

# Chapter 17

## MONEY TALKS: “Back to the Future”—Challenges in Banknote Design



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**Abstract** As artifacts of popular culture, banknotes signify more than just tokens of payment. Banknotes are at the heart of our exchanges and interactions. They are omnipresent and ubiquitous. The first modern banknotes were printed in Sweden in 1661 (Cribb in Money, Dorling Kindersley, New York, 1990); circulating for more than 350 years now; they bear witness to our everyday lives, our possessions, our stories and our memories—close to our hearts and deep in our pockets. With galloping technological advancement, on-going additions to payment gateways and alternate global currencies; banknotes would seem to be following the path of the dodo. In fact, it is just the contrary. The last decade has seen a growth of 175% of the US Dollar bills as per the data available on the United States Federal Reserve’s Web site ([https://www.federalreserve.gov/paymentsystems/coin\\_currircvolume.htm](https://www.federalreserve.gov/paymentsystems/coin_currircvolume.htm)). The Bank of England’s Web site (<https://www.bankofengland.co.uk/statistics/banknote>) also documents an increase of almost double at 190% of the British pound notes; even the relatively nascent Euro hit a staggering 200% increase in note circulation according to the European Central Bank’s Web site ([https://www.ecb.europa.eu/stats/policy\\_and\\_exchange\\_rates/banknotes+coins/circulation/html/index.en.html](https://www.ecb.europa.eu/stats/policy_and_exchange_rates/banknotes+coins/circulation/html/index.en.html)). With counterfeiters relentlessly at their heels; banknotes; substrates adorned with complex and layered artworks integrating constantly updated security technology into production techniques; ceaselessly needing to stay ahead; are befitting to the adage, *back to the future*; perhaps, like no other product design or innovation. The size is restricted, the medium usually paper, recently polymer, two-dimensional and two sided, the method being printing, foiling and special security technologies; not much has changed over the past three centuries considering the influx and constant bombardment of inventions leaving most products and practices obsolete or even redundant, but not banknotes. A clear indication that makes the banknote and its design so extraordinary and challenging. Apart from the usual mundane exchange; our interactions with banknotes run deep. They are experienced and consumed by our senses; even if less apparent and more subliminal. Seeing the magnificent and indigenous artworks, feeling the raised and intaglio impressions, hearing the flutter and folding (the crushing sounds are tests for

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real versus counterfeit notes); they have an extremely personal relationship with each of us on a daily basis. To make their design decisions further complex, they are also handled by machines regularly. Optical and magnetic sensors to assist the multiple interfaces and technology need to be embedded in the notes for effective exchange. Banknotes are, thus, part of an elite group of products that are handled both by men and machines. And as far as the quantum of exchange is concerned, they securely lead by a hefty margin. Designed exclusively and uniquely, individually customized, artistically bespoke and yet for a wholesale, across-the-board, extensive exchange; to be used anywhere, anyhow, anytime; a perfect blend of form and function, of information and security, of exchange and trust, of durability and bio-degradability; thereby making the banknote the most coveted of design possibilities, practices and commissions. Not to forget, each note, in its medium and its message integrates *zeitgeist*—the spirit of the time; reflecting the promise of its currency. This research presents; *back to the future*; the on-going journey of banknotes that continue to offer challenges and opportunities; a noteworthy specimen for the design of tomorrow.

## 17.1 Introduction

The art of banknote printing is a much-guarded secret and rightly so as are most security documents. Various accounts of economic warfare during the Second World War also reinforce the need for its secrecy. However, a dichotomy exists at the heart of its exchange. The premise of modern money is trust and authenticity. The general public has to be made aware of the peculiarities and originalities of the banknote design but only in part. And here lies the challenge in its design. This paper addresses the need to develop an effective framework in the user-interface design with keeping security safely protected.

