**2. Financial markets and electronic money**

***Money in the intangible economy***

With the new economic landscape now outlined, let us return to money. Not

surprisingly, in the intangible economy, money is also becoming increasingly

intangible. The relative weight of non-cash monetary transactions now exceeds

the value of cash money by a factor of ten. Money and payments are almost

entirely delivered via electronic networks as data bits and database entries. At

the wholesale level, money representation and manipulation are fully automated.

Dedicated payment networks such as SWIFT and payment clearing systems such

as TARGET or CHIPS are at the core of scriptural money.

Beyond the alteration of the appearance and mechanics of money, there are

deeper structural changes. The triumph of markets means that money is increasingly

used to settle multilateral market transactions rather than bilateral commercial

transactions. This functional evolution in turn leads to profound modification

in the design of clearing systems and networks, which need to handle larger volume,

work in real time, and offer more open access. While banks continue to play

a key role in the management of these systems, external pressure to open them to

other actors grows more intense.

Moreover, money itself became a tradable commodity. Markets for various

forms of money and monetary instruments are bigger than markets for equity or

for any commercial goods, and they fix the key money variables, interest rates and

exchange rates.

These changes make money more visible and pervasive but also less stable,

more volatile in its value, and more elusive. Monetary policy becomes more

important as a lever of economic management at the same time that the classical

monetary aggregates – M1, M2, M3 – lose their reliability as signals of future economic

growth and inflation. Charles Goodhart (1975) has formulated a monetary

equivalent of Heisenberg’s uncertainty principle:

“Any observed statistical regularity will tend to collapse once pressure is

placed upon it for control purposes.”

Because information is its key resource and output, the intangible economy is

highly data-sensitive and intrinsically self-reflective: it continuously monitors and

measures its own behaviour. As soon as authorities announce a monetary aggregate

target, financial intermediaries adopt strategies that minimise its pertinence

and causality.

***Electronic money debate***

The elusiveness of money explains the persistence of controversy as to

whether or not the transformation of money has led to the emergence of a new category:

electronic money (or e-money). Like the other controversies mentioned

above, disagreement is deep and remains inconclusive, due essentially to the difficulties

of definition. Academic, business and regulatory experts appear deeply

divided over the question.

Some analysts define electronic money as any form of money that is stored

and moved over computer systems and data networks. This implies that the

bulk of scriptural money is now by and large electronic. One example here is

Kurtzmann’s “megabyte money”, which is nothing more than a large-amount,

cross-border interbank payment.

Others characterise it in more restrictive terms. One commonly used definition

stresses the innovative use of technology. Frequently mentioned examples of

technology-driven e-money are the smart card-based electronic purses for small

value payments (Proton or Mondex) and encryption software-based digital cash

(token) schemes (Digicash or NetCash). Another definition focuses on novel uses

such as air miles – more than half of which are generated and used on the ground

– or multibrand loyalty schemes. The interest of use-based e-money schemes is

that they are originated and operated by non-banks.

The differences in definition are of more than academic interest. They have

substantial regulatory implications. In September 1998, the European Commission

(EC) issued a proposal for an electronic money directive. The result of several

years of discussion among official bodies and between the public and private sectors,

the proposed directive offers a legal framework for regulation of e-money

issuance by potential non-bank actors.

In the directive proposal, the EC defines e-money as a multi-purpose instrument.

In other words, e-money is construed as a payment instrument that can be

used to settle more than one kind of transaction, while the traditional definition of

money stresses its universal dimension. The new definition leads to a broader

and more ambiguous definition of the issuer of electronic money. A non-financial

institution, a retailer or an Internet service provider that issues an electronic

instrument appropriate for several types of transactions (buying physical goods

with selected merchants, buying intangible goods such as information, participating

in an auction, etc.) can thus be considered as an electronic money issuer.

The proposed directive explicitly acknowledges the possibility of non-banking

e-money issuers and defines a specific regulatory and prudential framework for

them.

