Banknote design policies

User-friendly banknotes start with the user
by Hans de Heij

The design policy of banknotes is a rarely covered topic. Design policies are used by central banks to give direction to the design process of banknotes. As such policies are often incomplete, designs for new banknotes may completely surprise the policymakers. A study of the design policies of the past century shows that ‘use-centred policies’ are gaining popularity. However, a real use-centred policy, which is based on all the functions a banknote will have to perform, is yet to be applied, as Hans de Heij explains in this article.

It is important to distinguish between design policies and ‘stakeholder policies’ (see Figure 1). Stakeholders are all parties involved in the supply chain of banknotes, such as manufacturers and distributors. They provide the infrastructure that makes paying with banknotes possible. If people cannot use the new banknotes to pay in a car park or on a toll road, they will become irritated, so the infrastructure should be ready in time.

Main users
• Public
• Retailers

Main stakeholders
• Banknote producers (e.g. printers)
• Banknote distributors (e.g. commercial banks)
• Banknote Equipment Manufacturers (BEM’s)
• Cash in Transit companies (CiT’s)

Figure 1:
The relation between a design policy and a stakeholders’ policy.

From technology-driven design to use-centred design

The two main user groups, the general public and the retailers, are not represented in the banknote’s design process. Common banknote design policies are either dominated by a ‘printer’s view’ or by a ‘cashier’s view,’ depending on who is in charge at the central bank. All too often, the printer’s view reminds us of Henry Ford’s quote: “Any customer can have a car painted any colour that he wants so long as it is black.” A typical cashier’s view is a ‘father knows best attitude,’ when the central bank’s management decides on a design on behalf of the population. However, both views represent a ‘technology-driven’ design policy, which tends to focus on authenticity features and durability properties.

The Central Bank of India, however, recognises the need for a ‘user’s view:’ “The transformation from centrally designed by in-house designer to public participation for indigenous designing of banknotes can be effected gradually but steadily.” A use-centred design policy for banknotes will balance user behaviour and technology (see Figure 2). Before we learn more about this type of policy, it is important to understand the historical evolution of design policies.

Historical overview of design policies

Table 1 presents an overview of current design policies in the order of their first application. The first is a ‘banknote handling’ design policy (Table 1, row 1). Paper money was invented to offer merchants an alternative to carrying heavy coins along unsafe roads. A handling design policy is still applied, mainly to smaller banknotes. If the size of banknotes is reduced, they fit better into wallets. When the Bank of Israel introduced their new banknote series in 1999 they stated: “They are narrower than the first NIS series, so that they do not protrude from the average size wallet, thereby reducing wear and tear.” The Swiss decreased their note height from 74 mm to 70 mm for similar reasons: “With their proportions being more ideal, the banknotes will not only give a more favourable overall impression, but wear and tear in the wallet can also be reduced.”
In the early years of banknotes many central banks followed a ‘low volume’ design policy (Table 1, row 2). The denominations have similar images and are printed on the same paper. Modern examples are the Bermuda Monetary Authority (similar paper and print) and the Central Bank of Aruba (similar paper, different print).

The third design policy reviewed is an ‘emergency’ policy (Table 1, row 3). Emergency banknotes are prepared to be issued if the number of counterfeited banknotes is beyond control. The concept of auxiliary, substitute or fallback banknotes is similar to that of emergency banknotes. In the 19th century, De Nederlandsche Bank (DNB) produced seven variants which were never issued, except for some minor volumes. Instead of the full production of emergency notes, central banks may prepare just a design. This was the case in the 1970s when designer Oxenaar prepared a fallback design for the denomination of NLG 100. As a portrait was not specified, Oxenaar was free to propose an alternative theme and he chose a bird, the snipe. As counterfeiters of the then current NLG 100 note kept on being accepted, the prepared design was taken into production. The new NLG 100 denomination was issued in 1981 and became very successful (see Figure 3c). The word Snipe even became synonymous with a NLG 100 note.

Although a success, the NLG 100 note was the last Dutch emergency banknote. Since then priority has been given to a controlled banknote design process due to the ongoing innovation in digital printing techniques. Fully prepared emergency banknotes in DNB’s vaults would probably have been outdated by the time they were needed. And the same reasoning can be applied to a fallback design. The revised policy stipulated that a new banknote should be developed within two years, including new authenticity features. Instead of new banknotes in their vaults, DNB wanted novel features ‘on the shelf’ ready for implementation.

In the first years of the euro the European Central Bank (ECB) developed two sets of emergency banknotes: the ‘Six Month Project’ and the ‘Two Year Project’, both covering three denominations (20, 50 and 100 euro). The two projects remained unused and in 2007 the Eurosystem also opted for controlled planning of a new design and for features on the shelf.