## 17.2 Literature Review

Toward the end of the twentieth century, the introduction of the World Wide Web, information accessibility and sharing, the break-down of the Berlin Wall, the start of the European monetary integration, have all contributed to an interwoven political, social, technological and cultural fabric to our world with a global redefinition in our interactions, including the experience and exchange of our money, specifically, banknotes.

However, the counterfeiters have also benefited with the shrinkage of innovations and their timelines owing to the galloping speed of technology. The initial life-cycle of banknotes was determined by usual wear and tear but now determined by counterfeiting. Significantly crashing the time between two successive issues from 10–15 years to sometimes, just 1–2 years [5]. Thereby forcing design and

**Image 17.1** Hector Breeze’s cartoon published in the *Guardian*; from Williams, et al. Eds. (1998), p. 15



development processes to follow certain parameters and models to crash lead times. A definite argument and the premise of this research.

However, banknotes are a peculiar lot. From most end-user’s perspectives, they are looked upon as monopolistic and thrust upon to use by issuing authorities in their usual nonchalant, top-down approach, making looking twice or even once at their images not worth the effort. Perhaps if design production was more interactive; banknotes would be seen in a different light, with more interest and enthusiasm. Add to that, they are produced exclusively and secretively within restricted circles owing to their sensitive nature. Perhaps that is why much discussion, debate or even academic research and models were not considered; let alone pursued and applied. That has now changed (Image 17.1).

On January 1, 2002 at midnight, Europeans rushed to cash dispensing machines to get their first notes; designs being shortlisted and voted for by members of the general public; never before on such a large and diverse scale; long lines were seen outside banks; to get the first peek at the notes.

But they are constantly at risk; making their shelf lives shorter and shorter; replacements or additions have to move in constant tandem calling for a need of using tested design models to be introduced in the banknote production process to keep money ahead in the game.

To better understand the future; it pays to visit the past.

The history of money began when humans learned that they could trade for things they wanted rather than produce them; themselves. The first primitive populations resorted to a simple form of barter, or exchanges in kind. However, one made tools and implements, another cloth and still another collected animal furs. The lack of an acceptable exchange value, need for a standard unit of measurement and a storage of value that would not perish with passage of time; combined with the ingenious human intellect; led to the introduction of modern money. Initially, as commodity money like rice, salt-bricks, tea-cakes; and eventually with the discovery of metals; money changed hands to ingots that were further polished to coins; still prevalent today.

Coins subliminally introduced a novel concept of documenting information on money [2]; the date, issuing authority and in due course denominations; changed the

very fabric of this medium of exchange that is so embedded in our everyday lives almost 2500 years later. As money historian Glyn Davies said, “for over 500 years the coins of Rome publicly portrayed the events, hopes, ambitions, lives and lies, of its rulers” [10]. The art on coins was truly splendid. But coins were small, round, hard objects, making it difficult for artists to really experiment on such a limited canvas. The art of money truly took off with the evolution of paper currency—today, money talks.

Historically, commodity and metallic money had an inherent value. Paper, however, has limited intrinsic exchange value unlike its predecessors and thus relies on trust and the philosophical premise on which modern money rests. The modern banknote is a combination of the promissory note’s tradition ensuring trust and guarantee and the coin’s character of information dissemination. The 1-lb coin issued in Britain in 1970; inscribed the words; “*decus et tutamen*”—meaning an ornament and a safeguard; a phrase from the “Aeneid” of Virgil; originally inscribed on coins from the seventeenth century; referring in this case to the serrated edge of the coin as a protection against clipping for its metal content; capturing best the essence of monetary design with “form” as its ornament and a safeguard as its “function.”

Additionally, the design of a banknote also carries the burden of being a national symbol important for many reasons; ranging from philosophic to pragmatic. Since currency is viewed as a symbol of sovereignty and independence; design decisions become emotional and contentious, sometimes, also resulting in long production delays which is not a privilege anymore in today’s competitive times. Another objective to be achieved is to establish or restore public confidence even via its design. The selection process, thus, should minimize delays and seek to ensure that the banknote is user-friendly, durable, easily recognizable and reasonably secure against counterfeiting. Surely a need for tried and tested product development process.