The proposed directive is still under discussion. It is highly controversial and

afflicted by the middle-of-the-road syndrome. For e-commerce enthusiasts, it may

create an additional burden and deter innovation. For regulators such as central

banks, it may be too light. Thus the European Central Bank (ECB) would prefer

that the issuance of electronic money be limited to credit institutions and that the

definition of credit institution be enlarged to include all issuers of electronic

money. Under this approach, electronic money is assimilated to scriptural money

on an electronic support and as such does not require a fundamental overhaul of

the regulatory and institutional framework of monetary systems. According to

many central banks within the European Union such as Banque de France, e-purse

and e-cash are prepaid instruments that resemble in substance traveller’s cheques,

except that the latter are not divisible. No new status or regulations are required

for traveller’s cheques, and therefore no new status is necessary for e-money.

As for loyalty schemes, their use is restricted and they are not broadly

redeemable (except within the designated set of merchants). Therefore, they cannot

be considered as money.

Beyond questions of definition, technology-based and use-based schemes

raise other substantive issues.

Both e-purse and e-cash ran into serious market acceptance hurdles. The

most successful financial e-purse scheme, Proton, has achieved a cash substitution

rate of less than 5% and its transaction rate is insufficient to attain profitability.

E-cash schemes fared even worse. Despite considerable media coverage and

excitement among the digerati, practically all the systems run into difficulties,

sometimes fatal. Digicash, tireless promoter of e-cash – which had moved from

Amsterdam to the promised land of Silicon Valley in April 1997, acquiring substan

tial funding and prestigious investors, including Negroponte – was liquidated in

September 1998. The early market leader, Cybercash, is struggling, has changed

its strategy and top management several times, and in early 2001 delisted itself

from NASDAQ. In France, KLELine, which specialised in e-merchant acquiring, was

closed by its owner, BNP-Paribas, in Spring 2000. Another company, backed by all

the French banks, which sought to combine Internet and smart card technologies –

Cyber-comm – was wound down in early 2001. Micro-payment, which was considered

in the mid-1990s as a potential killer application and a preferred mechanism for

intangible goods transactions (information, online entertainment…), has so far

failed to take off.

The main problem with these Internet payment initiatives is that they have

not focused enough on customers’ behaviour and attitudes. As a result, most of

them appeared as solutions in search of a problem, suffering from technological

overkill while lacking marketing and business sophistication. They were aimed primarily

at small-value business-to-consumer payments and were basically

conceived as substitutes for card- or cash-based payments. Thus, even if they had

been successful, it is not certain that they would radically transform the existing

monetary systems.

Use-based e-money schemes, many of which can boast millions of loyal users

and are becoming ever more sophisticated, raise the same question: what difference

do they make for existing money systems?

As a new generation of e-money initiatives emerges – some of them quite successful

(Paypal, for instance, which claims over 8 million customers) – the question of

what is electronic money becomes ever more topical.

***Electronic money: elements of a definition***

Electronic money should be defined as a new category and its starting point

should be a reference to two existing categories – fiduciary money and scriptural

money. The definition should be systemic, considering the ways in which the

given category articulates the three basic money functions – unit of account,

exchange medium and store of value – and its institutional framework. It is also

essential to look at the entire monetary process: not only at the issuance, where

most of e-money discussions tend to focus, but also at settlement and clearing. In

effect, clearing and settlement are as essential in the determination of the scope

of acceptability and universality of money (whether fiduciary, scriptural or electronic)

as the issuance. Furthermore, it is in this area that widespread IT use has

had the strongest impact. Back-office automation facilitated and stimulated the

explosive growth in the volume and scope of electronic payments, wholesale and

retail, national and global.

Fiduciary money tightly links the three functions. Its issuance is strictly

controlled. To the extent that cash is self-referential, the clearing and settlement

process is quite straightforward and seeks to ascertain that the currency is genuine.

Fiduciary money is not really suitable for multilateral market transactions.

Scriptural money combines unit of account and exchange medium functions.

The value is immobilised. The issuance of scriptural money is regulated. The

clearing and settlement process becomes more complex: it is necessary to verify

not only the instrument but also the identities of both the payer and the payee;

the exchange medium and underlying value need to be reconciled and exchanges

recorded. Thus scriptural money requires detailed accounting and dedicated

clearing and settlement systems. Such systems are tightly supervised by central

banks and their access is hierarchical, with commercial banks acting as gatekeepers.

When the scriptural money is paper-based, the system is costly and difficult

to scale up. Hence the emphasis on automation, in order to replace the exchange

of instruments by account transfers. However, automated clearing and settlement

systems have for the most part retained access restrictions and banking control.

