

Final Report

**Enhancing Website Accessibility:
Insights from Focus Groups with Visually
Impaired Users**

Team ‘Pending...’

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Introduction

ATMs offer an easy and convenient method for individuals to withdraw cash. Nevertheless, the utilisation of cash continues to decline as a result of technological progress and the growing prevalence of bank cards and digital banking. In order to tackle this tendency, banks and ATM companies are utilising diverse strategies to modify public perception through behavioural change techniques. The objective of these strategies is to highlight the ongoing significance and ease of using ATMs, while also encouraging the advantages of cash transactions compared to digital methods. They also aim to cultivate public trust and improve the perception of ATMs as a reliable and safe option for financial transactions through the implementation of targeted strategies, as well as attempting to influence preferences in favour of cash transactions in response to the increasing popularity of digital alternatives.

Background

Over the past few months, we've collaborated with Geldmaat, a leading ATM corporation in the Netherlands, that works at arm's length from the banks. With a widespread presence across the country, Geldmaat facilitates safe cash withdrawals and deposits, striving to ensure ATM accessibility for all users. However, according to Geldmaat, the use of cash in the Netherlands has steadily declined over the years, primarily attributed to the rapid evolution of digital payment technologies and the widespread adoption of bank cards. As a result, only around 20% of all point-of-sale (POS) payments in the Netherlands in 2020 were made in cash (NFPS-2021). One of the main contributing reasons for people not using cash is also associated with the global Coronavirus Pandemic, during and after which people were used to using cashless transactions in everything. As part of our collaboration, Geldmaat has requested us to conduct focus groups to gain a deeper understanding of the factors that are contributing to this trend and to formulate strategies to promote the ongoing utilisation of cash. At first, Geldmaat theorised that elderly people were choosing not to use cash and instead preferring alternative payment methods. Nevertheless, initial discoveries from our focus groups uncovered a contradictory narrative: individuals with visual impairments encounter some obstacles when it comes to accessing cash, a matter that had not been previously taken into account. This discovery has switched our research work towards comprehending and resolving the obstacles encountered by visually impaired users in order to guarantee a more inclusive means of accessing cash. The intricate methodology and findings pertaining to this transition will be examined in the subsequent sections. The objective of our project and this final report is to utilise our observations to assist Geldmaat in developing strategies that encourage the utilisation of cash while ensuring that ATM services are easily accessible and user-friendly for individuals of all age groups, including those with visual impairments.

Literature review

As evidenced by recent studies, the declining trend in cash usage within the Netherlands has raised significant concerns among financial institutions and ATM service providers alike. With projections indicating a further decrease in cash payments over the next five years, comprising 28% of Dutch citizens expecting reduced cash usage and 31% foreseeing a complete cessation, the landscape of financial transactions is rapidly evolving. The main reasons cited were that electronic payments are becoming easier (64%) and the expectation that more and more retailers will refuse to accept cash (15%) (DNB, 2023). However, cash remains important in the functioning of the eurozone economy. For example, cash payments are extremely inclusive of people with low digital skills. The DNB emphasises that cash must remain accessible, available, and affordable. As Olaf Sleijpen said, “In ten years, we will live in a less-cash society, not a cash-less one ” (DNB, 2021).

Furthermore, 12% already rarely pay cash, and a small group (6%) expresses concern about how difficult it is to find ATMs (DNB, 2023). In contrast, consumers from vulnerable groups such as older people, people with disabilities, and people with low digital skills experience a marked decline in the accessibility and availability of payment services, which appears to be linked to banks increasingly digitising their services and closing branches (DNB, 2024).

In addition to the difficulties encountered in using ATMs, disadvantaged groups with disabilities or a lack of digital skills have similar difficulties in accessing information on how to use Geldmaat services via the Internet. Take the visually impaired as an example, many visually impaired users have to use multiple assistive technologies like screen readers, screen magnifiers, and contrast tools to be able to access the information they are looking for (Hewitt & He, 2021), and the current Geldmaat website does not consider and prioritise the

needs of visually impaired users when developing sites. This further makes it more difficult for vulnerable groups to access GeldmaatATM services.