One of the earlier academic writings on these lines was by Adams [1]; on the considerations that needed to be taken into account when designing banknotes; how the designs would be selected, the design philosophy, the main themes and texts, the size, the user conditions, security features, durability and more. Perhaps, the need for such guidelines was motivated by the break-up of Soviet Russia; leading to the formation of 17 nascent nations in central Europe while 12 nations in Western Europe chose to shed individual identities toward a unified trans-national identity; all in need of banknote design.

Adams [1] suggested the best option for design selection would be to have the decision-making carried out by a broad-based, high-level committee that includes representatives from banks, government, academia, the arts (designers and commercial artists) and experts on currency printing and handling. This paper is significant as being one of the earliest writings where monetary design was considered as a part of a mainstream design process.

Adams, further added that the highlight of the committee’s work would be to organize a national competition for the best design and sometimes an appropriate name for the currency. However, sometimes, competitions are expensive and time-consuming. To combat these issues, an alternative of having the central bank or the committee to make the decisions on its own is also available.

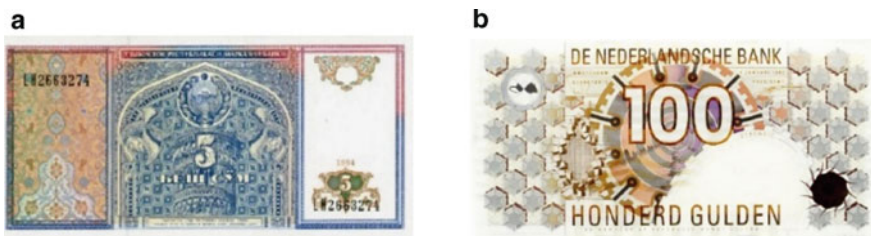
The second step proposed was the different approaches to the design. Certain decisions about the design philosophy should be made before the design process begins, such as whether the notes should be an expression of the culture of the country, or whether it should be a part of the serial design, or whether there should be a relationship between the two sides of the note. Design decisions about the art style, traditional, contemporary, or post-modern have also to be made. The style used also contributes to communicating national image, thereby identity (Image 17.2).

A country’s currency traditions should also be considered, since people are more likely to accept notes that are broadly similar to those that they have been used to seeing and using. Design decisions might also be influenced by the desire to have notes that are similar to a selected series of notes similar to another nation.

According to de Heij [4]; design motivations range from advanced, new, upgrades, revisions and emergency issues. However, to continue familiarity, consistency and to not shock users completely; the use of dominant colors are considered. Also, keeping in mind, the entire user population including the illiterate, people with vision disabilities, rely on consistent color linked with denominations (Image 17.3).

For security reasons notes also include different shades of gray, since color-copying machines have difficulties with the color balance if more than one gray color is used.

Countries like the USA prefer to have all their currency notes printed in a single set of colors so that they can be easily identified as the national currency also leading



**Image 17.2** a and b On the left is a 5-sum note of Uzbekistan issued in 1994 and on the right is a 100-Dutch Guilder note of the Netherlands issued in 1992. Both notes were issued at around the same time but with completely different design styles indicating the different design philosophies, an outcome of the political ideologies and cultural attitudes of both the nations. (Images from <https://banknotes.com>)



**Image 17.3** a–d Four notes of the 10-guilders issued by the Netherlands Bank across six decades are all printed in blue(s). (Images from <https://banknotes.com>)

to lower production costs. However, most countries prefer to use different colors for each denomination so that they can be easily recognized. This choice is especially important when a new series of currency notes are issued because once a color is chosen it is highly recommended to remain unchanged in the subsequent issues.