On the other hand, dematerialisation of the exchange function made it easier to

use scriptural money for market transactions settlement. It also facilitated the

emergence of new instruments based on bank accounts, such as direct debit or

debit and credit card.

Electronic money unbundles the unit of account function, which becomes

completely dematerialised. In the intangible economy, where all values are relative,

values are calculated as indexes and all index computations are widely and

readily available. Furthermore, the value is not necessarily fixed at the time of the

exchange. On the other hand, electronic money combines exchange medium and

store of value functions. It is not tied to a single exchange medium but can be

embodied in a variety of instruments. Similarly, the store of value is not limited to

a banking deposit. Various types of intangible assets, information, intellectual

property, etc. can be used as a counterparty for e-money. E-money can be seen as

a digital value contract, and e-money transactions as a digital barter. The issuance

of e-money is quite open. On the other hand, clearing and settlement systems are

regulated to ensure redeemability and convertibility into other money categories.

The access is no longer restricted to banking institutions. Nevertheless, those who

have access privileges need to satisfy defined regulatory and prudential requirements.

The distinction between commercial and market uses of e-money becomes

irrelevant as most commercial transactions are mediated by the markets.

This definition of electronic money is admittedly quite generic. Some of its

elements are already in place, while others are still in various stages of gestation.

Nevertheless, it provides a blueprint that should facilitate the understanding of

the ongoing e-money emergence process.

**3. Looking forward: from the cash nexus to the market nexus**

There is certainly no dearth of studies and essays about the future of money.

Most of them, however, tend to confuse current innovations with long-term trends.

Thus, discussions on the subject tend to oscillate between two extremes. On the

one hand are the “apocalyptic enthusiasts”, who view e-cash, e-purse and similar

initiatives as the four horsemen of the apocalypse, which will destroy the financial

system as we know it. For instance, Tatsuo argued in 1996 that digital cash has a

“potential to cause conflict between cyberspace and nation states”. On the other

hand are the “sceptical incrementalists”, who, having ascertained the hard slog of

e-money innovations, tend to see the future of money as more of the same, with

technology-based innovations being assimilated into the mainstream of the

scriptural money framework.

The author’s view is that neither of these extremes illuminates the way forward.

Electronic money is a major systemic innovation. However, as with the other

monetary system innovations, its deployment and dissemination will be a lengthy

process that should be measured in decades rather than in years. Furthermore,

electronic money will have a significant impact on the existing forms and categories

of money, without necessarily eliminating them. Various monetary systems

will be closely integrated with intangible markets. The cash nexus will become a

market nexus.

In order to highlight the systemic nature of electronic money, this peek into

the future of money will begin with a discussion of relevant intangible economy

trends, in particular the evolution of intangible markets. Against this background,

the chapter will examine emerging forms of money and the core alternatives of its

evolution.

***Cross-currents: strategic schizophrenia***

The intangible economy has strong momentum. However, the logic of dematerialisation

is not deterministic. It does not point to a single optimal trajectory. It

actually widens the range of choices and alternatives. Instability and volatility,

which govern the demand for intangibles, become pervasive and affect all aspects

of the economy, national competitiveness, business hierarchies and market structures,

prompting frequent and often brutal financial and economic shocks. The

hierarchy upheaval is particularly dramatic in business: out of 500 American corporations

that comprised the Fortune 500 ranking in 1980, 40% disappeared by 1992.

Market dominance can be achieved with unprecedented speed and lost with

equal if not greater rapidity, particularly in fast-growing sectors such as telecommunications

and the Internet.

Upheavals in the marketplace are accompanied by radical reversals of opinions

among business watchers. In the early 1990s, big multinational companies

were called “dinosaurs” and condemned to inexorable decline. By the late 1990s,

size and global reach mattered again.

Instability and volatility are not only sequential but also simultaneous. At the

core of the intangible economy, conflicting forces are at work: economies of scale

and increasing returns on the one hand, the shift of value to the consumer and

market upheaval on the other. Its trajectory is buffeted by contradictory crosscurrents:

globalisation and localisation, concentration and fragmentation, vertical

integration and horizontal competition.