To find strategies to be used to influence the perceptions and behaviours of vulnerable groups towards Geldmaat's ATM service, we introduce The Technology Acceptance Model (TAM), which was proposed by Davis (1989). The model's underpinning logic was that in the context of technology utilisation, behavioural intention was shaped by specific beliefs related to technology use. Three independent variables measure the ATM customers' perception of satisfaction, including perceived ease of use, perceived accessibility and perceived security (Idris, 2014). There is no doubt that the marked decline in the accessibility of ATM services to vulnerable groups in the Netherlands in recent years has prompted these groups to lower their assessment of the perceived accessibility of ATMs and ATMs websites, and thus their willingness to use ATM services, they naturally adopt lower mental expectations about using Geldmaat's ATM services.

A 1996 study reveals antecedents of technology acceptance models: Objective usability has an impact on ease of use perceptions about a specific system only after direct experience with the system. In such cases, The actual underlying problem might be the low computer self-efficacy of the target user group, and training interventions aimed at improving the computer self-efficacy of users may be more effective than improved interface design for increasing user acceptance (Venkatesh & Davis, 1996). Thus we can see that trying to integrate tutorials and simulators on an information-rich ATM website is necessary to enhance the user's perceived accessibility and to reach behavioural change.

We also plan to apply the theory of community empowerment to improve users' evaluation of the accessibility of ATM services. Community empowerment refers to the process of enabling individuals, groups, and communities to gain control over their lives and achieve their goals. Ersing (2003) argues that the practice of community empowerment can be summarised by three key principles, namely: building the competence or capacity of local residents and groups; providing opportunities for residents and local organisations to collaborate as change agents in resolving problems; and the use of advocacy and community or social action as change strategies to promote community well-being. Therefore, we prioritised simplicity, user-friendliness, and accessibility to build the capacity of user groups. Moreover, integrating features such as multilingual support, text-to-speech options, and audiovisual tutorials can promote inclusivity and empower users from different backgrounds.

Stakeholders

Geldmaad's stakeholders, including partner banks, the Government, young generations, and shopping stores, have significant influence but also gain mutual benefits from their involvement. Partner banks contribute financial support, technological infrastructure, and partnerships. The Government's regulatory role directly impacts Geldmaad's operations, however, they also benefit by providing citizens access to banking services. Young generations influence payment technologies through preferences and spending patterns. Shopping stores, with their strategic locations, enhance visibility and attract customers for Geldmaad's ATMs, while also benefiting from increased customer spending within their area/proximity.

Based on the research (Varvasovszky & Brugha, 2000), we discuss the issues that need to be considered before conducting a stakeholder analysis, including the purpose and time dimensions of interest, the timeframe in which the analysis is to be conducted, and the context. Based on the results of the discussion, we categorised the stakeholders into the following four groups:

- **High Benefit, Low Influence**

The customers and street vendors are determined to be high-benefit and Low-influence groups. This group includes individuals who frequently use the bank's ATMs for their daily transactions and benefit from cash use. Street vendors represent small-scale entrepreneurs who rely on ATMs for cash withdrawals to facilitate their business transactions. Their operations are highly cash-dependent, by enhancing ATM accessibility and functionality, street vendors can improve their cash flow management and reduce downtime. However, even the street vendors benefit from cash withdrawals, but their influence over banking policies is very low. On the other hand, Customers such as citizens to visitors are the lifeblood of ATM operation, individual customers often possess limited influence, but collective behaviour can significantly impact a bank system.

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- **Low Benefit, Low Influence**

Credit card issuers and Euronet, despite their low influence, stand to gain from Geldmaat's limited success. Issuers prefer reduced ATM availability to promote card use, enhance profits, and mitigate ATM-related fraud costs. Euronet, competing in Amsterdam, profits from high fees in tourist areas, differing from Geldmaat's local service focus. Both have minimal impact on Geldmaat due to their specific interests and legal constraints, positioning them as low-benefit, low-influence stakeholders.

- **Low Benefit, High Influence**

After analysis, we found that other banks that do not have a partnership with Geldmaat are equally important stakeholders. Although these banks are not yet affiliated with Geldmaat and therefore rarely benefit from Geldmaat's operations, they still have a strong capital base and a large user base, and there is a possibility of overlap between the user base of these banks and the user base of Geldmaat. To expand its user base, Geldmaat's marketing policy must take these potential partners into account. In addition, it is expected that additional consultations will bring other banks into the partnership with Geldmaat as investors in Geldmaat's infrastructure and services in the future.