The bookshelves of popular culture have been adorned by authors like Monestier [8], Standish [10] and Mudd [9]; discussing themes chosen and followed. Portraits are usually chosen as the main theme or part of the theme. From royalty, heads of state, leaders all the way to the ordinary and everyday citizens. Queen Elizabeth II though has been the exception; perhaps, more for her royal status; all the same; she has adorned across 85 years in 31 portraits from 38 different countries according to researcher Peter Symes (<https://www.pjsymes.com.au/QE2/>).

Hewitt [7], in her book “Beauty and the Banknote,” was one of the first to collate various essays on female representation from allegorical nation-states to their disappearance to the modern heroes; outnumbered by the men’s division. However, Australia since 2006 has been the for-runner against gender discrimination with portraits of men on one side and women on the other; on all its notes.

Other themes like plants, animals or buildings are often used because they are less contentious than portraits of individuals. These are also cheaper to produce than portraits, particularly, engravings of widely recognized individuals. Like the office of Lord Chamberlin indicates definitive guidelines on the use of British royal portraits. The Bank of Canada, too, clearly stated the approval of the metallic portrait used of the Queen on its commemorative polymer issue (2015).

However, portraits still emerge as winners; even the faceless Euro was redesigned with Europa finding herself embedded in the holographic foil window; following a study in the field of neuroscience; conducted at Stanford University; proving that the presence of a human face adds value by recognition, a strong sense of familiarity and more importantly, could reduce counterfeiting [6].

All the discussion and confusion about banknote imagery and its role as culture communication is best appreciated and acknowledged in the case of Slovenia; imagery and design playing the special role in communicating the nation’s new identity which declared its independence from Yugoslavia in the June of 1991 [11] (Image 17.4).

According to Tomanic and Hartman (1994), the government of Slovenia took full advantage of the opportunities presented by the design of a new currency to demonstrate the country’s strength, vitality, commitment to capitalism and its national values. The intent was clear to produce a currency which is at once distinctive and familiar to Western Europeans. The message; “We are like you. We will do business like you.” Along with their coherent economic policies and reforms; over a decade later, in May 2004, Slovenia was one of the new members to be inducted in the European Union.

After images, the text is the next decision. The mandatory information like the country name, the issuing agency is written on the front, while the value should be clearly printed in large numerals on both sides, and spelled out of the front. More than one language is sometimes used depending on the culture of circulation. Typography is now efficiently used as a tough to crack security feature. The next concern is the



**Image 17.4 a–d** Faces on the old currency of Yugoslavian banknotes (left) display politically correct anonymous communist icons and suggest the slow ponderous forces of nature and history through its static design. While Slovenia’s new currency (right) celebrates the lives and work of its cultural heroes and suggests the extraordinary dynamism of a new nation proud of its past and eagerly embracing the future with its new message to the world using its currency as a medium for communication. (All images from <https://banknotes.com>)

decision regarding size, small enough to fit in wallets, cash registers and large enough to accommodate all the images and text. Most modern currency notes are between 65 and 80 mm in height. This is an appropriate height for currency handling machines, vending machines, and modern cash registers. The storage and handling are much easier and more efficient when all the denominations are of the same height like the current series of the Indian Rupee. Views on the optimal length of currency notes vary. Different note-lengths help people, especially the visually impaired to discriminate between different denominations. On the other hand, when all denominations have the same size and the same watermark, it is possible to economize on paper ordering, since all the currency notes can be printed using the same lot of paper like in the USA.

All these points deal with the production aspect; switching over; user needs, safety and security are all to be equally considered. The notes should be easy to use, yet secure against counterfeiting. The levels of security features are classified by de Heij [5]; following acceptable guidelines by central banks world over.

