inevitably, been impacted by the extent to which the researchers were able to get responses from organisations representing vulnerable groups, financial services companies, regulators and individuals in the three countries we focused upon. In some cases, repeated email requests for information, in both English and the relevant language, produced no response.

[publications/57055/proposals-new-consumer-vulnerability-strategy-pdf](#) [Accessed 1st October 2018]

² EU, Payment accounts - Directive 2014/92/EU available from https://ec.europa.eu/info/law/payment-accounts-directive-2014-92-eu_en [Accessed 10th September 2018]

Context

This report has been compiled at a crucial time in the evolution of financial transactions. Digitalised financial services are transforming the way people pay bills and interact with their banks. These developments are almost all led by the banks and financial services companies themselves - and on the way to this brave new world, vulnerable groups appear to be increasingly left behind.

The European Accessibility Act

This report comes during a period in which EU member states are in discussions on the potential adoption of the European Accessibility Act (EAA). The act aims to improve the functioning of the internal market for accessible products and services by removing barriers created by divergent legislation. This will facilitate the work of companies and will bring benefits for the approximately 80 million people with disabilities and elderly people in the EU, expected to increase, due to the ageing of the population, to 120 million by 2020.

Bearing in mind that the figure for people in vulnerable groups is larger than this however, there are no figures available for the number of vulnerable adults in the EU in the context of accessibility to digitised financial services, specifically for the countries in this study.

Meanwhile the UN refugee agency UNHCR estimates that around 570,000 stateless persons live in Europe. Many will have access to digital technology (for instance through smartphones) and will require access to financial services too.

The European Accessibility Act sets out a set of common accessibility requirements for a range of products and services including banking services, ATMs, ticketing machines and smartphones, and places an obligation on member states to ensure that these products and services comply with the accessibility requirements. The EU's online information about the EAA states that the Act is intended to bring benefits not only to people with disabilities and persons with functional limitations but also benefits to businesses including more market opportunities for their accessible products and services³. In particular the study on the socio-economic impact of new measures to improve the

³ European Commission, Employment, Social Affairs & Inclusion, European Accessibility Act available at <http://ec.europa.eu/social/main.jsp?catId=1202#navItem-2> [Accessed 2nd August 2018]

accessibility of goods and services for people with disabilities (final report)⁴ identified particular examples of digital financial services (mobile terminals and ecommerce) where people with disabilities were at a disadvantage versus people without disabilities.

Cross-border accessibility

The ability to use most debit and credit cards across borders is now taken for granted, since financial services organisations such as Visa and MasterCard have extended their global reach. However, does the same international accessibility apply to, for instance, cards with special features such as clipped corners, issued by some banks to allow blind and partially-sighted customers to easily determine which way to insert the card into an ATM? There are issues with accessibility solutions that work in one country but may not work in another, therefore standardisation is required.

Where accessibility standards are left solely or mainly in the hands of individual financial services providers, it may not always be in each institution's competitive interest to create accessible products or services that can be used in another country, or even in, for instance, the ATMs of a different institution in their own country.

Cross-border accessibility is one of the specific aims of the EEA. To quote the EU briefing about the EEA4 ("The European Accessibility Act aims to improve the functioning of the internal market for accessible products and services by removing barriers created by divergent legislation."

Moreover, there is an argument that access to choice in payment systems should be subject to the democratic process, rather than determined by the priorities of private companies, as pointed out by the group Kontantupproret ⁵.

Leaving accessibility issues to the private sector has potentially problematic implications for vulnerable people - if the only bank that offers a card or ATM that you can use closes its ATM in your town, you may be effectively deprived of banking services, as some of the individuals quoted in this report point out.

⁴ European Commission, *Study on the socio-economic impact of new measures to improve the accessibility of goods and services for people with disabilities (final report)*, Page 36, available at file:///C:/Users/Gill/Downloads/Study_Accessibility_Final%20Report_03042014.pdf [Accessed 21st September 2018]

⁵ Kontantupproret, available at <http://www.kontantupproret.se/> [Accessed 21st June 2018]

The demise of cash

The growth of digital financial services is the prime driver of the demise of cash - a trend that will hugely impact people in vulnerable groups. This comes out clearly in comments from end-users, especially those who lack the skills to carry out digital financial transactions or the money to buy technology such as smartphones or computers.

Cash still dominates for low-value point of sale payments - a report by the European Central Bank in November 2017 found that cash accounted for 79% of these - but in some countries, including Estonia, the Netherlands and Finland, cash usage was only around 50%. Moreover, the report found that most people said they preferred to pay by card⁶.

The trend towards falling cash transactions has already led at least one financial regulator to take action. In February 2018 the Swedish Central Bank Governor Stefan Ingves urged lawmakers to protect the long-term status of cash, partly by forcing banks to handle it. Remarkably, over half of Sweden's bank branches no longer take or issue cash. (The bank with no cash for many people might equate to the pub with no beer!). Many retail stores no longer accept cash and two-thirds of consumers say they never use it. The proportion of cash payments in the Swedish retail sector fell from about 40% in 2010 to about 15% in 2016. "In the not-too-distant future, Sweden may become a society in which cash is no longer generally accepted"⁷ the Swedish central bank has said. Against this background the needs of people who are unable to carry out digital financial transactions, or who exercise their right not to do so, appear to be gravely under threat.

Geographical accessibility and extra costs

The trend towards cashless payments is one of the drivers behind the fall in the number of ATMs, and the resulting problem of geographical accessibility - which is mentioned as a problem in the comments from end-users quoted in this report.

The inability to reach an ATM easily can result in extra transport costs for vulnerable people, who may need to take taxis or public transport in order to access cash. Moreover, as banks reduce the numbers of ATMs that they provide, use of ATMs

⁶ FinTech, In Europe, cash still dominates at the POS, 27 November 2017, available at <https://www.finextra.com/newsarticle/31376/in-europe-cash-still-dominates-at-the-pos> [Accessed 21st September 2018]

⁷ Sveriges Riksbank, The E-krona Project's first interim report, May 2018, available at <https://www.riksbank.se/en-gb/financial-stability/payments/e-krona/the-e-krona-projects-first-interim-report/> [Accessed 21st September 2018]

operated by third party companies, and placed in locations such as convenience stores and fuel station, is likely to increase. These machines usually charge a fee for withdrawals, increasing the financial burden for vulnerable people.

The Netherlands has taken steps to address the geographical access issue. The National Forum on The Payment System, in an interim report for 2017⁸ on the accessibility of ATMs and cash deposit facilities, stated that in 2017 99.58% of Dutch households living in six-character Postcode areas had access to bank-operated or non-bank-operated ATMS within a radius of five kilometres. However, recognising the trend of banks to reduce ATM numbers, the forum welcomed the initiative by ABN AMRO, ING, Rabobank and Geldservice Nederland (GSN) to establish a joint network of ATMs and cash deposit machines. The ability to use one bank's card in another bank's ATM is nothing new - but the commitment to maintaining geographical accessibility is.

NFPS said: "Joining forces in this way ensures that the accessibility of ATMs is guaranteed in spite of the diminishing role of cash in society," and referred to the accessibility of ATMs by vulnerable population groups⁹.

Other solutions to cash access suggested in the NFPS report include (rather remarkably) home cash delivery. NFPS says this is currently offered by several banks and is aimed at specific groups of consumers who are unable to withdraw cash independently from an ATM due to their age or a functional impairment. If Dutch banks can offer this, why not those in other EU countries?

The demand for choice

It is also important to note that this study is conducted against a background of debate about consumer rights regarding digitalization and the use of cash.

In Sweden the organisation Kontantupproret campaigns to maintain the use of cash as a means of payment. It considers that cash supply should be considered as part of the

⁸ National Forum on the Payment System, Interim report for 2017 on accessibility of ATMs and cash deposit facilities in the Netherlands, available at https://www.dnb.nl/en/binaries/Interim%20report%20for%202017%20on%20accessibility%20of%20ATMs%20and%20cash%20deposit%20facilities%20in%20the%20Netherlands_tcm47-369712.pdf?2018010502 [Accessed 21st September 2018]

⁹ De Nederlandsche Bank, Press release: Results from the NFPS meeting of 31 May 2017, available at <https://www.dnb.nl/en/news/news-and-archive/persberichten-2017/dnb359690.jsp> [Accessed 21st September 2018]

democratic process rather than being an issue that is left to the private banking system to decide.

In the UK, consumer organisation Keep Me Posted campaigns for consumers to be able to choose to receive bills, statements and communications from companies by Post - without having to pay extra to do so (as is commonly the case). It states that 81% of adults want to choose how they receive important information. It adds: "Independent research reveals that the people who often have the greatest need for paper statements and bills are the older generation, those that are disabled, and those that lack access to the internet or lack basic digital skills."¹⁰

2.1.3 The process of safely using digital financial services

The use of digital financial services can benefit some vulnerable people by making financial services available in areas which were not previously covered (e.g. by the use of mobile banks, increased coverage of ATMs and online banking). In addition, users with some communication or cognitive disabilities may find it easier to interact with a machine rather than with a human being. The following table describes the specific issues that can arise when interacting with digital financial services. In this table it is assumed that the user has a suitable bank account, card and security information and is an authorised user.

¹⁰ Keep Me Posted Campaign, available at <http://www.keepmeposteduk.com/campaign> [Accessed 28th June 2018]

	Ticket Machines and PoS Machines	ATM (Automated Teller Machine)	Personal Mobile or Fixed Machines (Smartphone, laptop or desktop computer)
Geographical Accessibility	<p>Ticket machines and PoS machines are sometimes located in places which are not easy to access for persons with reduced mobility because of their position (up or down stairs, behind a wall that has to be leaned over) or their mounting height (too high for wheelchairs users or people of limited height).</p> <p>In addition ticket machines may be located in a position which is not adjacent to the accessible route (for instance parking machines where the user is asked to pay using ticket machines which are located near the main entrance (with stairs) rather than near the lift used by persons with reduced mobility, increasing the time they</p>	<p>Issues for the end-user of these machines arise as follows:</p> <ol style="list-style-type: none"> 1) When the introduction of an ATM replaces interaction with a staff member the method of communication changes and the responsibility for understanding the terminology and method of proceedings becomes the sole responsibility of the end-user. Formal help is also unlikely in this situation. 2) When the ATM is changed or upgraded its operation can become more complicated. 3) The increased use of contactless payments is leading to the reduction of availability of ATMs in some areas. This coupled with the monetary limit per transaction on contactless transactions can impact on people 	<p>Although the device is often personal to the end-user, issues can arise for users in areas without network coverage or with slow network coverage. In addition, some users may have to travel to use shared machines in libraries or similar communal buildings. It is also common that the software on mobile devices detects when a smartphone is outside of its "normal" region and blocks access to services unless responses to email that verify the user are completed.</p> <p>Plans for high speed broadband in all three countries may resolve these issues. However, many of the most vulnerable may not be in employment or may not have access to sufficient funds to enable them to pay for subscription to broadband providers, alternatively they may live in rural areas which remain poorly connected (intermittent faults or low speeds) or are unconnected.</p>

	need to get to their car and making it difficult for them to get out of the parking within the dedicated time). Previous work on access to the built environment provides information on the accessible positioning of machines.	where no alternative is available. 4) The siting of the machine can affect the ability of the end-user to access the machine. Previous work on access to the built environment provides information on the accessible positioning of machines.	
Physical Accessibility	Issues of reach and dexterity can arise with machines with respect to the physical operation of the machine.	Issues of reach and dexterity can arise with ATMs with respect to the physical operation of the machine.	Issues of reach are not applicable for personal devices, shared communal machines may be set up to be unreachable by some users. The design of the app or website can cause accessibility problems by people with dexterity limitations if the buttons are too small or if the systems 'time-out' before a task is completed.
Sensory Accessibility	Information is only available visually meaning in limited font size. There may also be issues of lack of sufficient colour contrast between the text and the background. The readability of the text may also depend on the light level of the surrounding establishment.	Information is normally only available visually (see use with Assistive Technology for talking ATMs). There may also be issues of lack of sufficient colour contrast between the text and the background. The readability of the text may also depend on the light level of the surrounding area, this can be a particular problem when the ATMs are sited outside.	Too many websites and apps are not designed to follow the correct web accessibility guidelines which require that the information should be available both visually and audibly.