Methodology

Given the discussion so far, to fulfil our purpose of understanding the experiences and challenges visually impaired individuals face when using ATMs and websites. Our primary research question is: *"How can behavioural change theories be applied to enhance website accessibility for visually impaired users based on insights from focus groups?"* To address this question, we formulated the following hypotheses:

H0 (Null Hypothesis): Applying behavioural change theories does not significantly improve the accessibility and usability of websites for visually impaired users based on insights from focus groups.

H1 (Alternative Hypothesis): Applying behavioural change theories significantly improves the accessibility and usability of websites for visually impaired users based on insights from focus groups.

To achieve our objective, we adopted a qualitative research approach, utilising focus groups to gather in-depth information from our participants. Geldmaat shared with us that various user minorities experienced accessibility difficulties. For this reason, we started by choosing the elderly as our target group and began our investigation.

Initially, we conducted a focus group with five individuals all around more than 60 years old to explore their experiences with ATM usage, website accessibility, and other related concerns. We held a 45-minute interview/conversation, where we started with a brief introduction of our goal for that session without oversharing our research purpose to reduce possible bias. After this introduction, we asked questions and they gave their personal opinion and experiences. This focus group revealed that while the participants did not

experience significant issues with ATMs, they encountered notable difficulties with website accessibility. Issues included navigating websites, reading text, and understanding the layout. As our project is based on developing a website to encourage individual behavioural change we thought that this was unfortunately not the most fitting focus group to tackle, as they already struggled with the principles of using the internet in general. Consequently, we shifted our focus to a different demographic to gain deeper insights into website accessibility for visually impaired users.

We assembled a new focus group comprising five visually impaired individuals a few weeks later. This group was chosen to provide specific feedback on the website of our partner, Geldmaat. During our 35-minute session, participants were first asked to navigate the Geldmaat website and share their initial thoughts and suggested improvements. The feedback highlighted several issues: the predominance of Dutch language content with limited English translation, large chunks of text affecting readability, small font sizes, and the use of yellow colours that strained their eyesight, particularly at night.

Following the discussion, participants completed an online survey designed to evaluate the website's permeability, understandability, and operability. Survey questions focused on alternative text for images and buttons, clarity of text headings and labels, summary information about tables, and the overall comfort of navigating a text-only version of the website. Participants also rated their confidence and satisfaction with the website, including aspects such as button clarity, information flow, and overall usability.

Website Design

After analysing the feedback from the focus group and survey, we developed a high-fidelity website prototype aimed at enhancing the online experience for visually impaired users. This prototype incorporated changes and adaptations based on prior research and the insights gained from our focus group.

One of the goals was to simplify and make it a more welcoming website than the current one. For that reason, we lowered the density of text and added big icons on the home page as a way to simplify users' objectives once they arrive at our website. We want them to be able to solve their questions straightforwardly. ATMs are already not such a friendly topic for some users and will probably most likely only search on it for a problem or question. Further modifications made were the colour mode, we introduced this mode that allows users to change the background colour of the website. This feature was designed to help users with colour vision deficiencies distinguish between different elements on the page more easily. We offer a second colour background colour option that provides better contrast and visibility. Also, we recognized that many visually impaired users struggle with small text, so we implemented a feature that allows users to increase the font size across the website, ensuring easily readable text. Furthermore, to assist users who have difficulty reading text on screens, we incorporated a text-to-speech feature. This website reader can read out loud the content of the page, providing an auditory alternative to visual information. In addition to text, we also found that icons were an important part of the website navigation. We increased the size of icons to make them more visible and easier to click. Larger icons will lower the risk of users misclicking and improve the overall usability for users with low vision. We also included a new feature that the original website of Geldmaat didn't possess, we included an accessibility simulator tool that allows users to experience the process of using an ATM, it was made clear

to us by Geldmaat that some users feel nervous, unsafe, or unsure when using an ATM in person, for that reason this simulator will show them what to expect and facilitate the process one's they arrive at one. This tool is also useful for educational purposes for example for young adults dealing with banking for the first time. Lastly, given the feedback that language barriers posed significant challenges, we expanded our website's language options. Initially, the website was predominantly in Dutch with limited English translations. We now have incorporated a fully translated website into English and Chinese in addition to Dutch.