Classification of authenticity features		
The features are checked by	Name giving technology-driven	Name giving use-centered
Human senses—subconscious	Level 0	Public trigger features
Human senses—conscious	Level 1	Public features
Hand-held devices	Level 2a	Retail features—human operated
Automatic devices	Level 2b	Retail features—automatic device
Banknote recycling machines	Level 2c	Commercial cash centre features
Sorting machines of central bank	Level 3	Central bank features
Counterfeit deterrence system	Level 4	Features to prevent home-made reproductions

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Classification of authenticity features		
The features are checked by	Name giving technology-driven	Name giving use-centered
Expertise in laboratories	Level 5	Forensic features

In addition to all these; advances in technology have led to other substrates like polymer banknotes as well as hybrid notes; the combination of paper with a special coating to safeguard notes from wear and tear, mutilation but also from easy counterfeiting; thereby contributing to shelf-life. But recent counterfeiting scams in Mexico (2017) and Romania (2020) suggest, otherwise, rendering all substrates equal in the playing field of fakes.

All of the above parameters deal with human interaction. Machine readability is one more factor since banknotes are used by both. The Netherlands (1989) for the first time applied the barcode on their notes proving to be very efficient for machine reading as well as anti-counterfeiting. The recently launched Russian 100 Ruble (2018) also carries a QR code. Identification of fake notes is a job that machines can do more efficiently minus human error. India's recent exercise of demonetization; involved not only the design of new notes but the entire reworking of the back-end to accommodate the machines to recognize new sizes and new features.

A greater understanding and interaction between the front-end (human) and the back-end (machine) usage, experience and interpretation is the need of the hour. Hence, the question; isn't it time to develop a design management model for banknotes?

### 17.3 Methodology

A study measuring user perceptions and experiences of this nature is extremely difficult in terms of time and resources. However, there have been recent published studies from the European Union; not only studying the Euro but also world banknotes; that do offer a good insight. Also being qualitative in nature, "anecdotal references" provide good indications enabling a fair and sufficient content analyses. Information also on central bank Web sites and issuing authorities is available for certain art and security features and their design motivations.

The launch of the trans-national euro prompted a plethora of social identity research due to the shift in the definition of European identity by member state citizens, thereby promoting and measuring the change in the fabric of Europeanness and banknote imagery's role in the same, which can and is applied to other countries and their currencies too.

The International Banknote Society (IBNS) started in 1960 also has been documenting articles in its quarterly journal about images on notes; their peculiarities and their classification across timelines and regimes.



However, the most unique point of this research is the personal interviews conducted by the researcher with banknote designers, museum curators, banknote manufacturers, central bank design researchers and enthusiastic collectors.

A combination of thus published literature, independent academic, as well as sponsored private and public information, popular and critical writings and testimonials from personal interview transcripts; pave a way toward answering the research questions and proposal provided herein.

## 17.4 Observations and Analysis

The case of the Euro is interesting. The first-ever design competition on such a large scale is worth appreciating.

*It is the design coup of the century: a chance to put your work in front of millions of people for years and years to come.*—(Steinmetz 1998).

The historical perspective of the Euro is also important especially while looking at the old currencies of the twelve nations that the Euro replaced. They are imagery revealed the loss and re-creation of Europe’s identity. A thorough study of the old design elements and themes along with the new notes; their continuation on the new coins that were allowed to retain their national sides and the spine on which the new designs were based was published. The critical finding that the European Union flag was the at the center of the new designs was unique to this study [3]; reconfirming that the design process does follow standard design management protocols but the acknowledgment and further use of models is not yet in play.

Recently, appreciating the Euro’s success; the Bank of England also organized a public opinion poll and vote (2019) to decide who features on the upcoming 50-lb polymer note based on the theme of science; with great success and euphoria. “The theme and design is the soul of the banknote”; Debbie Marriot; Banknote Designer at the Bank of England further quoted in a personal interview with the researcher; “It was better that theme design decisions reverted back to the Bank making them more unique and undiluted; with the fear that they are not just standardized by their printing partner De la Rue.”

