Key elements in banknote design
Part I: the product perspective

by Hans de Heij

Commissions to design a new banknote are typically unclear, hiding many implicit aspects. In 2008 Hans de Heij started a Ph.D. on the subject of key elements in banknote design. With the help of his thesis he aims to make these key elements more explicit in order to make them more manageable. This article is the first part of his research, which deals with the key elements of the banknote seen from a product perspective. In the next issue of KJD&I the process perspective will be discussed from a design management point of view.

Ever since I started working in banknote design, people have asked me: 'why do we need a new banknote?' I usually reply: 'to keep up with the technological developments in the graphic industry.' This is, of course, a very general answer. In fact, there are several reasons whether or not a new banknote series needs to be introduced (see box 1 and table 1). An example is the development of the second series of euro banknotes (€52), in which one or more innovative security features would be introduced for public use (the so-called 'quantum leaps'). Instead of a new design it was decided to upgrade the current banknotes, re-using the main design elements from the first series.

The design process of a new banknote is definitely not plain sailing, as evidenced by the delay of several major banknote design projects. The new Danish banknotes were issued in 2009, one year later than planned. The recently introduced new USD 100 banknote is about two years behind planning. A similar delay of one more year is recently announced for the new Swiss banknotes series. The new series of euro banknotes will experience the most serious delay up until now. Announced in 2003 to be issued by the end of the decade, this date was first moved forward to 2011 and is now delayed for an unknown period of time.

Key factors for a successful new design
One of the key factors for the success of a new banknote project is to launch the new banknote design on time, but more factors can be distinguished:

Figure 1
Schematic presentation of key elements in banknote design: product (in blue) and process (in red). Each key element is divided into subjects, with the more dominant subject in the centre.
The banknote as a means of payment: strength and weaknesses

It is my opinion that banknotes and coins will still be used in future because they have sustainable competitive advantages, not only over other means of payment such as debit and credit cards, but also over newcomers as e- and m-payments. E-payments are electronic payments using the internet and m-payments use the universal mobile phone as a payment device and terminal. The strengths of banknotes (and coins) over other means of payment are:

- person-to-person payment;
- anonymous;
- fast;
- secure and readily available;
- insight in the amount of money available, budgeting reasons;
- relatively cheap (compared to other means of payment).

Naturally also a number of weaknesses can be distinguished, such as:

- the possibility to lose a banknote;
- the possibility of being robbed;
- counterfeits.

Decrease in cash payments

The Netherlands is likely to see a change in the amount of cash transactions in the coming decade. From 1814 onwards the banknote circulation has increased steadily year after year, both in numbers and in value. However, since the 1990s the growth of the value of all banknotes in circulation has not been keeping up with the economic growth. The country will probably see a serious decline in banknote circulation, as debit card payments are more and more encouraged, according to the Dutch slogan “Klein bedrag, pinnen mag” (“Small amount, debit card allowed”).

- At least 70% of the public appreciates the banknote as attractive.
- There are less than thirty counterfeits per one million notes in circulation during the first two years.
- The development time is less than 2.5 years.
- The development costs are less than two million euro.
- The Intrinsic value of the banknote is similar to the previous banknote or, when a new technology is introduced, is increased by not more than 5%.
- The banknote poses no difficulties for banknote logistics such as Banknote Equipment Manufacturers (BEM), Automatic Teller Machines (ATMs), banknote accepting machines and sorting machines.
- And last, but by no means least: there is no room left for mistakes, since once issued a new banknote can not be withdrawn.

These goals can be achieved by fulfilling all key elements of a new banknote design project. Figure 1 provides an overview of those key elements. The figure shows that there are two separate groups of key elements, related to:

a) the product, i.e. the banknote;

b) the process, i.e. the design management.

Both product and process are divided into six fields of key elements, and each element is subdivided in several subjects.

Programme of Requirements

Linking pin between the product and the process is the Programme of Requirements (PoR), the key of all key elements. In 2004 the importance of such a document was outlined in an article in this Journal. The PoR is a complete and detailed design assignment, set up according to an appropriate methodology. Compiling such an assignment takes up a lot of time and attention and is done by a dedicated team within the central bank. All this hard work is definitely worth the effort, as the design project will benefit greatly from it.

- Pitfalls

A number of pitfalls can be identified during the development stage. One might be tempted to include R&D-projects within a banknote design project, but this should be avoided at all times. Only proven and finished R&D-results should be used within the PoR.