The participants' evaluations and suggestions were crucial in refining and finalising our website, ensuring it better meets the needs of visually impaired users. The iterative processes of focus group discussions, surveys, and prototype testing provided us with continuous valuable insights into creating a more accessible and user-friendly website for our target audience.

Conclusion and Limitations

As the business of the ATM system in the Netherlands develops, the design of the ATM and its accompanying informative website for the visually impaired should also evolve to make this technology as usable as it is for the average user. Through this study, it became very clear that the existing Geldmaat system does not fulfil the design goal of being user-friendly for visually impaired users. Our entire study aimed to raise HCI specialists' awareness of the particular requirements and problems of special populations in the design of ATM systems and their websites. Therefore, at the initial stage of our study, we conducted a stakeholder analysis and subsequently invited the elderly to form focus groups. We learned that there was a structural contradiction between the difficulties faced by this focus group due to low digital skills and our goal (to create an informative prototype website), so we replaced the focus group members in a timely manner.

At the second stage of our research, we aimed to have a website prototype that maximised effective interaction with visually impaired people. Our website aims to ensure compliance and help visually impaired users by integrating the following features: colour blind mode to change background colour, zoom mode to change font size, text-to-speech (e.g. website reader), zoom icons, simulator, and multi-language. At the completion stage of the study, we determined the effectiveness of the prototype website's functionality by presenting it to Geldmaat and receiving feedback. Integrating the Technology Acceptance Model and applying Community Empowerment Theory to give visually impaired people the opportunity to improve ATMs and their websites has the potential to achieve behavioural change in visually impaired users, enabling them to become accustomed to being able to carry out financial transactions in the same way as regular users and to alleviate public indifference to

the use of cash. This research will likewise inform the design of future Geldmaat human-computer interactions.

At the same time, we must also discuss the limitations inherent in this study. The limited time, the nature of the focus study, and the design of the prototype website dictated that we had to choose a single focus group, and although Geldmaat provided a sample of vulnerable people, including older people and people with disabilities, we ultimately chose visually impaired people for the study. This may have meant a degree of neglect of other vulnerable groups. Another possible limitation of the study is that our focus group membership remains generally small, and the opinions of a few members may not be sufficiently representative and could influence the conclusions.