<p>Use with Assistive Technology</p>	<p>Ticket machines and PoS machines can be set up to work in alternative ways and to interact with assistive technology. There is currently very limited information on this practise.</p>	<p>ATMs can be designed to `talk` to the end-user via a headphone socket and an individual headphone carried by the end-user. However, only a limited number of these are available at present.</p>	<p>Assistive technology can only operate successfully if the website or app has been designed to follow the correct web accessibility guidelines. Financial system can be fully accessible using appropriate assistive technology including screen readers, magnifiers and alternative keyboards and input devices, unfortunately whilst it is acknowledged that <i>“accessibility should be understood as principles and techniques to be observed when designing, constructing, maintaining, and updating websites and mobile applications in order to make them more accessible to users, in particular persons with disabilities”</i>¹¹ this is often not the case.</p>
<p>Knowledge/skills</p>	<p>The user will need to remember their security code and to be able to manipulate the card and the buttons or touchscreen. Limited assistance may be available from a staff member.</p>	<p>The user will need to remember their security code and to be able to manipulate the card and the buttons or touchscreen. They will also need to understand the terminology and operating instructions of the device. Limited assistance may be available</p>	<p>The user is expected to understand their financial situation, the operation of the financial app or program, the terminology used, the operation of their smartphone, laptop or computer and the operation of an assistive technology (if used). Help is</p>

¹¹ Directive (EU) 2016/2102 of the European Parliament and of the Council of 26 October 2016 on the accessibility of the websites and mobile applications of public sector bodies, available at <https://eur-lex.europa.eu/eli/dir/2016/2102/oj> [Accessed 1st October 2018]

		from a staff member if the ATM is situated in a shop or financial institution, but assistance is not available where the ATMs are situated in other locations or the end-user is using the machines outside normal opening hours.	available from a number of the banks in the form of videos, online written information and online support. But the online information is often not designed with the needs of persons with functional limitations in mind and information is not available in an accessible format.
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2.2 Who is at Risk?

People may be at risk of vulnerability with the introduction of digital financial services that have not been designed to meet their needs for the following reasons.

2.2.1 Functional limitations

People with sensory, cognitive or physical disability or with multiple disabilities can experience particular problems when dealing with digital financial technology. The negative impact can be permanent or temporary. The impact may lessen over time because of the temporary nature of the disability or because the end-user becomes proficient in carrying out tasks in alternative ways or in using assistive technology. The severity of the disability and its impact are likely to increase as the person ages. The particular effect of the different functional limitation on a person's ability to use digital financial systems is as follows.

Sensory Abilities

- **Seeing**

The majority of people with impaired vision face difficulties with respect to the size, luminance and colour contrast of the text that they are looking at. The design of the information presented by the ATM, ticket machine or PoS machine is thus very important. The location of the machine is also important as glare or varying light levels could affect a person's ability to read the information. People with no useful vision will need tactile or audible input. The digital financial systems should be designed to provide information in alternative formats and to connect to assistive technology that could be used by the end-user. In particular personal computers, laptops and smartphones can be fitted with screen reader or magnification programmes whilst ATMs can talk via an earphone socket.

- **Hearing**

Hearing loss can range from a mild reduction in hearing some frequencies to profound hearing loss. The choice of the frequencies used by the systems is thus important to these users as is the provision of audible information in alternative formats.

- **Balance**

The person's ability to keep their balance can be affected by many causes such as internal ear problems, medications, blood pressure problems, failure of the brain to interpret correctly visual feedback, multifocal glasses, etc.. This affect a significant number of persons with functional limitations and reduces their ability to use an ATM or similar machine if standing is required for a significant period of time.

Physical Abilities

- **Dexterity**

Persons with functional limitations may have difficulties to control their hand and arm to pick up and manipulate objects such as a mouse or touchscreen. A personal computer, laptop and smartphone can be set up to reduce the requirement for certain movements but ATM, ticket machines or PoS machines need to adapt for ex. to provide larger buttons to click on.

- **Manipulation**

Manipulation refers to a person's ability to carry, move and manipulate objects and the speed with which they can do these tasks. For users with limited ability to manipulate objects it is important that any PoS, personal terminal and software allows the user the possibility to request for a longer time to indicate their choice or enter their code rather than being locked out due to timeout policies.

- **Movement and Height**

Movement refers to the act of a person moving and maintaining the position of their body. People with impaired ability to move may be in a wheelchair or use a walking aid. The height of a fixed system such as an ATM or ticket machine must be such that it considers the full range of possible users. A number of machines at different heights is an alternative possible solution.

- **Strength and Endurance**

Strength and endurance refers to a person's ability to carry out a physical task for a sustained period of time. It is recommended that activities on machines or ATMs be as simple and easy to understand as possible to reduce the time it

takes to operate them and thus the requirement for strength and endurance (whilst ensuring that the systems do not stress the user by timing out before they are finished). This will also reduce the chance for the end-user being a victim of crime.

- **Voice**

A person with a voice impairment may not be able to communicate vocally. It is important that any digital financial system that uses voice for control or as a part of biometric security has an alternative method of operation. Persons with a voice impairment also face increased risk if they lose their card or it is stolen as the current systems to report such loss and to block further usage require the owner of the card to report the loss personal on the phone.

Cognitive Abilities

- **Intellect**

Intellect is the capacity to know, understand and reason. A person with an intellectual impairment may have difficulty in taking in and processing sensory information and in understanding the effect of their actions. Digital financial systems with limited or reduced functionality (such as ATM cards limiting withdrawals to a certain amount) could be of benefit to this group.

- **Memory**

Memory relates to the registering, storing and retrieving of information. This can affect an end-user's ability to interact with digital financial services or to remember security information such as PINs. A person with impaired memory may be at greater risk of crime if they record their PIN or online security information where it is available to other people or if they are forced to give their PIN to someone else due to the lack of accessibility of the device.

- **Language/literacy**

Language and literacy are the ability of a person to understand the signs, symbols and other elements of language. Although a person with low literacy may be able to carry out certain tasks on digital financial systems, s/he may be rendered at greater risk of crime by their lack of ability to understand security information.

2.2.2 Geographical Factors

Access to digital financial services requires the end-user to have access to the systems. This requires both the availability of the end-user systems and the availability of the networking signal to ensure that the networked digital system can successfully transmit operational and financial systems.

Personal mobile or fixed machines (laptop, desktop or smartphone) require the end-user to have a personal network connection in their home or access to a safe and secure Wi-Fi connection which they can utilise when outside their home. Universal access may not be available to end-users as this may be dependent on core business decisions based on cost, efficiency and demand. Therefore, this places the burden on users. For instance, the use of an ATM or ticket machine may require a user to travel to a particular location. Travel can be difficult for users with limited financial resources, a mobility disability or lack of access to personal transport, therefore the location of financial machines in any particular area needs to be considered to ensure accessibility.

2.2.3 Education

A higher level of educational attainment will assist an end-user to deal successfully with both the financial systems and their digital interfaces. This will include the successful and safe operation of security systems, financial systems and assistive technology (if required). In particular education or self-education is required to enable people to acquire the following skills:

- **Literacy**

Literacy is the ability to read and write (or type) as required. When using financial systems this will mean using and understanding the relevant financial terminology.

- **Media**

Media literacy is the ability to access information from a range of media including written text, spoken text and video. Note: alternative presentation of information in visual and audio media formats will be required if financial

technology is to be used by users with a sensory impairment.

- **Digital Literacy**

Digital literacy is the ability to interact successfully with digital systems including systems running financial applications including PoS machines, ticket machines, ATMs, laptops, smartphones and desktops.

- **Information Literacy**

Information literacy is the ability of an end-user to recognise when information is needed and to search and locate that information. This is particularly relevant for users of personal mobile and fixed devices who will need to find the correct program or app and not be taken in by a spoof version, or who need to add in additional security or assistive systems to enable them to access the financial system.

- **Financial Literacy**

Financial literacy is the ability of the end-user to make informed and effective financial decisions including when interacting with digital financial systems and being to comprehend the results of their actions.

- **Security Literacy**

Security literacy is the ability of the end-user to make safe and informed decisions when interacting with digital systems including digital financial systems. This will affect both what they do physically when interacting with machines in public, what they do online when interacting with personal machines or communal machines and what programs they choose to install and use on personal devices. It will also include the selection and use of security software.

2.2.4 Age

Older persons are more likely to have one or more impairment(s) which can affect ability to use digital financial systems. As most did not use this technology as part of their education, are less likely to have used it in employment (although that depends on when they retired) and may have had less contact with regular users of digital financial systems.

In their research The Finance Foundation which carried out end-user research, described the many problems older people had when carrying out their basic financial transactions¹² including the need to have accessible available technology. In the UK the campaign group 'Keep me Posted' campaigns for the right of consumers to have choice in how they access financial services, in particular they focus on the needs of vulnerable and older consumers many of whom do not have access to the internet. In 2018 in the UK, 8.4% of adults had never used the internet, of the 4.5 million adults who had never used the internet in 2018, more than half (2.6 million) were aged 75 years and over¹³ figures. More than a quarter (22%) of people aged between 65 and 74 don't access the internet on a regular basis¹. This rises to a 59% for over 75 year olds. These people are at risk of being uninformed about their financial status if they are pushed to online accounts and electronic communication.

2.2.5 Use of Intermediaries

The lack of accessible digital financial services combined in some cases with social pressure and the desire of family and friends to help can result in older or disabled end-users being forced to ask for formal or informal intermediaries to assist them to access financial services. This assistance may solve the issue of accessibility, but it can lead to the older or disabled person being put at risk and not being able to keep control of their finances. Formal assistance may be available from bank or similar staff, whilst informal help can be obtained from friends and family of the end-user or from bystanders. This may be requested by the end-user or be offered because the end-user is assumed not to be able to interact successfully with the device. A wide variety of formal and informal help exists but all raise security and legal issues since financial service providers can refuse to compensate the end-user if it can be proved that they did not exercise due diligence with regard to their card or their PIN.

¹² Cooper, H. (2016). "When I'm 84" Locking the Door on the Older Old: the Challenge Facing Britain's Banks. [ebook] London: The Finance Foundation. Available at: <https://www.thefinancefoundation.org.uk/images/the-finance-foundation-when-im-84.pdf> [Accessed 20 Jul. 2018].

¹³ Office of National Statistics (2018). "Internet Users in the UK: 2018". London ONS. Available at <https://www.ons.gov.uk/businessindustryandtrade/itandinternetindustry/bulletins/internetusers/2018#older-adults-are-less-likely-to-use-the-internet> [Accessed 12 Sept. 2018].

2.2.6 Security issues

The design of PoS, ATMs and online banking systems can if not carried out correctly limit the ability of a person with functional limitations to interact safely and securely. With machines outside the home security issues can arise if the interaction with the ATM or other system is observed (by shoulder surfing) or if assistance is offered by an untrustworthy person. Furthermore, during use individuals may not realise if the machine has been compromised by criminals using camera technology to capture user entered information as the criminal adaption may be difficult to spot. With all systems security issues can arise if the end-user is not aware of how to interact in a secure way and if the assistive technology does not fully interact with the security functions of the computer.

2.2.7 Financial and Legal

Digital financial services cannot be accessed by an end-user who does not have a bank account and suitable bank card. The EU directive on payment accounts¹⁴ gives people in the EU the right to a basic payment account regardless of a person's place of residence or financial situation. Everyone in the EU now has the right to a basic bank account and debit card. In spite of this there are people in the EU without bank accounts. These people are often referred to as the 'unbanked'. There are a variety of personal and other factors which can cause somebody to not have a bank account including:

- Lack of finance
- Lack of employment
- Lack of secure housing
- Legal status not confirmed
- Lack of creditworthiness limiting access to services or particular favourable services at an affordable rate – as some people are considered high risk
- Criminal record impact

¹⁴ European Commission (2013). "Access to Bank Accounts". Brussels. Available at: https://ec.europa.eu/info/business-economy-euro/banking-and-finance/consumer-finance-and-payments/consumer-financial-services/access-bank-accounts_en [Accessed 12th Sept 2018]

- Personal choice

The issue of lack of finance and of personal choice will intersect when a user with limited finances has to decide between purchasing a smartphone or computer to carry out financial and other activities or to make more urgent payments. This is key issue for persons with disabilities and many pensioners with small pensions, for these users the lack of alternative non-digital payment solutions is a problem.