At times, it appears that the guiding principle of business strategies and economic

policy making is schizophrenia. While competition has never been keener,

the fight for market share more brutal or the rivalry between firms more intense,

alliances proliferate in all sectors and management theorists extol the virtues of

co-operation and sharing. This coexistence of competition and co-operation has

led to the emergence of a bridging concept – “coopetition.”

The intangible economy has not killed distance but transformed its nature:

topography is less relevant and topology has become essential. Distinctions

between proximity and remoteness remain highly pertinent. Increases in connectivity

do not necessarily lead to either a levelled or a uniform field. If anything, the

communication landscape is becoming more picturesque and varied. The explosion

of potential links leads to a greater selectivity and proliferation of communities.

Density of links, connections and relations is highly uneven. Moreover, virtual

and physical contacts are complementary rather than mutually exclusive.

***Market and networks***

Thus, contrary to some high-profile pronouncements, the intangible economy

is not frictionless. Actually, the level and intensity of frictions is likely to increase.

Specific intermediaries such as travel agents may be threatened by the wide availability

of information and ease of communications, but this threat does not entail

complete disintermediation. As a matter of fact, the abundance of information,

opportunities and relationships increases the need for new intermediation

structures and mechanisms.

Markets are more important than ever. It is no accident that one of the key

players in electronic commerce, which emerged relatively unscathed from the

dotcom debacle, is E-Bay, a wide-open electronic marketplace with 30 million

users, seeking to trade “practically anything on earth”. In the B2B segment, the

proliferation of private and virtual marketplaces has been a dominant growth

driver. Even if there has recently been a pronounced slowdown in their deployment,

it seems likely that the increasing proportion of inter-business transactions

will be mediated through these marketplaces. If they follow the logic of dematerialisation,

they may provide a platform for generalised asset trading, where companies will be able to acquire either the (tangible or intangible) asset itself or

various derivatives offering defined rights to use it.

*Toward netmarkets*

As markets are growing increasingly dematerialised and virtual, traditional

distinctions between markets and networks blur. The two concepts converge, each

providing useful tools for the other:

• *Markets as networks.* Markets display strong network externalities: the greater

the number of users, the greater the benefits to every user. In the case of

networks, the primary benefit is connectivity; in the case of markets, it is

liquidity. As markets become more open, they need to make their access

rules less rigid and more similar to those of traditional networks such as

telecommunications. Markets also have to address and implement smooth

and transparent interconnection, the core competency of networks.

• *Networks as markets.* As networks become dissociated from the physical infrastructure,

the management of access and capacity becomes more complex.

Network designers use market negotiation mechanisms to optimise management

and guarantee a defined quality of service. Similarly, the use of

networks as a conduit for electronic commerce transactions creates a need

to enhance counterparty identification and trust building procedures, long

established in financial markets.

Thus, while markets seek to enhance their connectivity, networks look to

embed trading capabilities in their design. Hybrid forms of business and economic

organisations emerge, which can be called netmarkets.

***Emerging forms of electronic money***

*e-fungibility and digital barter*

In the intangible economy, the notion of fungibility acquires a new meaning. The

traditional meaning refers to fungibility among various forms of money, say between

cash and scriptural currency. The new term e-fungibility describes the possibility of

substitution and exchange between various types of intangible value: money, information,

intellectual property, communications. To the extent that they all share a common

technological substratum of digital storage, it is easy and cheap to exchange

money for information, information for access, access for intellectual property acknowledgement,

and so on. Each of these can be used alternatively as a store of value and/

or exchange medium. Thus e-money can, for instance, take the form of:

• Intellectual property money, where the value is based on the content and

its protection.

• Communication money, where the value is based on access and related

services.

E-fungibility makes it possible both to calculate exchange parities between

different forms of value and to carry out exchange transactions, through what is

really digital barter.

*Intelligent money*

As monetary transactions become more complex, the role of enabling technologies

becomes crucial. These technologies, network and database design more specifically,

have allowed the creation of highly reliable and secure networks and

systems. In the future, another technology is likely to play a critical role: object software

design and programming that increases the intelligence of various system

components. The intelligent agent technology is already frequently used in the

design of trading systems to allow them to respond automatically and appropriately

to delicate and complex situations (large trades or linked trades, where execution of

one transaction is contingent upon execution of one or more other transactions).