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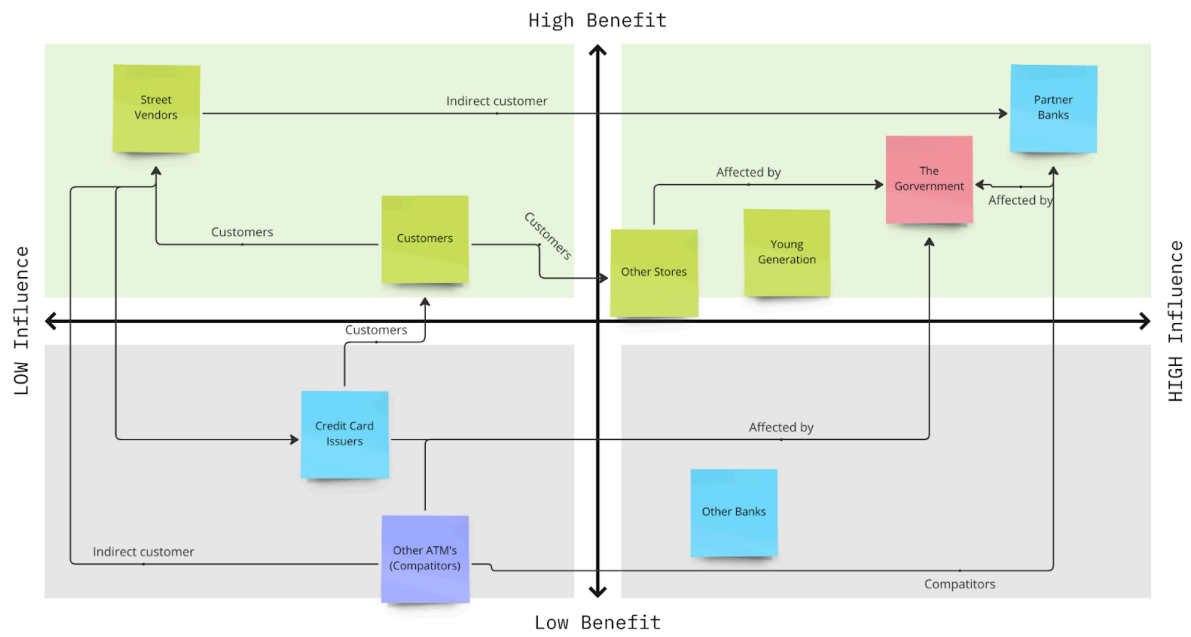
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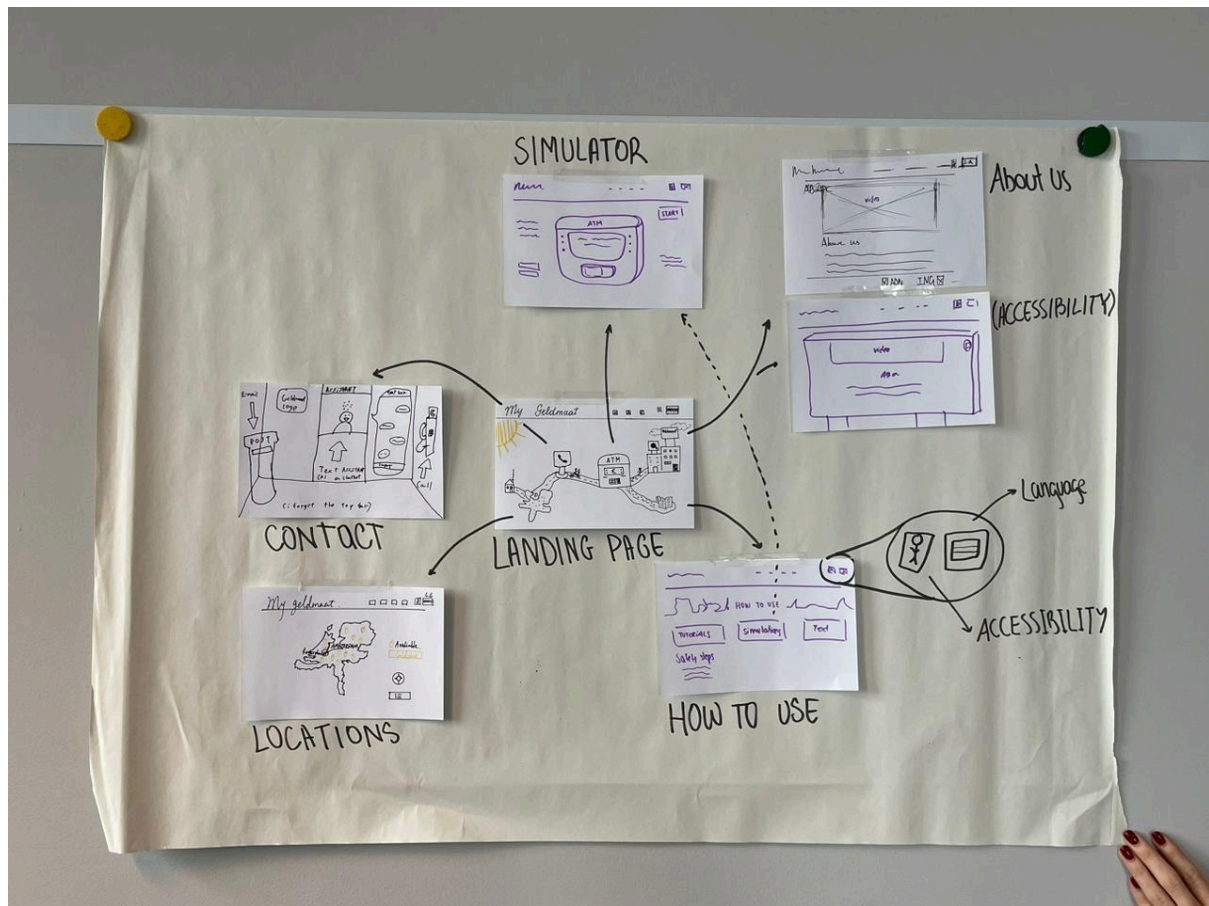
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Appendix

Stakeholder Analysis



Prototype Low-fidelity



Prototype Mid-fidelity