3. The User Experience

3.1 Personal Experiences: What it's Like for Me...

Digitized financial services could be seen to present a huge opportunity to give vulnerable people to access more financial services more easily. For instance, ATMs could make getting hold of cash much easier for deaf people, because they no longer have to interact with bank staff who are often not well trained to deal with them. Internet banking means blind people equipped with screen readers may carry out banking operations without having to find their way to a branch, and people in remote areas can use the internet to access bank services in areas where banks are hard to reach and transport is poor.

But is this potential being realised? What do users say?

We asked users in vulnerable groups in three countries - the UK, Italy and Estonia, how accessible and helpful digitized financial services were for them. The following comments are from these people broken down into the technology categories that were being looked at. This is what they said...

3.1.1 Ticket machines

Finding: "Finding ticket machines is difficult for me but I don't use them anyway, because they don't talk." Blind man, UK.

Using: "Some are solely touch screen, so I cannot see enough to use them, but even where they have buttons with Braille on, I can't see to read the screen, so they are useless to me." Blind man, UK.

"Ticket machines for transportation tickets are not very common in Estonia. Tickets are more often purchased from ticket booths, small kiosks or the internet. Buying tickets online is not difficult, but there could be videos in sign language to show how to correctly purchase the tickets." Deaf person, Estonia.

3.1.2 Electronic payment terminals

"There are huge security issues with electronic payment terminals. With contactless payment in particular, if you cannot read the terminal's screen or see the light that flashes when a payment has been taken, there is nothing to stop unscrupulous retailers from claiming that the transaction has not gone through, and asking for payment in another form, such as cash. You hand over the money and thus you have paid twice for the same thing, without knowing. *Man, who describes himself as "totally blind", UK.*

"Even without contactless, it's easy for retailers to overcharge or double charge you. It has happened to me – fortunately not for a large amount of money, but unless these terminals can talk, it's a big security risk and the banks seem to be doing nothing about it. If they move over to touch screen terminals, it will get even worse and blind people will be left with no way to pay other than cash. With bank branches closing and the number of ATMs going down, the combination of lack of accessibility to cash and [the introduction of more] touch screen terminals will reduce the financial independence of blind and partially-sighted people like me." *Blind man, UK.*

"For many blind and partially-sighted people, using PoS terminals can be very hard or impossible, because of problems reading the screen. Personally, I use an app on my smartphone that means my bank sends me a push notification when the transaction goes through, so there is an audible signal to confirm it has been completed. However, the number of smartphone users among the blind and partially-sighted community in Estonia is very small – only about 100 people have one – so this is not a solution for most people at present." *Blind man, Estonia.*

"In shops, the cashiers are often willing to help". *Blind person, Estonia.*

"I was born profoundly deaf and as I wasn't diagnosed until I was 10 months old. I missed the first crucial 10 months of language development, so my cognition isn't great, and I struggle to understand complex written information [such as that used on ticket machines/ATMs/electronic banking]. Same with my boyfriend who had meningitis at age 3 which left him deaf. He struggles with complex information more, because he used to be able to hear and had to start learning everything again. Not being able to hear affects your understanding compared to a Hearing person, but

nothing can help that, apart from getting the right support to help you try and understand all these things, but the support is decreasing." *Deaf woman, UK.*

"I have no problems using these card payment machines," *Woman with hearing impairment, Italy.*

"My dyspraxia means I find small, detailed movements difficult, and I have very poor proprioception. This means I find it hard to cover my PIN number when entering it into electronic payment terminals and ticket machines which enable card payment. It makes me worried about being at greater risk of fraud, so I use contactless when I can. Not having to key in PIN numbers means it's much easier for me and it feels safer." *Young woman with dyslexia and dyspraxia, UK.*

"Card payment in stores is easy, especially with contactless payment." *Deaf person, Estonia.*

"I don't have a card, so I don't use these terminals, but I do think in the end everyone will have to have cards to buy things. It's a sorry situation because holding money in your hand is very definite so you know where you stand." *Man, 95, UK.*

"Nowadays there are also plenty of machines that one has to use, such as gas station automats and self-service checkouts. In general, these systems have been made very simple and the user environment is very user friendly." *Dyslexic man, Estonia.*

3.1.3 ATMs

"The banks seem to have done some work on making their ATM screens easier to read and some have installed audio jacks, so you can plug earphones into them. It certainly makes ATMs more accessible to some people, but I don't use ATMs or electronic payment terminals because I use my Apple watch to make contactless transactions using the Apple Pay facility, which means I don't need to use a bank card. *Blind man, UK.*

"I don't interact with IT when I am out and about because of security risks. While you are using an ATM, someone could reach across and steal your money. There is a mobile phone app called 'Be My Eyes' that connects blind and low-vision people with

sighted people who can offer visual assistance through a live video call. They can help you use the ATM – but that is not entirely risk-free because someone could reach out and steal your 'phone." *Blind man, UK.*

"As for cashpoint machines I have realised from experience with my Deaf friends that they can be quite complex. All users want to do is put their card in and withdraw X amount, but sometimes the menu screen offers words like 'balance enquiry', or 'cash withdrawal' and many others which can get some people confused. The words need to be simpler." *Deaf woman, UK.*

"Some people ask whoever may be with them which option they have to click on. It doesn't give the user any financial independence." *Young Deaf woman, UK.*

"Deafblind people have even more issues than blind people with cashpoint machines or paying for things by card using terminals because they can't hear or see very well. I know a Deafblind couple who rely on having a support worker to help them with anything bank-related. When paying or withdrawing they have to ask for a receipt to sign as they can't put PIN numbers in. Many High Street bank branches are closing and in their area there's only one bank left, so they've had no choice but to move their bank account there, because they can't do online banking. The banks don't realise the implications of closing branches for customers who need face-to-face banking." *Deaf woman, UK.*

"Remembering all my PIN and account numbers is difficult because my dyslexia means I tend to get confused and remember them in the wrong order. This makes me nervous when using ATMs." *Dyslexic student, UK.*

"I have dyslexia and dyspraxia, and my dyspraxia means I find it difficult to tell how hard I need to press buttons on ATMs, as the buttons don't have feedback, especially if it is a touch screen. I have often ended up pressing buttons too many times. Combined with my dyslexia, this increases the chance that my card could be retained by the machine." *Woman with dyslexia/dyspraxia, UK.*

"I don't have an ATM card. I go to the bank branch weekly and get out the cash I need for that week. With cash I know where I stand. With a card you have to wait to get your bank statement to find out how much money you have in your account. Using cash, I know exactly how much money I have at any given time." *Man, 95, UK*

"I don't have any problems using ATMs - they are easier than dealing with some bank staff if you are deaf." *Deaf woman, Italy.*

"ATMs in Estonia are the regular ones - everything is written out in text and the language choices are Estonian, Russian and English. Some ATMs also include Braille letters, but there aren't separate sign language ATMs. Mostly there aren't any problems with ATMs though. Perhaps with more complex transactions it does take more time and you have to try a bit more. In a perfect world, ATMs could include sign language compatibility as well." *Deaf person, Estonia.*

My grandmother still has her Bancomat (ATM) card but cannot get to the bank any more, and she can't remember things so well, so if we took her to a cash machine I am not sure if she would remember the PIN number. My uncle keeps her card and has been getting the money out for her for a few years. She's very happy about that and trusts him because he is her son," *Student, Italy*

"I heard of a case where many adult disabled people lived in the same place. For some of them, remembering PINs and such like was very difficult, but others were very gifted with numbers. So the ones who could easily remember numbers memorised everyone's PINs and helped them out when needed." *Professional carer, Estonia*

"ATMs make people's lives easier, but if there is a queue you may be forced to perform transactions faster. If you take things slowly and calmly, there should be no problems. One option [for improvement] would be to use voice commands, so the ATM reads out the text, but that would probably make the transaction very slow and usually with several uses under their belt, a dyslexic will be able to find the right things fast and the voice option would turn into a distracting and slowing factor." *Dyslexic man, Estonia.*

3.1.4 Internet banking

"Internet banking can be accessible if the site is designed to be easily readable by screen readers, but sites designed for use on desktop computers tend to have many buttons and links, which can make them harder to read. Even with a screen reader you need training to use them effectively. Sites designed for mobile internet banking

tend to be easier as they display fewer items on the screen, so that's simpler." *Blind man, UK.*

"The mobile banking apps aren't always easy. All the terminology and wording is very complex. If you are viewing your bank balance that's fine but when paying someone else or setting up direct debit it's not easy and often people with hearing loss need support." *Deaf woman, UK.*

"There are many apps designed for blind people that read out to you what you are about to do, although Estonian is a very difficult language and the programs often do not read things correctly, but the general idea is still understandable." *Blind person, Estonia.*

"For many, the use of these [internet banking] services is comfortable, they've had good experiences and they get their things done fast. However, there are also many people who either aren't used to online banking and/or who haven't received sufficient schooling or education on them." *Deaf person, Estonia.*

"I supported someone who bought something on the internet and later discovered that they had bought four of the same items by mistake. They had also inadvertently set up an online credit agreement at a high interest rate, without realising it." *Woman working with people with cognitive impairments, UK.*

"Older people are extremely tech-savvy, as their children or grandchildren often teach their grandparents how to use different technologies. It is quite usual that older people have access to internet banking, laptops, and smartphones and know how to use them. There's a lot of support from family when someone has a cognitive impairment that does not let them do certain things." *Professional carer, Estonia.*

"In the case of a learning difficulty, it is usually discovered at an early age, which means the person is well aware that he/she might mess up or forget things like PINs or passwords, so the necessary extra caution is taken. There is a lot of support from family." *Charity worker, Estonia*

"I haven't [done any financial transactions online], because at the moment I don't feel that secure, you know, with all the fraud and the negative things you hear all the time." *Woman, 65-74, new learner on a course to learn how to use the internet, UK.*

"I'm a little bit wary of putting my banking details on the computer. They [the bank] showed me that it's absolutely secure and all the rest of it, but my daughter was conned out of two or three thousand because somehow or other they got her details." *Woman, 65-74, new learner on a course to learn how to use the internet, UK.*

"Other activities that don't involve taking money out or putting in can also be done via internet either on your computer or phone. The latter is definitely more comfortable for dyslexics as they can choose the place, pace and time. If I cannot do it on my own or find an answer anywhere, I write to the info email of the bank with my questions. I trail the answers with my finger on the screen, to make sure that I perform everything correctly. I would recommend having everything also explained through video versions, so that dyslexics could understand better. Also, to use sans serif fonts, but to avoid capitalised letters and long paragraphs of text." *Dyslexic man, Estonia.*

It's clear from these comments that there are some similarities in users' experiences across all three countries - but there are also differences. Variations in the availability of technology and access to it will affect users' experiences: if you have no access to a financial institution account, payment cards or internet banking, for whatever reason, your level of independence may be reduced.

Here we look at the availability of the tools required to access the digitized financial services market in each country, beginning with the basic statistics.

3.2 Availability and use of Digital Financial Systems

3.2.1 Financial Institution Accounts

The following figures¹⁵ describe the number of adults with an account with a financial institution in the UK, Italy and Estonia. The figures cover the use of bank accounts and similar accounts.