Poor judgement at the beginning of the project with regard to the roles of the participants is often the main reason for failure. It is crucial that each participant plays his role. The most underestimated role is the one played by the central bank, the principal party to communicate its thoughts on the design on behalf of the stakeholders. Starting point should be a thorough analysis of the previous design, the old banknote,
to try and learn from its counterfeits, public use and circulation behaviour.

The central bank might become involved in production issues if the roles of the participants in a banknote design project are unclear. It is not the task of the central bank to oversee all kinds of printing trials; these should be left to the manufacturers. Instead the central bank should concentrate first and foremost on being an expert principal, one who is trained in contracting banknote designs and providing independent R&D for new banknotes while focussing on the stakeholders. To explain the roles of the participants more thoroughly, the design of a new banknote can be compared to building your own house (table 2). If someone wants to build their own house, the owner, as the customer, should list their requirements. In the banknote design process, the central bank should list its stakeholders’ requirements. This can not be done without research, a stage that is all too often left out. The central bank is usually inclined to deliver a short and incomplete ‘design brief’ or ‘terms of reference’.

Subsequently the contractor, who is either the building contractor for your house or the banknote printing works for the banknote project, has to work with an unclear design assignment. Instead of using a proper architect or graphic designer, the banknote becomes a product out of a catalogue. Large printing works offer these so-called catalogue banknotes because they can be delivered fast at a relatively low cost. Contractors tend to make it easy for them. As long as they deliver on time everything is fine, large tolerances are accepted and quality measurements are avoided. Another option is re-inventing the previous banknote. This is an example of an ‘upgrade design policy’ and often looks like a ‘cut-and-paste’ job. The recent US Dollar 10, issued in 2006, illustrates this (figure 2).

Key elements of the product
As stated before, there are two separate groups of key elements that are relevant for the product and the process. The key elements of the banknote seen from a product perspective are outlined below. In the next issue the elements relevant for the process will be discussed.

There are six key elements for the product, as shown in the purple schematic presentation in figure 1:
- banknote identity;
- communication;
- value recognition;
- anti-forgery devices;
- durability;
- graphic design.

Banknote identity
Commercial companies have a corporate identity, set
Table 1: Reasons for central banks to introduce a new banknote/new series of banknotes

<table>
<thead>
<tr>
<th>Reason</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counterfeits</td>
<td>The number of counterfeits of an existing banknote exceeds a certain threshold.</td>
</tr>
<tr>
<td></td>
<td>The quality of security features needs to be improved, for example when a new feature has become available.</td>
</tr>
<tr>
<td>New denomination</td>
<td>Introduction of a higher denomination due to inflation.</td>
</tr>
<tr>
<td></td>
<td>Dropping zero's due to inflation.</td>
</tr>
<tr>
<td></td>
<td>A new denomination is introduced because an existing denomination proves to be popular, thus releasing the pressure on that denomination (for example filling the gap between 25 and 100 by introducing a new 50).</td>
</tr>
<tr>
<td>Public criticism</td>
<td>The banknote is not appreciated by the public.</td>
</tr>
<tr>
<td></td>
<td>The old banknote is outdated.</td>
</tr>
<tr>
<td>Durability</td>
<td>The banknote needs to be more durable, for example by using polymer.</td>
</tr>
<tr>
<td></td>
<td>The banknote dimensions prove to be suboptimal (trend towards smaller banknotes).</td>
</tr>
<tr>
<td>Improvement</td>
<td>Mistake(s) in the old banknote, for example in text or year.</td>
</tr>
<tr>
<td></td>
<td>Improvements for visually impaired.</td>
</tr>
<tr>
<td>Additional income or propaganda</td>
<td>Commsorative notes.</td>
</tr>
<tr>
<td>Logistics</td>
<td>The need to restock (choosing either a reprint or a new design).</td>
</tr>
<tr>
<td>Management</td>
<td>Maintaining know-how at central bank (constant flow of new banknotes, such as introducing a new note every two years).</td>
</tr>
<tr>
<td></td>
<td>New Governor/President, new Secretary, resulting in a new signature.</td>
</tr>
</tbody>
</table>

by the top management. Similar to a corporate identity a banknote requires a banknote identity, a task for the Board of the central bank. This work on the "calling card"-function of the banknote should be done before a graphic designer is selected. The description of the banknote identity includes statements on:

