While we are still some years away from a universal electronic-payments system that is widely used for e-commerce on the internet, it behoves us to take a closer look at ongoing cybercash experiments. Even in this embryonic stage we can get a glimpse of a future in which cybercash will have become a dominant money form.\(^1\)

When looking more closely at these efforts to develop online-payment systems, one is struck by the variety of designs for electronic money and their complexity. There are many different types of cybercash being developed. Such heterogeneity, so different from the highly standardized metal and paper monies, begs the question of how to classify these various cybercash systems. One way to do this is to distinguish between hardware-based and software-based cybercash systems. This approach is the one commonly shared by central banks (notably the European Central Bank or the Fed) and international organizations (the Bank for International Settlements). However, in my opinion, it is too broad a categorization inasmuch as it fails to take account of the clear distinctions between the subsets within those two categories. A similar problem of excessively broad categorization exists with yet another distinction commonly applied to cybercash, namely whether such money operates purely online or carries with it the ability for off-line use as well.

A more nuanced approach to the classification of cybercash may help us to understand this phenomenon better. To begin with, it is useful to adopt a case-study approach which takes a closer look at each major experiment in this area in order to identify its specificity as well as its communality with other alternatives. Moreover, we need to appreciate that different segments of e-commerce will each develop their own specific type of cybercash, widely used there but with limited application elsewhere. We can expect to have cybercash systems which are much more applicable to B2B transac-
tions while others are better fit for B2C or P2P transactions. Finally, if we look at those experiments in chronological sequence to get a sense of the product’s life cycle, we can distinguish three generations of cybercash. The first proved the technological feasibility of this new money form, but failed commercially (section 5.1). The second generation built a strong marketing component into its infrastructure and focused on specific segments of e-commerce – either as e-mail money for P2P transactions (section 5.2) or as coupon money in B2C commerce (section 5.3). The latest experiments focus on the construction of highly sophisticated online-payment platforms for the creation and transfer of digital tokens that can be used in a large variety of situations. This emerging third generation of cybercash, while still at the very beginning, points to the most dynamic area of product development over the coming decade (section 5.4).

5.1 The Birth of Cybercash

The earliest experiments with cybercash in the mid-1990s were conducted by some of the most talented and innovative software designers who had started out as scientists and turned entrepreneurs when e-commerce emerged as both a technological challenge and a commercial opportunity. This pattern, in the mode of Marc Andriessen who first invented the MOSAIC software program and then founded Netscape, made perfect sense at the time when cybercash had yet to prove its technological feasibility.

5.1.1 NetCheque

One such early e-money pioneer was Clifford Neuman who had developed the security and authentication software called Kerberos as well as the discovery and retrieval software protocol known as Prospero. With financial support from the Pentagon’s ARPA and under the auspices of the University of Southern California’s Information Sciences Institute, in the early 1990s Neuman launched a project to develop a software program for the creation and exchange of electronic financial instruments which could be used to pay for goods and services over the internet.

Neuman’s idea was disarmingly simple, namely to extend the traditional check-clearing system at the heart of our current monetary regime to the internet by setting up an online mechanism for fund transfers using checks. Rapid advances in digital-imaging technology had made it possible for such checks to be produced and processed electronically. His