UK

¹⁵ World Bank (2018), 'Little Data Book of Financial Inclusion 2018 (data compiled 2017)', Available at: <https://openknowledge.worldbank.org/handle/10986/29654> [Accessed 12th Sept 2018]

Percentage of all adults (15+) with a financial institution account/s: 96.4%

(down from 98.9% in 2014)

Account holding by adults, individual characteristics:

Adults in poorest 40%¹⁶: 94.5%

Adults out of labour force¹⁷: 94.1%

Adults living in rural areas: 95.8%

Unbanked: N/A

Italy

Percentage of all adults (15+) with a financial institution account/s: 93.8%

(up from 87.3% in 2014)

Account holding by adults, individual characteristics:

Adults in poorest 40%: 90.6%

Adults out of labour force: 90%

Adults living in rural areas: 95%

Unbanked: N/A

Estonia

Percentage of all adults (15+) with financial institution account/s (2016): 98%

(Up from 97.7% in 2014)

Account holding by adults, individual characteristics:

Adults in poorest 40%: 96.2

Adults out of labour force: 97.4%

Adults living in rural areas: 98.2%

Percentage of adults with a bank account: 97.7%

Unbanked: 24,641 (WSBI)

The small number of people without financial institution accounts may not have an account at all - or it could be that they use alternative financial systems such as crypto-currencies.

¹⁶ The 40% figure refers to the percentage of adults (15+) in the poorest 40% of the population since figures are not broken down by different areas of the country for any of the countries in the dataset.

¹⁷ Out of labour force includes the unemployed and may also include people who are not working but are not looking for work, e.g., stay at home mothers who do not want to be employed.

3.2.2 Availability and use of Bank Cards

The following figures¹⁸ describe the number of adults with bank cards in the UK, Italy and Estonia. The figures list both the type of cards and functionality of the cards.

Note: Some cards are multifunctional.

UK

Number of cards with a:

Cash function: 174.257m

Debit function: 99.632m

Delayed debit function: 2.117m

Credit function: 58.559m

Number of ATMs: 70,020 (end 2016, down 0.4% on 2015) *Source: UK Finance*

Italy

Number of cards with a:

Cash function: 81.0445m

Debit function: 53.7158m

Delayed debit function: 0

Credit function: 141.1m

Number of ATMs: N/A

Estonia

Number of cards with a:

Cash function: 1.8423m

Debit function: 1.4967m

Delayed debit function: 0

Credit function: 5.3392

Number of ATMs: 746 (down from a high of 942 in 2008)

¹⁸ European Central Bank (2017), 'Payments statistics for 2016: figures for number of cards by resident payment systems providers' Available at: <https://www.ecb.europa.eu/press/pdf/pis/pis2016.pdf?be9989f6bd72483ebe27d8dfae1f0362> [Accessed 12th Sept 2018]

3.2.3 Internet Banking

UK

Percentage of the population who used a mobile phone or the internet to access an account: 46.7%

Percentage of UK households with home internet connection (2018): 90% (up 1% point on 2016¹⁹).

Italy

Percentage of the population who used a mobile phone or the internet to access an account: 22.2%

Estonia

Percentage of the population who used a mobile phone or the internet to access an account: 69.5%

Percentage of Estonian households with home internet connection (2017): 88% (up 2% points on 2016)

Households using a mobile internet connection (2017): 82%, (up 4% points on 2016)

Slightly more than two-thirds of Estonian households without internet connection at home cited lack of need or interest as the main reason.

3.2.4 Fraud Levels

The following figures²⁰ indicate the amount of card fraud.

Note: CNP: card not present transaction, e.g., online or telephone transactions

UK

Volume of fraud/1,000 cards: 27.5

¹⁹ Office of National Statistics (2018). "Internet access – households and individuals, Great Britain: 2018". London: ONS. Available at <https://www.ons.gov.uk/peoplepopulationandcommunity/householdcharacteristics/homeinternetandsocialmediausage/bulletins/internetaccesshouseholdsandindividuals/2018> [Accessed 12 Sept. 2018].

²⁰ European Central Bank (2015) "European Central Bank 4th Report on Card Fraud 2015 (Data from 2013)". Available at <https://www.ons.gov.uk/peoplepopulationandcommunity/householdcharacteristics/homeinternetandsocialmediausage/bulletins/internetaccesshouseholdsandindividuals/2018> https://www.ecb.europa.eu/pub/pdf/other/4th_card_fraud_report.en.pdf [Accessed 12 Sept. 2018].

Percentage of fraud by transaction type:

ATMs:6%

CNP:76%

PoS:18%

Italy

Volume of fraud/1,000 cards: 5.9

Percentage of fraud by transaction type:

ATMs:15%

CNP:61%

PoS:24%

Estonia

Volume of fraud/1,000 cards: 3.5%

Percentage of fraud by transaction type:

ATMs:43%

CNP:41%

PoS:16%

4. Personal Experience of using Digital Financial Services focusing on UK, Italy and Estonia

4.1 Ticket machines and PoS machines

Definitions: A point of sale (PoS) terminal is an electronic device used to process card payments. It reads the information off a customer's credit or debit card, checks whether sufficient funds are available and if so, processes the payment. Most require the customer to punch in their PIN number via a small keypad but increasingly they are also capable of 'contactless payment', whereby the terminal 'reads' the card without the need to enter the PIN. These are commonly used in shops, hotels and restaurants. We will call these **electronic payment terminals**.

When incorporated into other devices, such as the ticketing machines commonly used in rail stations, we call this **electronic payment technology**.

4.1.1 Ticket/POS machines: Blind and partially-sighted people

UNITED KINGDOM

Of the estimated two million people in the UK with sight loss, 360,000 are registered as either severely sight impaired or sight impaired (blind or partially sighted.)

RNIB research in response to the Department for Transport's Transport Accessibility Action Plan showed that only 6% of people with sight loss were able to use a ticket machine without difficulty. Over half (56%) said it was impossible for them to use a ticket machine, and 30% found it difficult.

Unsurprisingly only 4% said they'd choose to buy a ticket from a vending machine if travelling at short notice, while 76 % would prefer to buy a ticket from a person in a ticket office and 20% would prefer to buy it on the train. With ticket office staff cuts being rolled out across the country, many passengers are concerned that they are not able to receive the level of support they need.

Of those at the RNIB workshops who had used ticket machines, if with difficulty, many said that there were other problems such as the types of tickets available are limited

to the most expensive; it is hard to add a rail card, extra passengers or select different ticket types on the machines.

Many of the chip and PIN devices on the machines do not have the accessible raised bump on the number 5 which is common on keyboards worldwide and used by many people with sight loss to navigate their way around numerical keyboards. Those with touch-screens alone are almost inaccessible to many people.

Electronic payment terminals

The RNIB says that in the UK there are no electronic payment terminals that can talk. As a result, they present accessibility and security issues for blind and partially-sighted people.

The screen is usually unreadable (and few display information in large fonts) so users are unable to see the sum that they are approving and must trust retailers to charge them the correct amount or ask others to verify that the sum being charged is correct.

In certain modes the PIN can be visible to the retailer – a security issue that RNIB researchers have flagged up to the banks, but the researchers say that nothing has been done.

The raised dot on the number “5” button of the keyboard, very widely used around the world, is not present on all terminals.

POS terminal manufacturers are now switching over to touch-screen only models. With no buttons at all, these machines are likely to be unusable by blind and partially sighted people who cannot see the screens and thus will have no method of payment.

Contactless payments, which do not involve keying in a PIN, are in some ways easier to use but do not solve the problem that the screen is unreadable so blind and partially-sighted people are still reliant on the honesty of the retailer.

ITALY

Luca Davanzo, of the Assistive Technology and Devices Work Group of the Unione Italiana dei Ciechi e degli Ipovedenti (UICI), the Italian Union of the Blind and Partially Sighted, says: "Unfortunately, ticket machines that take payment cards are not

accessible, to my knowledge, to blind or visually impaired people. We have high hopes on the proposed European Accessibility Act on this."

POS machines: UICI reports that traditional, keyboard-based payment terminals are usable by blind people as tactile marks on the number "5" and confirmation keys allow the user to independently enter the PIN code. However, the user cannot see on the terminal screen the amount being paid. More modern, touch-screen-based payment terminals, which are starting to appear on the market are completely inaccessible, says Davanzo.

However, he sees as a potential benefit the possibility of making payments from the user's smart phone, simply by touching the payment terminal with the phone. Davanzo says: "Systems like Apple Pay, Google Wallet and others, appear usable and accessible, although the experience with these new payment methods is still limited."

ESTONIA

Jakob Rosin, board member of the Estonian Federation of the Blind, who is blind himself, says: "Estonia does not have so many card-operated ticket machines as the UK – generally you buy your train ticket, for instance, from a person. However, ticket machines are being tested now, especially at small rail stations. It's not just blind and partially-sighted people who are affected, and the federation has complained about this because we consider it unacceptable."

As regards PoS terminals used in retail outlets, he says: "Counter-top terminals are largely inaccessible to blind and partially-sighted people here in Estonia as much as anywhere else. Many people who cannot read the terminal's screen ask people with them for help, or even the shopkeeper. It's not ideal."

4.1.2 Ticket/PoS machines: People with hearing loss

UNITED KINGDOM

Given that digital financial services systems are usually designed to circumvent the need to speak to, and hear other people, digitalization seems on the face of it to solve a great many communications problems for people who have hearing loss. The charity Action on Hearing Loss has researched accessibility to banking services for people with hearing loss but has not looked specifically at access to ticketing machines equipped with electronic payment technology and electronic payments terminals. It does not

report receiving feedback from its members and supporters about access issues with them.

However, this does not mean that digital financial technology does not raise issues for people with hearing loss.

One of these is that deaf people may not understand written instructions and responses displayed by the machines. People who are born deaf or became deaf at an early age are not exposed to spoken language in the same way as a hearing child, and thus may not internalise vocabulary or linguistic structure to the same degree. This can show up in comprehension of written English.

British Sign Language (BSL) users also face issues because sign language does not employ the same grammar as spoken and written English.

Aine Jackson, Research and Policy Officer at the British Deaf Association, which is largely run by, and has members and beneficiaries, who are Deaf sign language users (both British and Irish Sign Language) says of electronic point of sale terminals: "Generally speaking, there is little issue here unless there are complicated instructions in English. It is worth bearing in mind that for Deaf sign language users, English is usually a second language. There are also often issues of communication with whomever is operating the machine."

On ticketing machines equipped with electronic payment technology, she says: "Again, just as with payment terminals, complicated instructions in English can present issues."

When things go wrong:

Action on Hearing Loss reports that the problems often start when digital financial transactions go wrong. At this point, users are likely to contact the service provider, and it is then that challenges arise.

Its Access to Rail Travel for People with Hearing Loss Policy Statement 2014 says: "Ticket sales at each station are the responsibility of the train operating company, so they are responsible for [hearing] loops at counters and other accessibility requirements. Information and assistance points do generally have loops fitted but

are not accessible by people with profound hearing loss. However, we are aware of help points in Paris which have keyboards and screens. We therefore urge train operating companies and Network Rail to consider the possibility of installing this equipment in UK stations.”

In its 2011 annual report Action on Hearing Loss published the results of a survey that examined members' experiences in communicating with banks. It reported that only 50% agreed that they were happy with the available ways they could communicate with their bank: one third (32%) had experienced difficulties, and less than half (44%) agreed that they found it easy to contact their bank when they needed to.

Reasons given for communication difficulties included a lack of working loop systems in bank branches, difficulties with background noise in call centres and inflexible communication procedures (such as the service not being willing to speak to a nominated representative of the end-user).

ITALY

We have no evidence of particular difficulties for deaf and hearing-impaired people when using ticket machines and PoS terminals in Italy. However, judging by responses from relevant organisations and users in the UK and Estonia, these technologies present no problems - and indeed make things easier for the deaf and hearing-impaired. The only issue that might arise is that people with profound hearing loss from birth or an early age may not have the same breadth of vocabulary as hearing people, so any terms that may be perceived as complex could be harder to read on the screen.

ESTONIA

The board of EKNO, the Estonian Deaf Organisation for Youth, in a collective reply to questions about the use of ticketing and PoS machines, told us: "Card payment in stores is easy, especially with contactless payment. Ticket machines for transportation tickets are not very common in Estonia. Rather tickets are purchased from ticket booths, small kiosks or the Internet. Buying tickets online is not difficult, but there could be videos in sign language to show how to correctly purchase the tickets."