Hans de Heij from the Central Bank of Netherlands added that “the field even though its super-specialized; the lack of any design management literature is appalling”; he has been working on user-friendly model for cash as a payment instrument as compared to others. He has also proposed for the first time a working model and protocols regarding a banknote design manager who would liaison between banks and printers. According to him; “the Netherlands; not only factored in security with the novel innovations of placing barcodes on notes but also making machine reading ability and tracking the banknote trail very easy.”

Inge Madle, self-employed banknote and stamp engraver and designer working with central banks and printers; quotes “the process of modern banknote design can best be summarized as the beauty and the beast; where the beast-security features

more or less determine the beauty-form.” She concurred; “With a framework in place, it would be easier to take these decisions across time and cost resources. Also, helping to deal with international banks in a professional way.”

Steve Gulliford from De la Rue added that; “Business decisions are hard to take for a publicly held company and answerability to stake-holders would mean more efficiency required in the process; and since the lead times have fallen; various frameworks are followed given to meet the time and cost requirements. De la Rue has created standard templates designed to facilitate the process.”

Sudhakar Kaza; chief of Bhartiya Reserve Bank Note Mudran; also noted that “the demonisation process put great pressure and the designs though conceptualized needed to be moved out at lightning speed. The choice of Mahatma Gandhi to instill trust on the obverse and the series of heritage sites on the reverse; contributed to a balance between the old and the new.” He added; “What was more important in India’s case was the overhauling of all the ancillary machinery like cash disbursing machines, etc., to accommodate not only the new design but also the new size with width of notes remaining a constant and only lengths varying for the 5 variants of 50, 100, 200, 500 and 2000; a radical change for both human as well as machine interactions.” A standard model and protocol would surely have helped.

Kaori Sekiguchi, curator of the Currency Museum Bank of Japan spoke of the upcoming designs of the Japanese yen and the lead time to complete them has been set at 8–10 years; however, their designs were put out for public viewing since 2019 though notes were expected in 2024; a strategy for public recognition and trust; following standard design management protocols. She proudly quotes; “To think that artworks were revealed for public display 5 years in advance to instill familiarity of the banknote; best reflects the Japanese efficient planning systems.”

The central theme from all the interviews did point toward a shift in the framework and processes from product development and execution strategies used by industry.

## 17.5 Findings and Future Research

Banknotes are unique and thus cannot work on *the one size fits all* principle but keeping continuously shrinking lead times and ever-expanding printing and processing technologies; a working model or combination thereof has become the need of the hour. Blending learnings and templates from the art and form department along with machine scanning and reading technologies and can greatly contribute to banknote design implementation and effective exchange.

The design challenge is twofold; the first part being the user interaction with the general public and the second being the machine-interface. The first part can refer to the guidelines by Adams [1] and the classification by de Heij [5]; working as effective starting point for a framework regarding images, colors, sizes and themes. The information dissemination to the public and their involvement will make exchanges more effective; with the use of social media; more involvement can be generated as in the case of the Bank of England. (<https://www.bankofengland.co.uk/news/2018/nov>

[ember/think-science-for-the-next-50-character](#)). The second part that involves the more critical security features will have to be worked upon with firms that specialize in security documents and their implementation. The role of the banknote designer; private or part of a central bank, thus, involves dual interaction from the front-end-users and the back-end manufacturers with keeping resources like time and costs too; in the equation. Various models from the product and brand design literature can thus be combined to enable a faster, more efficient approach to the system by keeping the user and his interaction at the heart of all design decisions. The objectives would be to ensure that the banknote is user-friendly, durable, easily recognizable and reasonably secure against counterfeiting with minimizing delays. With end-users being the starting point of the design process; easy recognition of notes would enable combating counterfeits more easily; and to some extent support an argument toward more complicated counterfeiting; which would be unviable, thereby reducing such cases.

This research concludes by strongly proposing a completely reverse model unlike the presently followed industry-norm; by looking at the origin of banknote design usage and exchange as the starting point; the user interaction being the most important and then working backwards to offer design solutions considering the challenges and opportunities of the banknote; a noteworthy specimen for the design of our tomorrow.

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