It is only a matter of time before the intelligent agent approach is applied to

the design of money systems and money instruments. These will be endowed

with sets of behavioural rules and, at a later stage, with a learning ability. If successful,

the intelligent agent application will result in the emergence of intelligent

money (I-money). Such money will for instance vary its value and response function,

depending on specific transactions and counterparties. Monetary systems

will consist of sets of I-money and rules for their interactions.

**4. Core alternatives for the future money landscape**

Let us now try to put the future development of e-money into a broader

perspective. If history provides any guide, it suggests two main lessons:

• The development of electronic money is unlikely to be a smooth, linear or

harmonious process. In all probability, it will be a rough, meandering and

contentious journey.

• Various money systems will coexist and interact.

To apprehend the future money landscape, we can try to identify what could

be called “core alternatives”. These are not full-fledged and internally consistent

scenarios but narrow beams into the future, structured around a simple hypothesis.

Three such alternatives can be identified:

• The private currencies alternative.

• The global currency alternative.

• The market nexus alternative.

***Private currencies***

The private currencies alternative postulates a proliferation of issuers and

currencies. It is a variation on an idea first formulated by F.A. Hayek in 1976. He

argued forcefully against the government monopoly on money and in favour of

competing private issuers. This was seen as a way of avoiding the monetary

manipulation which, according to Hayek, caused inflation and the “boom and

bust” cycle.

More recently, two other private currency models have emerged. One is the

community currency model, where the value store of money is constituted by a

range of local services. Community money is then used to build a common

account base and thus facilitate a broader exchange of these services. Nevertheless,

community money remains fundamentally local and is not intended for

redemption outside the boundaries of the community. Probably the best-known

examples of community currency are the Local Exchange and Trading Schemes

(LETS), which were first launched in the late 1970s in British Columbia and really

took off in the 1980s, thanks to the efforts of Michael Lipton.

The other private currency model is the corporate currency model. The

underlying idea is that many corporations have a stronger balance sheet than

most banks and their activities are extensive and global. Thus, if a corporation

such as IBM or Microsoft issued currency, to be redeemed against its products or

products of affiliated companies, it would be as credible as any bank-issued

money; the corporate issuer would have no difficulties attracting affiliated merchants,

who would accept the IBM or Microsoft dollar. Other “natural” candidates

for corporate currencies are the network suppliers and operators. It could be

argued that loyalty programmes offered by GSM operators such as Vodaphone,

which are redeemed either as additional minutes or against goods and services

offered by affiliated merchants, constitute a private currency. Moreover, these

operators deal with sophisticated networks that already offer financial functions

such as micro-payment accounting, real-time credit checks for international roaming,

and roaming clearing centres to settle operators’ liabilities.

So far, private currencies remain either at the idea stage or are confined to marginal

local situations. Corporate currencies also remain limited to schemes such as

Disney dollars, redeemable in various Disney attraction parks, or GSM loyalty points.

Nevertheless, the wide availability of enabling technologies, providing tools both

for issuance and clearing and settlement, lead many analysts to believe that private

currencies will take hold and constitute a preferred form of electronic money. Community

currency in particularly has attracted vocal and passionate support. Keith Hart

(2001) sees it as a lever of greater economic and political democracy.

***Single global currency: the geo***

This is the polar opposite of private currency: it postulates the emergence of

a single global currency. That would be a logical consequence of a broad globalisation

trend, a monetary translation of deepening economic integration. The example

of the euro demonstrates – although some observers question how

convincingly – the feasibility of a single currency in a multinational framework. It is

interesting to note that another Nobel Prize winner – Robert Mundell, who played

a major role in providing the conceptual underpinning for the euro – has more

recently advocated creating a composite global currency, initially backed by gold.

Thus, from the euro, the dollar and the yen could emerge the geo.

The technology for the global currency is available (although not as widely as

the technology for private money) and the task, while challenging, is not excessively

complex. What would be required is a creation of a single clearing and settlement

system for geo-denominated transactions. Such a system would be based

on Real Time Gross Settlements methodology adopted by all the major central

banks, and would be built on the architecture and experience of the TARGET system

used by the European Central Bank to settle interbank euro transactions.

The critical success factors for the geo are not technological; they are economic

and political. Economically, countries entering a common currency system need to

accept a common macroeconomic discipline. Politically, there has to be a strong will

to create a global common currency. The geo will not arise spontaneously from the

interplay of market forces.