4.1.3 Ticket/PoS machines: People with cognitive impairments, learning disabilities, dementia and associated issues.

UNITED KINGDOM

The capacity to access digital financial services varies among people with these issues perhaps more than any other of the vulnerable groups considered in this report. However, there are some common themes – the ability to remember PIN numbers and passwords is one of them.

Where people have trouble remembering PINs, charities such as DOSH Financial Advocacy, which supports people with learning difficulties to manage money, and Alzheimers UK suggest that users may find a chip and sign card, which requires users to give a signature, a better, safer option than a chip and PIN card, because the user does not need to remember their PIN. All banks offer a chip and sign card and all retailers who take card payments accept them.

Meike Beckford, Financial Advocacy Manager at DOSH, says: “Many people we help prefer not to use any kind of PoS machines or PoS-enabled ticketing machines because they have trouble remembering PIN numbers but also because they prefer to use cash, where they can see exactly how much they are spending. Some find the abstract nature of electronic money harder to understand than money in its physical form of notes and coins. We find that people with the least understanding of money tend to be the least likely to use POS in any form. Many fear that using digital finance presents a higher risk of losing control of their budgets.”

DOSH has been contacted by people who have got into debt because they did not understand the full financial implications of card transactions. “Because no physical money changes hands in a card transaction, it may feel to them as if they have received an item without any financial consequence, until they discover that they have in fact paid for it,” says Meikle. “In some cases, this has resulted in them facing unexpected overdraft fees.”

Specific Learning Difficulties (SpLDs) affect the way information is learned and processed. They are neurological, occur independently of intelligence. They include dyslexia, dyspraxia, dyscalculia and ADD/ADHD. Common characteristics of SpLDs that may affect the ability to use digital financial technology include difficulties with memory, reading and writing, organisation, and visual processing.

4.1.4 Ticket/PoS machines: People who lack literacy/digital literacy/information literacy.

UNITED KINGDOM

The Good Things Foundation, which provides courses to help vulnerable people access the internet, had no information on this.

ITALY

We were able to source no information.

ESTONIA

We could find no specific information on this.

4.2 ATMs

4.2.1 ATMs: Blind and partially-sighted people.

UNITED KINGDOM

The RNIB 2011 annual report stated that just 11% of the blind and partially sighted people it surveyed reported using cash machines on their own, without the assistance of other people. Variation in the layouts of the menu options and card and cash slots among banks and fears about personal safety were cited as key barriers to the greater use of cash machines. The report found that 4% had asked a stranger for assistance with cash machines.

Respondents did however feel that there were things banks and building societies could do to improve the use of cash machines such as agreeing on a universal layout for machines, consideration of where machines are located to avoid sunlight glare and the implementation of audio feedback.

The RNIB launched a campaign called 'Make Money Talk'²¹ in 2011 aimed at encouraging retail banks to make their ATMs 'talk', by installing headphone jacks so that blind and partially-sighted people can plug in the kind of headphones that come with mobile phones, enabling them to communicate with the machines verbally and aurally.

Today, the availability of talking ATMS varies hugely according to bank: at two High Street big-name banks, all, or almost all ATMS can talk, at others it is around 50%, and two High Street big names offer no talking ATMS at all. Some ATMs provided by Pay Point inside convenience stores also talk. RNIB researchers now estimate that one in four ATMS can talk. This patchy implementation restricts accessibility to ATMS for blind and partially-sighted people and restricts their financial choice.

In May 2017 sight loss charity Thomas Pocklington Trust (TPT) announced it had been working with the LINK ATM network on a fully accessible smartphone app which will enable visually impaired people to locate ATMs more easily.

The app allows users to set up filters to find ATMs with audio assistance that are wheelchair accessible, dispense £5 notes, allow mobile phone credit top-ups, enable PIN management and are free to use. It also enables people to find ATMs close to their location and perform Postcode-based searches in order to find ATMs at another location.

ITALY

We could find no figures for the number of 'talking' ATMs in Italy, but a major bank BNL, has announced that it has equipped 2,000 ATMs at more than 1,000 locations with a voice feature for blind and visually-impaired customers.

The ABI told us in an email that the ATM system operator BANCOMAT has developed the app "BMap", which can detect an ATM nearby, giving information on offered services such as withdrawals, payments, disabled access, or a withdrawal system accessible to blind and sight-impaired people.

²¹ RNIB (2011), 'Make Money Talk Campaign'. Available at <https://www.rnib.org.uk/sites/default/files/Make%20money%20talk%20Campaign%20report.pdf> [Accessed 12th Sept 2018]

Meanwhile major Italian bank Intesa Sanpaolo announced that by the end of 2017 it had equipped over 6,700 of its total of 7,737 ATMs with standard headset jacks, enabling visually-impaired customers to withdraw cash, view their account balances and top up mobile 'phone, aided by voice-guided navigation. **All its ATMs had been fitted with a high-visibility display format** (yellow font on a black background), activated, as in the case of the headset jack for visually impaired customers, by pressing the "5" key (which has a raised mark) before inserting a card.

The ABI, which issued a report regarding its work on accessibility in July 2018, told us in an email: "There are many applications of banks designed to facilitate the operations of blind people that connect to different devices including ATMs. Some banks are working to offer customers the possibility, using their own smartphone or tablet, to remotely start setting up transactions in such a way that, once at the branch office desk, the operator can terminate [assume: conclude] it quickly, recovering data from the web."

Davanzo of the Assistive Technology and Devices Work Group of the Unione Italiana dei Ciechi e degli Ipovedenti (UICI), the Italian Union of the Blind and Partially Sighted, says: "There are quite a lot of talking ATMS in which you insert a headphone, press a button (usually button five) on the keypad and the process is accessible through spoken messages."

Some progress has slowly been made in increasing the numbers in recent years, but he estimates that less than 40% of Italy's ATMS can 'talk' at present. Moreover, he adds: "It happens quite often that talking ATMs stop working for various reasons - common problems include the volume being too low, software not updated, or headphone jacks have defects and audio is distorted."

He reports great concern, especially for the future, about the appearance of ATMs which are completely touch-screen, and without a keyboard. "These are completely inaccessible and unusable," he says.

Davanzo also reports a developing trend of the possibility of carrying out ATM operations on the user's smart phone. The user initiates the operation on their phone, entering the amount of money he or she wants to withdraw, then approaches the ATM, aims the phone at the QR code that appears on the ATM screen, and the

operation is performed without any other action on the ATM being required.

Davanzo says: "These are somewhat usable, but require some practice, and there may be problems, especially with finding the QR code."

ESTONIA

The overwhelming majority of ATMs in Estonia are not equipped with technology that allows them to 'speak'. There are 746 ATMs in Estonia, but Jakob Rosin of the Estonian Federation of the Blind says: "Official figures say only about three of them can speak." Most blind and partially-sighted people learn the layout of the buttons by heart, he says, but if the ATM is swapped for another model, this means they have to relearn. In some cases, users unable to see the buttons ask other people – who they may not know – for help in choosing which buttons to push, with obvious security risks if this involves inputting a PIN.

This is particularly concerning in Estonia. While it has low levels of card fraud compared to most EU countries, Estonia has the highest level of card fraud committed via ATMs, which made up 43% of total card fraud in the country in 2013, according to The European Central Bank Fourth Report on Card Fraud published in 2015.

Customers unable to see ATMs clearly can go into bank branches (when open) to get help from staff, but Jakob Rosin says: "Bank staff will help but they often do not have any training to do so." Rosin says: "There is some technology available to blind and partially-sighted people in Estonia that can help with accessing technology such as ATMs. For instance, the Aira app for mobile phones connects the user via a video call to a sighted agent who can help them operate an ATM. But overall, the issue of access to ATMs for the blind and partially-sighted has not been fully addressed." A small number of ATMs have braille labelling on tactile buttons, but this is only useful for non-touch screen ATMs in addition the use of braille is very limited among young and older persons. Yet according to WHO, "81% of people who are blind or have moderate to severe visual impairments are aged 50 years and above. With an increasing population of older people, more people will be at risk of vision impairment due to chronic eye diseases"²².

²² World Health Organisation, Blindness and Visual Impairment, available at <http://www.who.int/news-room/fact-sheets/detail/blindness-and-visual-impairment> [Accessed 10th September 2018]

4.2.2 ATMs: People with hearing loss

UNITED KINGDOM

The Deaf Association points out that the problems faced by people with hearing loss in understanding complex instructions apply to ATMs as well as electronic payment terminals and ticketing machines equipped with electronic payment technology. It adds that some ATMs have noise/voice assistance which is inaccessible to Deaf people.

Access to ATMS has not been researched by Action on Hearing Loss, but in the conclusions to its 2011 survey on access to banking and utilities, it recommends that, among other things, "All written information needs to be in plain English." That would doubtless include written information displayed on the screens of ATMs.

ITALY

One in eight of the Italian population has a hearing impairment²³ (with 75% of them not using a hearing aid) and approximately 70,000 are profoundly deaf.

Bank BNL the Italian subsidiary of bank BNP Paribas, announced in 2016 that it was developing a mobile app enabling deaf and hearing-impaired customers to access services via voice recognition and speech synthesis technologies. Customers can perform essential operations with complete autonomy, including disputing charges or transferring money.

Customers use also their smartphone to send a text request to a dedicated message service. After the telephone support representative listens to the message through speech synthesis, their answer is transcribed to text to be read by the hearing-impaired customer. This is however not a solution for those who do not own or use a smartphone.

BNL said it is the first Italian bank to use this innovation to offer three basic banking services to its deaf and hearing-impaired customers: obtaining information about their credit and debit cards, obtaining details from their bank statement, and talking with a live representative over an adapted phone service. It does not therefore offer an alternative to an ATM in terms of obtaining cash, or POS terminals to allow payment in

²³ Hear-it, available at <https://www.hear-it.org/> [Accessed 7th October 2018]

shops restaurants, etc - but it could be used as an alternative to telephone banking or internet banking.

ESTONIA

According to the board of EKNO (see above) some ATMs include Braille letters, though none offer information in sign language, which they consider desirable.

4.2.3 ATMs: People with cognitive impairments, learning disability, dementia and associated issues

UNITED KINGDOM

DOSH (see above) points out that people with memory issues may well avoid ATMs because of uncertainty about remembering PINs. All UK banks offer chip and signature cards, enabling the cardholder to use their signature, rather than a PIN, to approve the transaction - but a chip and sign card cannot be used at an ATM and may be of limited use outside of bank or shop opening hours because it requires an interaction with another human. The same applies to people with dyslexia or learning difficulties who may have problems remembering the sequence of numbers in a PIN.

4.2.4 ATMs: People with cognitive impairments, learning disabilities, dementia and associated issues

ITALY

We received no information about the accessibility of ATMs for people with cognitive impairments, learning disability or dementia and associated issues in Italy (despite asking several organisations), but this comment made on a study day about accessibility hosted by Italian deaf association ENS may be pertinent. Dr. Valeria Carusa, University of Naples "L'Orientale", said: "In Italy there are no adult learning programs, this contributes to the serious problems of functional illiteracy... this lack also weighs more heavily on deaf people."

ESTONIA

Here we also have little or no information - but it seems clear that in Estonia, helping vulnerable people of all kinds to access banking technology is the norm. As regards use by older people, a professional carer in Estonia told our Estonian translator: "Usually nowadays, even older people are extremely tech-savvy and can easily use all

the technology available to them, though of course there have been cases where older persons have been taken advantage of by their family or carers."

4.3 Personal mobile or fixed machines/internet banking

Note: The EU Directive on the accessibility of public sector websites and mobile applications, which means public sector websites and apps must be made more accessible (except in cases where to do this would be disproportionate) entered into force on 22 December 2016. Member States have until 23 September 2018 to transpose the text into their national legislation.