### Table 1: Overview of current design policies in the order of their (believed) first application.

<table>
<thead>
<tr>
<th>Banknote design policy</th>
<th>Main focus</th>
<th>Aiming for</th>
<th>Recent examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Low volumes</td>
<td>Similar substrate</td>
<td>Similar sizes, paper tint and watermark</td>
<td>Aruba, Bermuda, Cayman Islands, East Caribbean, Tobago</td>
</tr>
<tr>
<td>4. Authenticity</td>
<td>Authenticity features</td>
<td>New security features</td>
<td>All central banks</td>
</tr>
<tr>
<td>5. Communication (message)</td>
<td>Main image</td>
<td>Celebration of person or nation</td>
<td>Science/arts/royalty (Great Britain, Thailand) Big Five (South Africa) Focus on message (Switzerland)</td>
</tr>
<tr>
<td>7. Durability</td>
<td>Time in circulation</td>
<td>Cost reduction, environment</td>
<td>Polymer banknotes (Australia, Canada) Hybrid papers Durable paper/varnishes</td>
</tr>
<tr>
<td>8. Low production costs</td>
<td>Paper and gravure</td>
<td>Low banknote price, strong law enforcement</td>
<td>USA</td>
</tr>
<tr>
<td>11. Cash is one system</td>
<td>Coins and banknotes</td>
<td>Usability cash</td>
<td>Same image on coin and banknote designs 1994 and 2002 (Brazil)</td>
</tr>
<tr>
<td>12. Identity</td>
<td>Identity theme</td>
<td>Emphasise identity</td>
<td>Norway (to be issued in 2017)</td>
</tr>
<tr>
<td>13. Use-centred</td>
<td>Retailer, public</td>
<td>Usability, user-friendliness</td>
<td>Advocated design policy</td>
</tr>
</tbody>
</table>
The fact that ‘authenticity’ policies (Table 1, row 4) have always been popular, is not surprising as banknotes have endured three major technical threats of being counterfeited in large numbers (see Table 2). Central banks may say that it is their policy to stay one step ahead of counterfeiters, or they may say: “It’s about getting the balance right between something that’s difficult to counterfeit but very simple to authenticate.”[6]

In 2003 the Federal Reserve System of the United States (FRS) captured their authenticity policy with the motto: “Safer. Smarter. More Secure.” The design policy for the second series of euro banknotes was also an authenticity policy that involved the introduction and advancement of ‘quantum leap features’.\[^{17}\]

Using banknote design as a ‘communication tool’ (Table 1, row 5) is a design policy applied since the 1850s that has many followers. According to the Swiss National Bank communication is the most important aspect of a banknote: “The public is doubtlessly more interested in the theme and design of new banknotes than in the security technology.”[4] A similar design policy is ‘commemorative’ banknote design (Table 1, row 6), which commemorates historical or recent events. Both China and Russia issued commemorative banknotes to mark the Olympic Games in 2008 and 2014 respectively. Usually such banknotes are printed in limited volumes, which is appreciated by collectors and the reason why they tend to disappear from circulation. Unlike collectors, the general public are wary of unfamiliar looking coins and banknotes and usually try to get rid of these first.[8] Commemorative banknotes may also serve other purposes, for example testing new approaches such as new substrates, features, varnishes or designs.

A design policy that was first applied in the 1950s is the ‘durability policy’ (Table 1, row 7) which aims to increase the lifespan of banknotes. Durability policies

<table>
<thead>
<tr>
<th>Time</th>
<th>Threat</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Around 1850</td>
<td>Photography and lithography</td>
</tr>
<tr>
<td>2. Around 1920</td>
<td>Offset</td>
</tr>
<tr>
<td>3. Around 1985</td>
<td>Digital printing revolution</td>
</tr>
</tbody>
</table>

Table 2:
Three major graphical reproduction threats. Due to these threats and automatic banknote processing, the number of authenticity features increased from five to over 35.

Figure 3:
NLG 100 banknotes between 1953 and 1992. Realistic images on Dutch banknotes were abandoned in three steps. The first step was from a classic portrait gravure (a) to a novel portrait gravure style (b), followed by a second step to a classic gravure of a bird (c). The third step was to abandon a realistic gravure altogether in favour of an abstract design (d).

d) NLG 100/Little Owl, 1992. Designer: J.T.G. Drupsteen.
are mainly driven by efforts from central banks to reduce the cost of banknote production. There are no direct benefits for banknote user groups, except that in the end they may pay less tax.

Central banks may also try to reduce costs with a ‘low production costs policy’ (Table 1, row 8). The production of euro banknotes involves two additional steps compared to that of the US dollar (foil and silk screen printing) and is therefore more costly. Europeans rely more on ‘self-defending banknotes,’ while the FRS has a stronger bias towards stronger law enforcement in order to prevent counterfeiting. This bias towards law enforcement dates back to President Lincoln, who explicitly assigned the Secret Service the task of combating counterfeiting. This still holds today.