It is probably for that reason that the geo alternative has had a considerably

lower profile than the private currencies alternative. However, over the next ten to

twenty years, the question of a global currency is more than likely to return to the

top of the public policy agenda.

***Market nexus***

This alternative builds upon the hypothesis of an ever growing integration of

monetary systems and financial markets. It postulates strong development and

ever broader coverage of e-money in the form of digital value contracts (DVCs).

The “digital value” notion refers both to the medium – DVCs will be softwarebased

and electronic network-resident – and the substance – they encapsulate

various types of values that are e-fungible. Combining value and medium of

exchange, DVCs are not unlike Lewis Carroll’s Cheshire Cat, obeying the disconcerting

rules of fuzzy logic: they are simultaneously value and representations of value,

unique and ubiquitous, standardised and customised. Although they may be privately

issued, DVCs are widely tradable on various public and private markets.

This makes them distinct from private currencies. As markets interconnect, DVCs

will be increasingly fungible with each other. This will enable their greater use as

collateral and security, and thus enhance their store of value function.

DVCs are used to facilitate exchange of value in a multilateral and uncertain

environment. They are widely used for risk management, whether on the cautious

(protection) or audacious (speculation) side. The marking trait of DVCs’ evolution

is their ever expanding coverage. After having conquered the realms of basic

commodities and financial instruments, they are being readied for use in energy

management and environmental protection. Thus, trading of carbon dioxide emissions

permits is seen as a way of reducing pollution more rapidly and effectively

than the better-known alternative of the political process and tough regulatory

regimes. This confidence is based on the successful results of the existing United

States Sulfur Dioxide Allowance Program, which achieved high rates of compliance

with stringent environmental goals at a low overall cost to the economy. Regulated

sources have enjoyed maximum flexibility to choose their means of compliance

with environmental regulations, and government administrators have found

emissions trading to be politically attractive, efficient, and simple to maintain.

Two other areas where DVCs are likely to play a major role are the B2B

markets and social protection.

In the B2B domain, DVCs will enable the transition from procurement of

direct and indirect inputs to generalised asset trading. By extending the range of

contracts and applying financial derivatives techniques, DVCs will enhance the

liquidity of B2B marketplaces. Already, they are being used to reduce the volatility

of markets for such critical components as DRAM memories, and to better manage

network capacity through bandwidth trading. A new category of DVCs is likely

to be developed to allow greater tradability of such intangible assets as intellectual

property or customer databases.

Social protection use of DVCs is still at the concept stage. One can argue that

company stock options, widely used in technology companies, could be construed

as a form of DVC. However, as shown during the severe market correction, stock

options offer less-than-perfect downsize protection.

A more ambitious project to use DVCs for protection against long-term economic

and social hazards such as unemployment or substantial drops in income

has been formulated by Robert Shiller, who proposed setting a new market category

for these hazards. Designed to manage society’s largest economic risks,

“macromarkets” (as Shiller called them) could be used for instance to mitigate the

transition from pay-as-you-go to funded pension schemes, and to make these

transferable. In the future, the use of DVCs as a tool for solving public policy

problems will become commonplace.

***Key questions***

*Displacement or coexistence?*

Relationships between the three alternatives are ambiguous and highly

context-dependent. Under certain conditions they are conflicting, even mutually

exclusive. Hayek’s vision of “denationalised” money clearly runs against the

concept of a single global currency. Private currencies and DVCs are possible substitutes.

Large corporate entities may prefer to issue DVCs rather than corporate

currencies for the same reasons that they prefer negotiable instruments to bank

loans.

In other circumstances, core alternatives are compatible and could actually

be complementary. The geo can very well coexist with corporate currencies and

with DVCs. Some observers argued that the euro introduction should have been

used as an opportunity to promote new forms of money, which could have

reduced the demand for cash currency. Even if this opportunity has not been

taken, introduction of the geo would entail major changes in the handling of

traditional fiduciary and scriptural money and thus favour financial innovation.

*How quickly and strongly will the new alternatives emerge?*

At present, DVCs have the strongest growth momentum and potential. Private

currencies, despite considerable media coverage, remain a largely marginal phenomenon.