4.3.1 Personal mobile or internet banking: People who are blind and partially-sighted

UNITED KINGDOM

The 2011 RNIB report, *Barriers to Financial Inclusion: Factors affecting the independent use of banking services for blind and partially sighted people*, states: "Websites that are inaccessible to screen readers, and personal security codes sent to customers in printed formats and which were unable to be read were just some of the barriers to customers wanting to use internet banking."²⁴

It found that only 10% of the blind and partially-sighted respondents surveyed used internet banking. When internet banking could be accessed however, 55% of blind and partially-sighted people who used it felt it at least fairly easy to use compared to 30% who felt it fairly or very difficult. Age was not found to be a significant factor in relation to how easy or difficult people found it.

Many blind and partially-sighted people who access the internet use a screen reader, software with a synthesised voice that reads aloud what's on the screen, but pages must be designed to facilitate this. The RNIB says that it gets many complaints about internet banking, usually that the sites don't work well with screen readers. Many websites are not easy for this software to read. Moreover, websites that were initially

²⁴ RNIB, *Barriers to financial inclusion: Factors affecting the independent use of banking services for blind and partially sighted people*, available at https://www.rnib.org.uk/sites/default/files/barriers_brief_1.doc [Accessed 21st June 2018]

designed to be easily read by screen readers, sometimes become less so after redesigns or updates.

Two UK banks were taken to task in the media recently after website changes made their internet banking services harder to access for blind and partially-sighted users. One user was locked out of his bank account by unannounced changes in the way passwords had to be entered. The site replaced one box to type in a full password, with three separate boxes, each requiring a single character from the password.

The customer said: "I was typing my whole password in the first box and then going to the login button and it was rejecting it because it was invalid data."

Another bank upgraded its website, adding elaborate headings, special offers and banner advertisements - what one user described as "an all-singing, all-dancing website." He added: "From the point of view of someone who can't see, it's an appalling job."

ITALY

The ABI states that 'Speech tokens or reading tokens are security tools aimed at generating the OTP code, usable by persons with visual disabilities (e.g. by reading the aforementioned code that appears on the screen). They are used to operate on remote channels (e.g. internet banking). A one-time password or pin (OTP) is a password that is valid for only one login session or transaction, on a computer system or other digital device.

Tokens generate the code and in addition to reproducing it visually on the screen, dictate it number by number to the blind or visually impaired. In this way the person can enter it by doing the operations online, without the help of third parties. Therefore, they favour the autonomy and safety of people with visual impairment.

The bank Intesa Sanpaolo has stated that it has developed a new website and the mobile app with a view to ensuring full accessibility.

The ABI also said that: "Some banks are working to offer customers the possibility, using their own smartphone or tablet, to remotely start setting up transactions in such a way that, once at the branch office desk, the operator can terminate [conclude] it quickly, recovering data from the web.

The two channels were subject to testing by a specialised organisation (Fondazione

ASPHI Onlus) and the bank monitors the accessibility situation in collaboration with a group of visually-impaired employees.

UICI recently conducted a user survey on this and found the accessibility of banking websites to be quite diverse. Some major banks have quite accessible sites, on which all or most operations can be made quite effectively with screen readers.

Some other banks, especially smaller ones, have websites that are not very accessible, and where some or most operations cannot be carried out by blind people independently. Davanzo says: "Icrea Group, for example, has a main site which is quite inaccessible in most aspects, while they have also a "simplified", mobile site, which is accessible but doesn't permit many common operations (which are permitted on the main site)."

Most Italian banks use some form of two-factor authentication in order for users to carry out operations on their websites or apps. Most of the banks have 'talking tokens' available, in which the code that the user has to enter on the site to confirm the transaction is pronounced aloud by the device. Headphones can be used in conjunction with most of these talking tokens.

Davanzo says: "These tokens are usable but require some getting used to. They are not so easy to use for older blind people or by people who may not be very proficient with their screen reader - these account for a significant segment of blind and visually-impaired people.

"Moreover, sites often allow a limited time in which the user must enter the code generated by the token, which is a problem for those who require a longer time, and often, there is a limited number of attempts one can make, so the possibility of making errors is high."

These tokens are now commonly being replaced by software apps, that the user installs on their smart phone, or the user receives an SMS with the code to enter on the web page or the bank's mobile app. "In general, these are accessible, but the problem of the limited time available and the possibility of making errors is still present," says Davanzo.

With mobile apps, UICI's research found the situation reported on internet banking sites was similar: major banks often had accessible and usable mobile apps, but others, especially smaller banks, had less accessible apps in respect of some of their functions. Some banks are willing to cooperate with UICI to resolve these problems.

As for blind and visually-impaired people with hearing impairments, UICI reports that they have a lot more difficulties using screen readers, being forced to use braille displays only. Davanzo says: "For this reason very few visually- and hearing-impaired people use electronic-based banking systems independently and cannot use talking token devices and talking ATMS."

ESTONIA

Here Estonia is making progress, says Jakob Rosin of the Estonian Federation of the Blind. The federation is in contact with the banks about the accessibility of internet banking websites – though Rosin reports that the federation has to deal with banks individually as there is no group within the Estonian association of bankers dedicated to addressing the issue.

The federation was approached by Swedbank, one of Estonia's main retail banks, for help in assessing the accessibility of its new website. "We are working with them to identify problems, which resulted in a new design but there are still issues that need addressing, which they have promised to look at," says Rosin.

As regards mobile internet banking, Rosin says that many banks are testing apps now. The federation worked with LHV Bank on its accessible mobile banking app, which uses a screen reader on the user's smartphone, and allows users to make transactions and payments and check balances.

However, he says: "While Swedbank's app is quite accessible, many mobile banking apps are not very accessible, even to blind users with screen readers. "Many of my blind friends cannot access digital financial services and are effectively discriminated against by the banks. People in Estonia do not often complain enough to the banks about it. Overall, however, things are getting better as the banks are gaining knowledge about accessibility of websites in particular."

4.3.2 Personal mobile or internet banking: People with hearing loss.

UNITED KINGDOM

Action on Hearing Loss says: "Using email or the bank's website are among popular ways that users contact their banks." However, people with hearing impairment are less likely to be internet users. Action on Hearing Loss cites research by Ofcom (2013) which found 83% of non-disabled people have internet access compared with 64% of people with hearing impairment. People with hearing impairment are also less likely to own a smartphone - 28% compared with 48% of non-disabled people.

Action on Hearing Loss asked members who didn't use the internet to identify with one of two statements about internet use. Approximately two-thirds of respondents who don't use the internet (65%) said that they aren't interested in the internet, yet roughly one-third (35%) said that they would like to know more about it.

The charity adds: "Online services (such as internet banking) can certainly be useful for people with hearing loss - but they won't necessarily be the solution for everyone, which is why we'd always advocate for there to be a range of ways that people can use or contact a service. That way people have choice over using a method that is best suited to them." It recommends: "All video content, including that on websites, must be subtitled and key information translated into BSL."

ITALY

We did not get any response from the Italian deaf association but this comment from its website is pertinent: Dr. Valeria Carusa, University of Naples "L'Orientale", with the report Projects and best practices for the inclusion of deaf citizens: "In Italy there are no adult learning programs, this contributes to the serious problems of functional illiteracy and return, and this lack also weighs more heavily on deaf people. "

The ABI's comment that: "Some banks are working to offer customers the possibility, using their own smartphone or tablet, of remotely setting up a transaction in such a way that, once at the branch office desk, the operator can terminate [conclude] it quickly, recovering data from the web." This could possibly be of use to deaf and hearing-impaired people.

ESTONIA

The board of EKNO, the Estonian association for deaf youth, commented that many deaf people in Estonia were comfortable using internet banking, and they get

transactions done fast. "However, there are also many people who either aren't used to online banking and/or who haven't received sufficient schooling/education in it," it added.

The board suggested that the banks hire deaf people who know Estonian sign language to make instructional videos about how to use both online banking and ATMs.

4.3.3 Personal mobile or internet banking: People with cognitive impairments, learning disabilities, dementia and associated issues.

UNITED KINGDOM

DOSH says that its experience is that few people with learning disabilities use internet banking, or mobile banking – though some do. "More would do so if there were more apps that made money more easily understandable and easier to manage," says Beckford.

As it is there can be issues with making internet payments, in particular with ensuring that the correct item and correct number of items had been bought and that insurance or other 'add-ons' had not been purchased by mistake. .

The charity MENCAP, a UK charity that supports people with learning disabilities, reports: "Access to banking is important for people with a learning disability, because many people need a bank account in order to get their benefits, spend their money, and manage direct payments. However, research by DOSH in 2014 showed that people with a learning disability may face a number of difficulties in accessing banks and building societies. These include banks not giving people the right support to access their money – such as offering them a card requiring a signature instead of a PIN number."

The Good Things Foundation, which runs internet training courses for vulnerable people of all kinds, says that its experience with learners showed that the main problem associated with internet banking was finding out how to go about it.

Rather than simply 'teaching' learners how to use internet banking for its own sake, the foundation's course facilitators ask the learners what they want to do, then, if it would involve internet banking, support learners to use it.

Learners were nervous about using it for the first time, not only during the transaction but afterwards.

Other learners were already happily using internet banking, often to track loans and repayments that they had negotiated within their own families, while other learners had registered for internet banking but were not using it. The overall message from the Good Things Foundation was that digital skills and financial skills were often perceived to be two different skillsets, but today they overlap, and help or support for vulnerable people of all kinds needs to acknowledge this.

ITALY

A report from Alzheimer Europe, published in 2009, indicates that in Italy, support for people with Alzheimer Disease is almost totally the responsibility of the family. Where there is support it is largely private (e.g., private care services), though they are relatively little used, and the limited state support is provided on a regional basis and patchy²⁵

ESTONIA

We have no specific information on this, though comments from professional carers seem to indicate that they feel nearly everyone in Estonia is able to access internet banking. This is likely to be an erroneous impression.

While it is a huge mistake to equate age with disability, it is likely that dementia, for instance, affects a larger proportion of the older members of Estonia's population than of the population as a whole, so the following figures may be worth considering. Estonia's statistics agency states that while 97% of 16–54 year-olds used the internet in the last three months to Sept 2017, the same indicator among 65–74 year-olds was 68%. The share of internet users among 65–74 year-olds increased two percentage points in a year, reaching 53%. Nevertheless, the digital divide between the youngest (16–24 year-olds) and the oldest (65–74 year-olds) age group was 46 percentage

²⁵ Alzheimer Europe, Italy, Organisation and financing of social support to people with dementia and carers, 2007, available at <https://www.alzheimer-europe.org/Policy-in-Practice2/Country-comparisons/2007-Social-support-systems/Italy> [Accessed 21st September 2018]

points. With the increased life expectancy²⁶ in Estonia over the last decade it can be assumed that some people over the age of 75 will also using the internet.

4.4 Third party use issues

Third party use, in this context, is a technical-sounding term for a familiar practice. Grandma, who is aged and less able, asks her granddaughter to get her some shopping. She hands her granddaughter her bank cash card and tells her the PIN. The granddaughter duly goes to the nearest ATM, withdraws money from her grandmother's bank account and uses it to pay for the shopping. A familiar scene - but fraught with potential risk.

Grandma trusts her granddaughter - but grandma has no way of knowing (until she checks her bank account) how much her granddaughter has withdrawn. There have been numerous court cases in the UK - and most likely in Italy and Estonia - where people trusted with bank cards and PINs have used them to steal money from the cardholder.

In the UK, Italy and Estonia banks issue cards to customers alongside a set of terms and conditions for their use. In each case, one of the terms is that the cardholder should not divulge their PIN to anyone else. That means third party use violates the terms and conditions of the agreement. If it can be proven that this took place, the bank is within its legal rights not to reimburse the cardholder for any loss.

The most common form of card fraud in both the UK and Italy is cardholder not present (CNP) fraud, where card PINs are not required - for instance in paying for purchases over the telephone. Here rules about the use of PINs are irrelevant. But in Estonia, where the overall level of card fraud is lower than in the other two countries, the most common form of card fraud involves the use of ATMS. This may be because people in Estonia are reportedly eager to help vulnerable people with access to technology. One person from a dementia care charity told us, when asked about third party use: "The

²⁶ Tiit, E. (2016). Changes of life expectancy in Estonia during the last 70 years. *Papers on Anthropology*, 25(1), p.55.

field/matter at hand has not been researched in Estonia and as a rule, caretakers help people with dementia with such doings."