- Upgrade policy: should the new note be forward looking and should the appearance of the note be completely new? Or is an upgrade desired, similar to the existing note? One should bear in mind that any upgrade design policy has its limits and ends after two or three cycles, just as in the car industry. Ultimately an upgrade policy is a dead-end street.
- Advanced versus middle of the road: should the new note be the most advanced banknote in the world or is second-best good enough?
- Public involvement versus paternalism: should the public be involved during the design process?
- Familiarity: which banknotes and which countries are considered an example? With whom do we associate? Which national feelings - or in case of the euro which European feelings - should be addressed? An example of familiarity can be seen in figure 3, a pre-study for the new Aruba florin banknote.
- Emotions: to receive public attention emotion-driven design is a requirement. What kind of emotions should the new banknote evoke? Should it exude happiness or create a warm feeling (figure 4)?

Communication
A communication concept is the next key element necessary for a successful banknote design. Once again such a concept should be drawn up before the start of the graphic design. If the designer has already been selected, he or she could be involved in this central bank guided process. Recommendations for a communication concept are:

- a serial theme: try to limit the banknote themes to just one, for example 'bridges linking people' (euro) or 'local flora';
- a motto for the public security features, for example 'all features in a row', E-U-R-O-P-A or the 'feel-look-tilt'-method;
- a name, for example 'Snipe' (NLG 100) or 'Mona Lisa';
- placing all public features on the front of the banknote, which will enhance the communication, since only the front image has to be explained;
- the combination of simple public recognition with high counterfeit resilience (figure 6).

Value recognition
The two main functions of a banknote are its value and its security features, which in themselves are sufficient to result in a characteristic design. Research by DNB has shown that the main images on the euro banknotes - the windows and doors - are not contributing to value recognition. Switching the main images on
Table 2: Analogy between the design of a new house and a new banknote and the different roles of participants

<table>
<thead>
<tr>
<th>Participant</th>
<th>New house</th>
<th>New banknote</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer (principal)</td>
<td>Owner</td>
<td>Central Bank</td>
</tr>
<tr>
<td>Project management</td>
<td>Property developer</td>
<td>Project leader</td>
</tr>
<tr>
<td>Designer</td>
<td>Architect</td>
<td>Graphic designer</td>
</tr>
<tr>
<td>Contractor</td>
<td>Building contractor</td>
<td>Banknote printing works</td>
</tr>
<tr>
<td>Subcontractors</td>
<td>Foundations, bricklaying, carpentry, electricity, plumbing, roofing</td>
<td>Papermaking, thread, foil, inks, gravure, platemaking</td>
</tr>
<tr>
<td>Semifinished products</td>
<td>Washbasin, tiles, paint</td>
<td>Fibres, thread, inks, foil</td>
</tr>
</tbody>
</table>

the euro banknotes went unnoticed by more than 80% of the public. So what purpose do they serve? A main image on a banknote only adds value if such an image contributes to an immediate recognition of the banknote or if the image contributes to a positive emotion or appreciation. A recent overview of the key elements of value recognition, such as the use of large numerals and colours is provided in the publication 'Banknote design for the visually impaired'.

**Anti-forgery devices**

The banknote security concept lists all stakeholders and their planned security features. The most important stakeholder is clearly the retailer, preventing the acceptance of counterfeits. New banknote designs should focus first of all on the retailers instead of the general public.

In the case of the euro banknotes six security features are dedicated to the general public, while only three
Figure 4

are needed for a reliable authentication. Furthermore, the public tends to remember about two and a half security features and nobody recalls more than four. Therefore, four public features should be enough. However, in using six features people can make their own choice and older people can stick to the features they have become acquainted to. The communication plan may be further fine-tuned to actively promote for example three features on television and to keep the remaining features from the public.

If the decision has been made to introduce new security features, then obsolete features should be abandoned. This is usually a though choice for a central bank; once a feature is in, it is hard to get it out. Preferably the bank should first of all decide on the feature that will be abandoned before it makes a decision on a new feature. The new feature should meet the user requirements, the most important one being the time needed to check the feature (five seconds for the note, less than two seconds per feature). Apart from the public features (level 1) so-called 'trigger features' (or level 0) are required. These features contribute to the perception of the quality of a banknote, also known as 'heuristic quality'. When someone gets handed a banknote that feels limp or looks blurred or pale, these features trigger their brains into refusing the note or thoroughly checking its authenticity using the dedicated security features.