They experience difficulties to scale, to expand beyond particular local

circumstances. The geo is far from the top of public policy makers’ agendas. It

should not be assumed, however, that over next twenty years the relative position

of the three alternatives will remain unchanged. Private currencies may enter an

explosive growth trajectory under the impact of new aggregation and peer-to-peer

technologies. The geo could be catapulted to the forefront in the aftermath of a

major global crisis.

The range of futures of money is quite broad. Nevertheless, one thing

appears certain. Electronic money will continue to emerge, rendering the overall

money landscape more intricate and multifarious.

**5. Opportunities and risks**

The emergence of electronic money will create a wide range of benefits:

• It will align the monetary system more closely with the overall dynamics of

the intangible economy, thus making resource and asset allocation more

efficient.

• It will facilitate the development of new products and services, not only in

the financial sector but also in various forms of electronic commerce. Many

of these products and services will be highly innovative and offer high

growth potential.

• It will sustain the design and deployment of new business models such as

multitier third party payments and multistream revenues generation, which

allow easier capture of value of intangible artifacts and assets such as

content and knowledge.

• It will offer speed, global reach and granularity, which facilitate the customisation

of payment solution to particular customers and situations.

Yet, the progress of electronic money also creates risks.

***Conceptual confusion***

The first is one of conceptual confusion about electronic money and its implications.

We have seen above the difficulties of defining electronic money and the

more general problems of apprehending traditional money. The monetary system

is increasingly complex. It never was really stable, but the pace and the scope of

change are now greater than ever. Historical precedents are only of limited relevance.

Money practitioners, analysts and regulators all grope for conceptual

tools that would make those changes more intelligible and provide actionable

guidelines. But their quest is far from over.

***Unstable institutional framework and governance***

One of the major symptoms of confusion is the concern about disintermediation.

That term has several meanings. Traditionally, it means the decreasing role of

banks in financial activities such as lending. In the new economy context, it

describes the sweeping elimination of all intermediaries and the generalisation of

peer-to-peer relations. This type of disintermediation is unlikely. However, the

changing role of banks in the economy is unquestionable. So far, while banks have

been losing share in many of their traditional strongholds, they have maintained a

dominant role in the management of monetary systems, particularly the clearing

and settlement function. This was not only due to their market prowess but also to

a firm stance taken by regulatory authorities, notably central banks. Nevertheless,

political pressures to open the existing monetary management and clearing

system to greater competition are growing. Neither private currency nor DVC

approaches place banks at the heart of their governance. In the electronic money

context, the very notion of financial institutions becomes more ambiguous and difficult

to define. The existing institutional framework is thus under pressure to

evolve, but there is no well-defined and agreed blueprint for an alternative framework.

It is not even sure that a single framework will emerge. After all, financial

markets and financial services often operate within different frameworks and

distinct regulatory regimes. In any case, the governance, operational management

and regulatory oversight are and most likely will remain in a state of flux.

***Loss of control***

The upshot of conceptual confusion and institutional instability is a widespread

sense of the loss of control. This goes beyond the difficulties of conducting

monetary policy and supervising financial institutions that are active across all

continents and offer a huge range of services. Many observers, some of whom

have extensive inside knowledge, believe that the evolution of monetary systems

is undermining the traditional political structure of nation states. Walter Wriston,

ex-CEO of Citicorp, called this the “twilight of sovereignty” (1992). Financial markets

have taken away the economic policy making power of governments. This

power has not so much been transferred as diffused across a wide range of actors

with often conflicting interests.

***Extreme volatility and increased fragility***

As a result, financial markets are unstable. The volatility of financial prices is

widespread, persistent and contagious: foreign exchange markets have been volatile

since 1973, interest rates since 1979 in the United States and the mid-1980s in

Europe; equities became more volatile during the 1990s. Volatility results not only

in wide swings of value but also in large gaps between financial and economic

value. In turn, those gaps lead to financial “bubbles”. As bubbles cannot inflate

indefinitely they burst periodically, often brutally: hence the increasing frequency

of financial crashes. Global equity markets crashed in 1987, in 1989 and again in

1998 and 2000; bond markets collapsed in 1987, 1994 and 1998, every time wiping

away hundreds of billions of dollars of market value. So far, despite those crashes,

the global economy continues not just to function but to grow and prosper. Nevertheless,

the sense of fragility is exacerbated. National and international regulatory

authorities live in a mode of permanent crisis management.