Third party use is doubtless an issue for banks in all three countries. In the UK, those who want someone else to operate an account on their behalf have several choices:

- A power of attorney (financial), under which the holder has full power to operate the account (including making cash withdrawals and making payments, etc.) on behalf of the account holder;
- A third-party mandate which gives someone else (a carer or family member, for instance) access to your account. The mandate gives details of exactly what authority you are giving the other person, so the account holder can specify the level of access they are given. They will not usually be given a card and PIN so will not have access to cash machines.
- Setting up a joint account with someone else, such as a carer or family member, which will give both full access to the account.

Some charities advocating for people needing care have called for the banks to introduce 'carer cards' that allow carers to access the bank accounts of the people whom they care for, but so far none of the banks have done so, almost certainly because of problems regarding the terms and conditions attached to cash cards.

5. Research

5.1 Research Method

The research for this project was carried out in two ways; by theoretical research and by direct contact with end-users and experts in the field of financial accessibility.

The majority of the research involved direct contact with end-users to discover their perspective on the introduction and day-to-day use of digital financial systems.

Cultural factors may have affected the research methods, as the ease of which comments from organisations could be obtained varied widely among the three countries featured in this report.

In the UK, data is easily obtained online - many charities have researched the use of digital financial services and happily share the information. Comments from individuals are easily obtained - and many are quite vociferous about better access to digitized financial services. This may reflect the increasing visibility of people with disabilities, particularly as charities fight for increased funding.

In Estonia, organisations were also reasonably open to talking about the subject, in English or in Estonian (via translators), and provided comments from individuals about their experience, though we also approached individuals to seek comments. The comments above tend to show there was a tendency to provide comments on behalf of disabled or vulnerable people, and there appears to be a far more communal and family-based approach to offering help in accessing digitized financial services. Helping your family and friends to access ATMs or internet banking is considered normal - despite the fact that in Estonia, as in the UK and Italy, divulging PINs or passwords to others means violating account terms and conditions. Against this background of trust, it is worth noting that Estonia is a European leader in ATM fraud: see figures above for fraudulent card transactions by type.

In Italy, organisations were often slow to respond to email requests (in English and Italian) or never replied at all. Does this reflect a general culture of reluctance among all Italian organisations to share information? This was a view shared by one of our Italian translators. Since no organisations provided access to, or comments from,

individual users of the technology, we reverted to asking for comments direct from individuals, using personal approaches and networking. Even so, getting comments proved challenging. Could it be that disability and vulnerability are more 'hidden' in this society?

5.2 Choice of Countries for Research

This report focuses on the accessibility and usability of three types of digital financial devices in three EU countries with different backgrounds and levels of digitalization of financial services: the UK, Estonia and Italy.

The commitment by countries around the world has seen an unprecedented digital transformation programme that has resulted in more people connected to the internet, enabling them to access products and financial services. As more and more people are comfortable in sharing of information on social media, acquiring information, accessing both public and private services online, digital transformation programmes sit comfortably with consumers of these services and information.

As well as the structural and the financial investment these countries have demonstrated, financial institutions have also committed to schemes to enable inclusion of people in the digital transformation programmes. The table below details programmes installed by various institutions to provide consumers with digital skills in a wide range of activities extending beyond accessing financial services.

Institution	Scheme	URL	Country
Barclays	Digital Eagles	https://www.barclays.co.uk/digital-confidence/eagles/	UK
Barclays	Digital Wings	https://www.barclays.co.uk/digital-confidence/digital-wings/	UK
Consortia	Digital Champions	http://digichamps.co.uk	UK
Lloyds	Digital Champions Programme	https://www.goodthingsfoundation.org/news-and-blogs/case-studies/lloyds-digital-champion-programme	UK
No programmes were found for Estonia and Italy that were championed by Financial Institutions though there are some schemes to improve digital literacy generally and for employability.			

<p>Look@World Foundation No comparative schemes were found in Italy.</p>	<p>NutiKaitse</p>	<p>http://vaatamaailma.ee/projects/nutikaits-e-2017</p>	<p>Estonia</p>
<p><i>Some interesting statistics are listed on the Estonian sites http://vaatamaailma.ee/projects/look-at-world-training-program</i></p> <p><i>basic computer training for 102,697 people (10% of the adult population of Estonia)</i></p> <p><i>11,693 courses organised (approximately 35 courses per day)</i></p> <p><i>an 8-hour basic computer and internet training course for beginners free of charge</i></p> <p><i>17 training classes that hosted 34 full time educators created</i></p> <p><i>280 part-time educators who worked in 245 training classes were engaged</i></p> <p><i>the average rate given to the training by the participants on a 5-point scale was 4.8</i></p> <p><i>more than 70% of the participants started using the internet</i></p> <p><i>A special training provided to the 422 employees of the open access internet points</i></p>			

Table2: Financial Institution Inclusion Schemes

5.2.1 United Kingdom

In the UK, the government has committed to provided superfast broadband for 95% of UK premises by 2017, with speeds of up to 30 Mbps by 2020 in line with the EU Digital Agenda for Europe.

5.2.2 Estonia

Estonia describes itself as the e-state. For a small state with a population of just over 1 million people, Estonia is at the forefront when it comes to the adoption of digital financial services.

People in Estonia are happier than most to embrace cashless shopping: in 2016 cash was used for only 48% of payments at points of sale, against a Euro-area average of 79%. The only EU country where cash was used less in this context was the Netherlands. Cards were used in 66.3% of transactions in Estonia in 2016 and card payments overtook cash withdrawals in 2011.

In 2014 Estonia also became the first country to offer e-Residency²⁷, a government-issued digital ID that offers entrepreneurs from around the world the chance to easily start and run a global business in an EU environment.

The Estonian state and its citizens clearly appreciate the benefits that digital financial technology can bring - but in this race into the e-future, are vulnerable groups being left behind?

In Estonia where the digital transformation provision has been transforming, the Institute of Baltics Studies reports language barriers faced by non-Estonians in understanding information provided in Estonian only, and this inevitably creates barriers for third-country visitors and tourists. Furthermore, it was found that the quality and availability of multilingual resources vary in terms of quality and availability outside of the main cities Tallinn and Tartu. However, this is not the case in terms of infrastructural internet investment by the Estonian government. In Estonia, e-government services (e-voting, instant access to electronic patient's records, registration of business, e-ID cards) have meant these services are regularly accessed by younger citizens.

5.2.3 Italy

The Italian government has also committed to a programme of digital transformation which commenced in 2017 with the rollout of a three-year plan that will make a range of public services accessible to the public. Compared to the UK and Estonia, in Italy internet usage is lower: less than 20% of people had ordered online in the past 3-month period, and figures were similar for interacting and obtaining information from public authorities online. This provides one justification for selecting Italy as a case study for this research.

The Italian Bankers Association (ABI) has stated that it is following the EU directive of the European Accessibility Act (2015) at national and EU level. The ABI, which prepared a report on its work on financial services availability in July 2018 (not made available to us), nevertheless told us in an email that banks were working on documents "prepared in a format usable through assistance devices such as ...the

²⁷ Republic of Estonia. 'The New Digital Nation'. Available from <https://e-resident.gov.ee/> [Accessed 12th September 2018]

screen reader that transmits the contents of the screen to a further device that can be a speech synthesizer, which reads the text, or a Braille output device."

5.3 Regulation and Legislation

In the UK the Equality Act (2010) applies to any financial business that provides services to members of the public. The Equality and Human Rights Commission provides advice to banks and other financial services providers on how to interpret the law, including how to deal with people with characteristics which are protected under the legislation including disability, sex, gender reassignment, or pregnancy and maternity. The law does not yet require service providers not to discriminate against people because of their age or the age group to which they belong.

In Italy the Stanca Law (Law 9 January 2004, n. 4 "Provisions to support the access of disabled people to IT tools") applies to web accessibility but only applies to public sector and government websites. In addition, research carried out on the operation of the law has shown that it is not effective. When asked about web accessibility one of the authors of this paper stated: "The general trend of Italian websites and apps developers (not specifically of financial services) is to not put a lot of effort on the development of accessible solutions". This research has not found that other legislation or regulation is effective in this area.

In Estonia the Equal Treatment Act lists eight criteria for the purposes of unlawful discrimination. These are: nationality (ethnic origin), race, colour, religion or other beliefs, age, disability, sexual orientation and gender. This act refers to the provision of access to and supply of goods and services which are available to the public but does not specifically mention financial services. Meelis Joost, of the Estonian Chamber of Disabled People (Epikoda), which brings together 46 organisations including those representing the deaf, hard of hearing, blind and partially-sighted and people with cognitive impairments, says: "At Epikoda we have not looked specifically at accessibility, and we have done no studies on this. However, we had a conference last year about the European Accessibility Act and we are trying to get the banks more closely involved with financial accessibility issues."

On internet banking in particular, he feels the Estonian banks are making progress.

Technology such as screen readers, is available in some instances to vulnerable people, partially funded by local authorities, though part of the investment must come from users, and this may not extend to computers and mobile devices.

The planned European Accessibility Act covers the products and services that have been identified as having the highest risk of being concerned with diverging accessibility requirements across the EU countries. The items listed include the following key elements of digital financial services:

- Computers and operating systems
- ATMs, ticketing and check-in machines
- Smartphones
- Banking services
- E-commerce

6. Future Developments and Examples of Alternative Best Practise

6.1 Current state

The advancement of technology has seen many changes in recent years particularly since the availability and accessibility to smart devices (smartphones). This has led to an increase in people using technologies in a more remote manner suiting current lifestyles. This has been made possible through investment in infrastructure in all three countries. This acceptance of access to financial services outside of traditional working hours has seen more and more services become available through such devices. This has led many institutions to assess methods of increasing efficiency by reducing less-used services (face to face services, and walk-in services). The issue here is that persons on the periphery are marginalised and excluded from services which they could access when human assistance was available.

Whilst legislation in all three countries has formally declared that such persons cannot be excluded or discriminated against, the reality is different in all three countries. Whereas in the UK, groups exist to champion the cause for these groups, this is less evident in Italy where even websites are not in the main designed with accessibility in mind. Even in Estonia where digitisation of services is a top priority, little information can be found on accessibility for these groups or how they are catered for. Particularly of concern is how all three countries deal with an aging population where more accessibility issues will arise through natural lifespan ailments that arise later on in life. However, it should be noted that cultural support for vulnerable persons should not be discounted which in Estonia is strong in lieu of other assistance, but this approach raises security and privacy issues around third-party use.

6.1.1 Technology vendors of mobile devices

The largest market share of mobile devices is held by Samsung (Android) and Apple (IOS). Whereas, Samsung utilises the Android platform and Apple use the IOS platform, both providers take security of devices seriously. Over the last few years security of devices has begun to move from password, PINs, and patterns to user oriented biometric measures (fingerprint recognition and face recognition). Whilst this

functionality makes the device more secure and less prone to unwanted use, it can limit access to these devices particularly when:

- Longer PIN numbers are required to be entered when a device is restarted or locked out, hence these need to be remembered by the user, but those with cognitive difficulties may struggle
- Pattern recognition relies on users to draw a pattern to enter the device, so those with physical abilities requiring dexterity may also struggle
- Facial recognition and fingerprint recognition provide some remedy for the above issues, however, this can be open to abuse by untrustworthy parties that could utilise this to access the device and its applications / data.

6.1.2 Application developers

Financial institutions that provide access to their services via web pages and mobile applications that meet W3C accessibility standards can enable access to digital financial services for many end-users. This is often not done. Developers of applications that enable access to alternate financial systems (crypto-currencies) may not consider such criteria or beware of legislation when developing such applications. Therefore, this disjointed approach by all stakeholders that only fulfil their requirements to let most users access their applications, excludes vulnerable persons. While a more domain-centric approach that involves all stakeholders may improve the experience, it is unlikely it could cover the range of issues identified earlier. A simpler remedy may be involving technology vendors, who could force application developers to consider vulnerability issues before such applications are included on their platforms (such as Google Store and Apple Store) which may be able to resolve some issues. Alternatively, those that develop for financial services must align themselves with the recommendations of the Finance Foundation²⁸.