Durability
Recommendations for the durability concept are:

- ‘Green’ banknotes: banknotes should be environmentally friendly, should have a low ecological footprint and shouldn’t pose a health risk. From 2007 onwards DNB includes at least 15% fair trade cotton in its euro banknotes.
- Sustainability: the sustainability of the notes may be improved by using a polymer substrate instead of cotton paper. Polymer notes have a longer life (up to four times longer), but are also more expensive to produce (up to 200%). A varnish will also increase the life of a banknote, as well as using a combination of paper and polymer (a hybrid banknote, for example the recently introduced hybrid banknotes by Landqart and Papierfabrik Louisenthal).
- Dog ears: a durability feature to prevent dog ears is the Cornerstone, a reinforced watermark (DeLaRue).
- Soil resistant: soil becomes less visible on the note when ‘anti-soil design’ is applied, a method whereby the unprinted and light areas are reduced and white borders are avoided. However, anti-scan features or Counterfeit Deterrence System-features result in pale and blurred banknotes, thus conflicting with the principle of ‘anti-soil design’. Also, strong colours are much more appreciated by the public, whereas pale colours prove to be a dissatisfier, reducing the heuristic quality.
Graphic design

It is a graphic designer’s job to give expression to the new banknote concept, to the ‘meaning’ of the identity, communication and security concept. The graphic design should focus on the usability of the banknote, on ‘interaction design’ rather than on the manufacturing or ‘product design’. This is one of the reasons to opt for an independent, open-minded graphic designer. Preferably the chosen designer is not associated with the security industry. DNB always tries to attract outstanding designers who have already won their spurs in graphic design, such as Ootje Oxenaar and Jaap Drupsteen. The designer should be trained in applied design and should be interested in technological design aspects, and in using graphical software and media such as art directing and mass advertisements. The graphic design phase may be supported by perception research such as ‘eye movement planning’. Once the visual layers for a new banknote concept are set, the eye tracking path is designed and the features may be worked out in further detail.

This article discussed the six key elements of a banknote seen from a product point of view. In the next issue of KID&I the process perspective will be discussed from a design management point of view.

Figure 5
Trade-off between similar security features in all denominations and simple or more complex information tools. The design of the features can be different, but still based on the same technique.

Key elements in banknote design

Part 2: the process perspective

by Hans de Heij

Commissions to design a new banknote are typically unclear, hiding many implicit aspects, and therefore central banks have to become more aware of their role in good banknote design. They have to act accordingly by preparing their banknote design projects by using the key elements of both product and process. In 2008 Hans de Heij started a Ph.D. on the subject of key elements in banknote design. With the help of his thesis he aims to make these key elements more explicit in order to make them more manageable. The design elements related to the banknote as a product were published in issue 32 of KJD&I. This article is the second part of his research and deals with the design management process.

Management style, whereas for product innovations a more adventurous management style is needed. The monetary income on the banknotes is high and easily earned. Central banks may therefore not be very critical of their own attitude towards banknote design, since there are ‘indirect’ stakeholders and there is no competition except from the counterfeiter. Consequently, central bank managers tend to fall back on their personal taste when banknote design is considered. In these cases a Programme of Requirements would be helpful.

The key elements of a banknote design process are Pre-conditions, Quality, Time, Cost, Organisation and Information. These elements are depicted in figure 1. By using these elements when organising the banknote design process the success rate of the new banknote will increase: think before you print!

Pre-conditions

The Board of a central bank plays a key role to create a fruitful design climate. It does not involve a lot of work; the Board’s main task is to come up with half a page providing the required banknote identity. Equally important, however, is that they should create the appropriate conditions for the banknote design project, which is quite a different task from their usual duties. One of the pitfalls in this stage is to start making relatively easy decisions right at the beginning of the project, for example concerning denominations.

Figure 1
Schematic presentation of key elements in banknote design: product (in purple) and process (in yellow). Each key element is divided into subjects, with the more dominant subject in the centre and the ones on the edges less important. The Programme of Requirements is the linking pin between the process and the product.
and dimensions. An example of such a decision was the one concerning the main design elements of the second series of euro banknotes. As early as in 2003 it was decided not to change those elements, while no analysis had been done (figure 2). Such premature decisions will limit the flexibility of the more complex design decisions further on in the project.