Another reason for a new series may be changes in the central bank’s banknote sorting systems. Policies that facilitate this usually concern the introduction of a ‘new feature plus detector’ (Table 1, row 9).

‘Value recognition’ is a design policy aiming for unambiguous identification of the note’s value (Table 1, row 10). Banknote designs are often suboptimal when it comes to value recognition. Complaints from the public about the ability to recognise the value of banknotes may trigger new banknote designs, as was the case with the E-series in the United Kingdom issued between 1990 and 1994.

Emerging banknote design policies

The design policies discussed so far represent two basic models to approach new banknote design: ‘refreshing existing models’ and ‘emphasising the use of a banknote.’ These two basic models occupy the first two rows of the scheme presented in Table 3, row 3 represents the third group of design policies which focuses on user experience. This model is quite rare and has been applied only incidentally. One example is ‘cash is one system’ (Table 1, row 11) which prioritises a coherent design of coins and banknotes such as those in use in Brazil (see Figure 4). Taking the bank-
Banknote design policies

User-centred design

User-centred design, as opposed to use-centred design, was introduced by Don Norman. A user-centred design policy is characterised by an early and continual focus on people using the product. Apple’s late co-founder Steve Jobs famously said: “User experience is the only thing that matters.” The fact that Jobs’ statement was made a century after Henry Ford’s statement on black cars, illustrates how the customer approach has made a 180-degree turn. Although Norman coined the term ‘user-centred design,’ Gould and Lewis laid the foundations for it, by unveiling three basic principles of ‘designing for usability:’ an early focus on users and tasks, empirical measurement and an iterative design. In the case of a banknote it is more appropriate to focus on the use of banknotes rather than the user, as a banknote is not a consumer product, but a collectively used product. The step from user to use was made by Flach and Dominguez who introduced the term ‘use-centred design.’ A use-centred design policy was laid down in an ISO standard on human-centred design process, defining ‘usability.’

Table 3:
Four basic models to approach new banknote design.

<table>
<thead>
<tr>
<th>Basic models to approach a new banknote design</th>
<th>User Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Refresh existing model</td>
<td>Use</td>
</tr>
<tr>
<td>2. Emphasise use</td>
<td>●</td>
</tr>
<tr>
<td>3. Emphasise experience</td>
<td>●</td>
</tr>
<tr>
<td>4. Use-centred</td>
<td>●</td>
</tr>
</tbody>
</table>

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Figure 5:
NOK 100 banknotes - Norwegian banknote designs that focus on the Norwegian identity.
Above: NOK 100, with the portrait of Kirsten Flagstad (1895-1962), opera singer and first director of the Norwegian National Opera. First issued in 1997.
Below: NOK 100, to be issued in 2017 (design was made public in 2014). Front and reverse are made by different designers: front by The Metric System, reverse by Snøhetta Design.

Table 4:
The Coaster model divides the banknote’s user functions into User Experience Functions and User Interface Functions.

<table>
<thead>
<tr>
<th>User Experience Functions (UXFs)</th>
<th>User Interface Functions (UIFs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Recognise identity</td>
<td>1. Recognise value</td>
</tr>
<tr>
<td>2. Judge aesthetics</td>
<td>2. Handle</td>
</tr>
<tr>
<td>3. Retain confidence</td>
<td>3. Check authenticity</td>
</tr>
<tr>
<td>4. Connect with main image</td>
<td>4. Receive the message</td>
</tr>
<tr>
<td>5. Expect sustainability</td>
<td></td>
</tr>
<tr>
<td>6. Link to information technology</td>
<td></td>
</tr>
</tbody>
</table>

The final banknote design policy in the overview in Table 1 is the use-centred design policy, an advocated policy that has not been adopted yet by central banks. In Table 3 this is also the last of the basic models. A use-centred design policy could be based on the Coaster model, shown in Table 4. This model provides a structure to organise a complete banknote design policy for each of the User Experience Functions (UXFs) and each of the User Interface Functions (UIFs).
as the extent to which a product can be used by specified users to achieve specified goals.\cite{25}

Effectiveness, efficiency and user satisfaction are the main criteria in this ISO standard.

Conclusion

Banknote design policies have evolved and are becoming more use-centred and less technology-driven. A use-centred policy aims for user-friendly banknotes, covering all user experience functions and all user interface functions. The key to such a policy is the involvement of the general public and retailers; their feedback should be used in several steps of the design process. In this view, it is the central bank’s task to represent the user and formulate user requirements and subsequently design requirements.

References