6.1.3 Payment Cards

²⁸ Finance foundation, 2016, When I'm 84, Locking the Door on the older old: the challenge Facing Britain's Banks, available at <https://www.thefinancefoundation.org.uk/images/the-finance-foundation-when-im-84.pdf> [Accessed 14th September 2018]

Payment cards are a dominant method of withdrawing money from ATMs and as a payment mechanism. However, it is also associated with significant fraud (such as card not present, online transactions, or abuse by third parties). Whilst, in cases where fraud can be proved through investigations, the customer is refunded for loss when using financial institution-issued payment cards, this is not the case for prepaid cards or stored value cards nor in the case of third-party use. Furthermore, cards that enable crypto-currency transactions are further complicated by anonymity functionality built within protocols and therefore recompense is not achievable as there is no intermediary to go to.

6.2 Future Technical Developments

The rapid development of technology has led to new services that enable institutions to provide their services to their users at their demand, which would not be possible to facilitate using traditional financial services with face-to-face contact. For those users that have no difficulties (physical or cognitive) these technological advances are welcomed as they enable users to seamlessly interact with financial services at demand.

Even in economies where citizens have limited access to financial institutions or technology due to cost, poverty, lack of infrastructure, lack of validated identity documents, or informal abodes, other methods are used to interact and contribute to economies. One such method that provides banking and financial services to these groups of people is the Hawala system that predates “Western banking and traditional banking”²⁹. In Hawala systems banking services are carried out by brokers who extract a fee for transferring of funds in Africa, Asia and Middle Eastern regions. Although this system is not illegal in all countries, there is concern about it being used as a vehicle for laundering proceeds of crime and the lack of transparency makes it unsafe and untrustworthy for regulated institutions to have links with this system.

However, these systems require individuals to be capable, able and have cognitive independence to make decisions enabling them to use such financial systems. In this section the scope of utilising technologies for those that are presented with difficulties will be discussed.

²⁹ Patrick M Jost and Harjit Singh Sandhu, ‘The Hawala Alternative Remittance System and Its Role in Money Laundering’ [2003] Interpol2 1

In the UK, the percentage of adults with financial institution accounts went down from 98.9% to 96.4% in 2014, whereas in Italy and Estonia there was an increase of account holders with financial institutions³⁰. One reason for this decline may be the adoption of the use of alternate technologies for engaging in financial transactions, such as crypto-currencies. Bitcoin has continued to be successful since its inception in 2009³¹. Its popularity was initially catapulted in response to the last economic crisis^{32, 33}, altruistic principles³⁴ and for the “perceived anonymity” it can provide³⁵. By design there is no reliance on financial networks and intermediaries involved in traditional regulated institutions to process transactions. Transactions are made directly among participants via a peer-to-peer network. The blockchain is a public ledger held by all the participants of the network and contains a record of every transaction ever made, which makes it more transparent than the ledgers maintained by Hawala operators.

Innovation in the domain has seen this technology mature, as more business-oriented services have emerged and the newer blockchain models (private, hybrid) have evolved that are compatible with corporate requirements. This together with the increasing interest in fintech services, Initial Coin Offerings (ICO’s) and development of alternate currencies has moved this technology from the periphery into the mainstream.

³⁰ Figures from the Little Data Book of Financial Inclusion 2018 (data compiled 2017), World Bank, except where indicated. WSBI: World Savings and Retail Banking Institute

³¹ Arthur Gervais and others, ‘Is Bitcoin a Decentralized Currency?’ (2014) 12 IEEE Security and Privacy 54.

³² Stephanie Lo and J Christina Wang, ‘Bitcoin as Money?’ (2014) 14 Federal Reserve Bank of Boston 1 <<https://www.bostonfed.org/economic/current-policy-perspectives/2014/cpp1404.pdf>>.

³³ John Lanchester, ‘When Bitcoin Grows up.’ Available at <https://www.lrb.co.uk/v38/n08/john-lanchester/when-bitcoin-grows-up> [Accessed 10th September 2018]

³⁴ M Malte and B Rainer, ‘Join Me on a Market for Anonymity’ [2016] The Workshop on the Economics of Information Security 1, Available at <http://weis2016.econinfosec.org>, [Accessed 10th September 2018]

³⁵ Philip Koshy, Diana Koshy and Patrick McDaniel, ‘An Analysis of Anonymity in Bitcoin Using P2P Network Traffic’ (2014) 8437 Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics) 469.

Less technical solutions have included banks (Royal Bank of Scotland) providing services for remote communities through banking vans. Age UK Friendly Banking Report 2016 indicated whilst this service is useful it could be a better service if more than one bank utilised this service. Furthermore, both Royal Bank of Scotland and NatWest bank have provided more accessible cards which have identifiable markings (raised dots) that assist blind and partially blind sighted customers to differentiate between debit and savings cards together with larger font sizes for contact telephone numbers printed on the card. They also provide indication of using the cards the correct way up by cutting a portion of the cards to indicate which way to enter the card into an ATM.

In the future it may be possible to use crypto-currency and its underlying technology (blockchain) for financial inclusion for the unbanked and provide those with difficulties a method by which their transactions are verifiable and auditable by the blockchain preventing abuse by carers and others charged with care responsibilities. This idea has not yet been fully investigated by either financial services or by people with disabilities and older people or their representatives.

Despite the global interest in blockchain technologies and crypto-currencies only one project at ICO stage was found that specifically targeted the unbanked. The Humaniq ³⁶ project aims to bring banking services for the unbanked utilising mobile technology as a mechanism for biometric identification with no anonymity in the technology for the regions - Africa, Asia and South America - through the involvement of start-up businesses.

6.3 Future Regulatory and Compliance Measures

Robin Christopherson of UK charity AbilityNet, which helps older people and those with disabilities use computers and the internet to achieve their goals sums up the current state of implementation of regulation that is application to the three selected jurisdictions. He started by saying “We have the regulations that inform best practice – now we need to enforce them.” AbilityNet has been campaigning on this issue for

³⁶ Humaniq Whitepaper, available at <https://humaniq.com/pdf/humaniq-whitepaper-05.09.pdf>, [Accessed 10th September 2018]

three years and what he says echoes in all three of our target countries. Christopherson says: "We have had guidelines and even legal requirements on website accessibility for years, but in the UK at least 90% of websites still don't meet the standards. The advent of mobile technology has improved things because the tools are better, but what would help even more is enforcement of the standards we already have." He points to the existence of the Disability Discrimination Act of 1995, the 2010 Equality Act, and the BS 8878:2010 Web Accessibility Code of Practice released in the UK in 2010. He says: "We have laws and guidelines so if there is a transgression, there must be a consequence. Digital accessibility is a hugely important area but little has been done about enforcing the legal requirement to make digital technology usable for people with disabilities".

The EU Directive on the accessibility of the websites and mobile applications of public sector bodies came into force in December 2016, but Christopherson says: "Why does this apply only to the public sector?" As practical methods for enforcement, he cites the possibility of making a public sector body responsible for it, suggesting it could be like The Office of the Information Commissioner which oversees the operation of the Freedom of Information Act. Furthermore, the regulatory bodies for the financial services could also play their part in ensuring all customers are duly catered for. These regulatory bodies include the Financial Conduct Authority, Joint Money Laundering Steering Group, UK Finance that could impact the adoption of this in the private sector. Furthermore, Christopherson suggests using "software that tests for non-compliance that could be used to enforce it and if that failed, fines could be issued. It would raise plenty of money, but more importantly change the accessibility landscape, by compelling institutions to raise the bar to avoid penalty."

With the new General Data Protection Regulations now in effect it remains to be seen what impact this will have on the signing of terms and conditions by vulnerable people, privacy breaches caused by carers and the responsibility of institutions whose services are being used.

6.4 Future Training Requirements

Training requirements for all those that provide technology solutions, hardware (ATM, PoS) solutions and those utilising these services may require different levels of support and training. This may take many forms depending on the type of

stakeholder. Currently HSBC, Royal Bank of Scotland provide access to a British Sign Language Interpreter for their customers enabling customers to access and use the required services³⁷. To date no information could be gathered that could be summed as compulsory training for software developers. However, those in usability or UX Design professions could be involved in projects to ensure such customers are catered for.

6.5 Other Future Ideas

It is also possible that alternative practical methods could be introduced to meet the needs of vulnerable people such as the *Netherlands, National Forum on The Payment System suggestion for the home delivery of cash*³⁸.

³⁷ Independent living, Banks Improving Accessibility, available at <https://www.independentliving.co.uk/banks-improving-accessibility/> [Accessed 12th September 2018]

³⁸ De Nederlandsche Bank, Press release: Results from the NFPS meeting of 31 May 2017, available at <https://www.dnb.nl/en/news/news-and-archive/persberichten-2017/dnb359690.jsp> [Accessed 21st September 2018]

7. Recommendations for Best Practise

Throughout the report we have included recommendations about how improvements can be made for financial inclusion for all three countries. However, the main recommendation is that a change of thinking among financial institutions is required:

- Financial institutions must be pushed to see vulnerable groups as a valuable source of customers, that is, as a potential source of profit rather than an extra cost. Although financial institutions are focussed on profit and viability, they must be convinced that investment in accessibility, implemented carefully, can be a source of profit rather than loss. With an aging population globally, vulnerabilities due to physical and cognition are likely to increase. Therefore, financial institutions need to adjust their strategies in-line with this development.
- Without this change of thinking, many, perhaps most, financial services organisations will need to be coerced towards compliance with EU accessibility regulations. These rules will need to be rigorously enforced using financial penalties, but perhaps more effectively, by public 'naming and shaming' of institutions which fall short. Without this, regulation is most likely to be treated as little more than a box-ticking exercise rather than a necessary adjustment in business practices.

Appendix One, List of Participating Organisations

The researchers are grateful to the following organisations for providing Information and quotes for this project:

ESTONIA

Eesti Pank

Eesti Statistika

Eesti Kurtide Liit

Eesti Pimedate Liit Eesti Puuetega Inimeste Koda (Epikoda)

Eesti Sotsiaalministeerium EKNO

ERR News

Estonian Daily News

Ivi Normet, MTU Elu Dementsusega

Majandus- ja Kommunikatsiooniministeerium

SEB Pank

Swedbank

Triin Linamagi, Startups & Innovation, Head of Ecosystem at SBC Colab FinTech

ITALY

Associazione Bancaria Italiana (particularly Giustino Trincia)

Banca D'Italia

Bancomat

BNL

Ente Nazionale Sordi

Intesa Sanpaolo

Pierlauro Sciarelli

Unione Italiana dei Ciechi e degli Ipovedenti ETS-APS

UK:

AbilityNet

Age UK

Alzheimers UK

Action on Hearing Loss

British Deaf Association

Centre for Ageing Better

Dementia UK

DOSH
Financial Inclusion Commission
Good Things Foundation
HSBC
LINK
MENCAP
Nationwide
NatWest
RNIB
Scope
The Money Charity
Thomas Pocklington Trust
Toynbee Hall
UK Finance
Young

EUROPEAN AND WORLD ORGANISATIONS

European Central Bank
World Bank

Additional sources where information was sought³⁹

In addition to the above sources a number of other organisations were contacted who due to the timescales of this project and their own priorities could not provide information at this time. Information was received from older people and people with physical, cognitive and sensory impairments additional research would be required to identify the needs of those whose vulnerability is caused by their lack of statehood or citizenship, lack of permanent accommodation or lack of financial knowledge.

³⁹ **ESTONIA**, Eesti Statistika*, Eesti Tarbijakaitse Liit (consumers union)*, ERR News*, Estonian Daily News*

ITALY, Adusbef (consumer group)*, Altroconsumo (consumer group)*, Bancomat*, BNL*, Ente Nazionale Sordi*, Intesa Sanpaolo*, Associazione Italiana Dislessia*, Relazionale***, La Federazione *Alzheimer* Italia*

* No reply to email contacts.

** No reply to emails but information gleaned from organisation's website

*** Asked members for answers to questions but none replied by 25.10.2018

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