In the 1980’s and 90’s a new banknote design was a fun item on the agenda of the Board of the Dutch Central Bank (DNB). In those years President Duisenberg’s standard opening question for a Dutch guilder design approval used to be ‘What beautiful design have you made for us this time?’. Encouraged by the plaudits received for previous guilder note designs, the DNB Board always felt challenged to take a new design one step further.

**Impeding factors**

Two impeding factors might cause a delay in banknote design projects: group dynamics and juridical barriers.

**Group dynamics**

Why is it that the design of the euro banknotes is not outperforming the former legacy banknotes? And why is the design quality of the US dollar notes so marginal? It seems that large organizations are less capable of delivering outstanding designs than smaller ones.

As we all know ‘Change’ is the motto of the US President Obama. A group of American graphic designers thought that a new president in the White House would be their chance to come up with new ideas for US dollar designs. They organised the ‘Dollar ReDesign Project 2009’, of which the proposals were made public on the Internet (figure 3). As the US is one of the most advanced countries in the world, certainly when it comes to technology, I wondered why this love for technology is not reflected in the design of the US dollar notes. Are Americans in their heart actually more conservative than innovative? I find this hard to believe.

In all probability the Federal Reserve System suffers from the same bureaucratic forces as other central banks and government institutions. The Secretary of the Treasury usually selects the designs shown on United States currency. Unless specified by an Act of Congress (e.g. note sizes and adding the motto ‘In God We Trust’), the Secretary generally has final approval, advised by the Bureau of Engraving and Printing (BEP) officials. In addition, the Commission on Fine Arts reviews all the designs.

A central bank may also use committees for the design and decision-making. This however introduces even more burdens, as we saw with the development of the second euro series. All committees, task forces and working groups counted over 60 people². In such a large design organization there are a number of distinctive psychological obstacles at work:

- **Group thinking**.
  Characteristics of group thinking are: a lack of (self-) reflection, and criticism is largely ignored. Warnings are categorically neglected and the messenger is removed from the group. Group thinking goes hand-in-hand with plural ignorance.

- **Plural ignorance**.
  If people are unsure of or unfamiliar with a subject, which is often the case with committee members, they tend to look towards other group members for clues, thus possibly moving the group in the wrong direction. Also, the danger is that people lacking the appropriate skills might try to block innovative approaches by using far-fetched arguments or asking irrelevant questions.

- **Diffusion of responsibilities**.
  It is typical for the individual members of a group of seven people or more to think: ‘Why should I be
the one to answer that question?" This is known as 'diffusion of responsibilities', a phenomenon already observed by Edmund Burke (1729 - 1797): 'All that is necessary for evil to triumph is for good men to do nothing'; today phrased as 'Everybody and nobody responsible.' My advice is to keep the committees lean and mean to ensure a good design process.

- Planning fallacy.
Planning fallacy is the irresistible urge to give a rosy picture of how things are going: unreasonable optimism. A committee will often continue a project even if it is not running according to expectations. 'A fault confessed is half redressed' is not an option here. It is well known that managers start projects easily, but hardly ever freeze them. Such management may result in 'wandering through endless design loops that only slowly, if at all, converge towards the desired product', as Ruud van Renesse phrased it. Without a Programme of Requirements there is no memory and some design issues are discussed three, four or even more times around, often starting again from scratch.

- Juridical barriers
In addition to group dynamics there are also juridical barriers making the project into a lawsuit and paralysing the central bank as is for example the case with the banknote sizes of US dollars (the American Council of the Blind has argued that US paper currency design should use increasing sizes according to value). Obliged tender procedures will also make banknote design projects more complex. Smart project management is part of the answer.

The culture within a central bank can often be characterized by a strong hierarchical and cautious management attitude. As employees are used to doing what their manager tells them to do, banknote design projects have a habit of drifting away from the central bank's design experts, a variation on upward delegation. As a result the central bank starts opting for damage control, which is not a positive climate for innovative graphic design.

Quality
Banknote design projects differ from other, commercial design projects, because there is no way back once the note is issued. That is why in such a project often more time and money is needed to reach the highest quality level. Failures can be reduced by public testing,

Figure 3
Is this a change in US dollar design? Proposals published by ‘Dollar ReDeSign Project 2009’.