***Social backlash***

To the extent that the ascendance of global electronic markets is seen as a

dictatorship of blind economic forces, it can and does generate social backlash.

Electronic money is widely seen as one of the most pernicious aspects of globalisation

– hence, the continuing interest in the Tobin tax proposal. An international

association to support this proposal, ATTAC, became one of the most active and

visible promoters of the anti-globalisation movement, which vehemently criticises

the World Bank, IMF and WTO.

The development of the intangible economy is likely to further exacerbate

the backlash, as it entails a continuing extension of the scope of intangible

markets and DVCs. For many people, feelings and ideas should not be subject

either to the economic calculus or to market vagaries.

***Growing dependency on technology***

Electronic money, in its different forms, becomes practically impossible to

dissociate from its technology, which is not only its support but also its substance.

This creates a strong dependency on technology and its evolution, and that

dependency in turn triggers risks. Some of these are well-known – system breakdown,

security breach – and are being treated with a high degree of priority.

Such treatment requires an extensive use of technology, thus aggravating the

dependency.

The evolution of technology is likely to set off qualitatively new types of risks.

Its major thrust will be to endow systems and its components with increased intelligence

and ability to learn. Both markets and money will become intelligent.

Transactions will be automated, carried through machine-to-machine, agent-toagent

dialogues and transactions. This entails a decreasing involvement of

humans. It is even possible to envision situations of conflict between intelligent

systems and their human operators. Some future watchers go even further. Thus,

Bill Joy, chief scientist of Sun, conjectures a future that “does not need us” (2000).

**6. Conclusion**

A new category of money is emerging: electronic money. Underpinned by the

broad shift to the intangible economy, it is likely to become not only commonly

used but a dominant system for determining and exchanging economic value. Its

trajectory is clearly ascending. Yet, it is not linear or two-dimensional. There is no

“one best way”: the range of its possible evolution is very wide. More importantly,

both economic agents and public policy makers have latitude to act and to

influence both the process and the outcome of electronic money’s gestation.

The configuration of electronic money will be the result of interactions among

economic agents, public policy makers and structural trends of the intangible

economy. This configuration may be stable but will not be fixed: the ability to

adapt will be its built-in feature.

To facilitate the emergence of electronic money, it is important to be openminded,

to accept innovative visions of money and monetary transactions. At the

same time, it is essential to recognise that many of these visions will either never

be implemented or fail the critical test of customer acceptance.

For policy makers, the critical challenge is that of new forms of governance. In

the new landscape, the roles of financial and non-financial institutions as well as

those of the enabling technology providers and regulatory authorities need to be

redefined. Does the combination of business and technological trends imply that

finance is being rendered commonplace? Does it reduce barriers to entry to a

point where any network can become a market, any computer can become a clearing

system and anybody can issue electronic money? In the new environment,

what is the meaning of financial transaction, financial intermediary and money?

The openness of electronic money means that governance structures and

conduct will need to be more open than they are at present. They are more likely

to be structured as a network than as a hierarchy, interconnected rather than centralised.

They may even include elements of competition and negotiation among

various structures.

More importantly, they will need to integrate the technological dimension.

Lawrence Lessig (1999) considers that information technology and computer code

have regulatory power. In other words, computer code can be used to define and

control the rules and behaviour of a given system and its components, not only in

cyberspace but also in the physical world. For instance, privacy and decency rules

built into the system architecture constitute an efficient alternative to legislation

and administrative laws and decrees. Financial systems already include codebased

rules, which govern access and risk management in real time. Interbank

clearing systems, for instance, verify funds availability in real time and automatically

limit the credit exposure of system participants. Such automated rules were

introduced because usual rules and control mechanisms were simply impracticable.

This approach may be extended and raised to a higher level of governance.

The International Financial Architecture has been extensively if rather inconclusively

debated at the most senior levels of international co-operation with the aim

of improving the stability and the security of the global economy. This discussion

acknowledged the risk of technology but has not considered its potential

advantages, in particular its integration into the regulatory framework. Is it

naive to believe that one way to advance this debate is to introduce the concept

of International Financial Technology Infrastructure?