Figure 4
Conceptual banknote for the partially sighted: clear, large numerals, alternating between positive and negative against different geometric backgrounds. Secure tactile patterns are included at the short edges providing a codification for the blind. Maximum attention for the four security features in the centre (but not on the folding line). One security feature has a secure purple colour. Background could be used for other security features. Design by author (2009).
An important planning constraint is the time lag between the selection of the security features and the banknote’s release, which should be as short as possible. If the delay is more than the two years’ development time the selection process has to be redone, since otherwise the security concept for the new note will be outdated by the time the note is issued. The most important planning advice is to start on time and to break the project down into several smaller steps.

**Cost**

As mentioned before, the monetary income on the banknotes is high and easily earned. Although a constraint on the costs for new banknotes may therefore not be very essential, security features have different price levels. Some features are more expensive than others and may take up to 15% of the banknote’s price (for example the Spark® technology). Other features, such as the majority of the paper-based features (watermark, thread), are less expensive. Central banks could benefit from developing three different sets of security features with a respective cost increase of 0, + 5% and + 10%.

**Corporate Social Responsibility**

The production costs of a banknote might be further increased by a policy called Corporate Social Responsibility (CSR), through which businesses are encouraged to support, among others, ethical standards. As mentioned in the previous issue of KID&I, DNB now includes at least 15% fair trade cotton in its euro banknotes. The fair trade system guarantees local cotton producers a fair price and sets standards prohibiting exploitative child labour and the use of unsafe pesticides. The use of fair trade cotton and biological cotton will lead to slightly higher banknote paper prices. Observing the cradle to cradle principles will reduce the ecological footprint of banknotes but will increase the banknote production costs.

**Organization**

Banknote designs should always be managed as a project. Key in such a project is an enthusiastic project manager stimulating a collaborative atmosphere and creating adequate resources. He or she should be quite independent and should have access to a high management level. The first task of the project manager is to come to a joint design language, for which the Programme of Requirements will be very useful.

The project team should be a multidisciplinary team of five to eight members. A smaller team might affect the quantity of ideas and the group energy level, whereas a larger team might enhance group dynamics and will be harder to manage. A project team can be more powerful when it includes a clarifier, ideator, developer and implementer, so that every member contributes to
the final product in their own way. The creative input of the team members will increase after an introduction period, a clear case of synergy. The team has to be proactive and should invite the designer to come up with a proposal. This is certainly more fruitful than the usual situation where project members play a reactive role to the proposals of the designer.

It is not necessary for team members to be experts on security printing production techniques; in fact, this should be discouraged. One printing expert will suffice, as well as a graphic designer. The others could have their expertise in mass media, perception, banknote logistics and sorting.

Larger central bank organizations would do well to put together three competitive design teams, each with their own setting and all with the same budget and time constraints. Smaller central banks might employ an independent designer with origination experience who will detail the drafts based on a rough sketch of a local graphic designer. This way of working can be included in the tendering process for a new banknote.

Information
Taking decisions on banknote design is an emotional process and the project manager should offer proper proposals to senior management, so that the decision taken by the governor is always a well-founded one. Then again, the governor is hoped to contribute more to the entire project than just his or her signature. A good example is the decision of the Board to add the flag of the European Union to the euro banknotes (the winning 1996 euro design did not include this flag).

Decision making can be simplified as long as the best test print is offered. The risk of bringing unfinished proposals to the Board’s table is that their reaction might be to combine the front of one note with the reverse of another. Sketches might even be taken home and discussed with Board members’ families! It is therefore vitally important to report on milestones and avoid fragmented decision making on for example watermark designs, texts or other obligatory icons.

Recommendations on the banknote design process
It is not an easy task to launch a new banknote (series) for a central bank. I therefore would like to provide some recommendations for central banks on what I consider to be the key elements of a banknote design process:

- Pre-conditions: set up a framework for the required banknote identity and create suitable conditions for the design project.
- Quality: pay attention to the lay-out of and space for security features.
- Time: start on time and break the project down into several smaller steps.
- Cost: develop three banknote designs incorporating different sets of security features with a respective cost increase of x, + 5% and + 10%.
- Organization: set up a multidisciplinary project team of five to eight members.
- Information: simplify the information on decision making by offering only the best test print to the governor.

Organizing a banknote design process in this way will increase the success rate of the new banknote, according to my own experiences at De Nederlandsche Bank.


More information is available on: http://www.dnb.nl/en/zonderzoek/researchers/personal-pages/auto184528.jsp or Google: Hans de Heij DNB.