**Intangible Economy and Electronic Money**

**Introduction\***

Money is a fulcrum of paradoxes. It is, in the famous characterisation by

Simmel, heartless – and yet, according to Zelizer, deeply emotional, ubiquitous

but elusive, uniform and endlessly varied. The paradox to be explored here is that

of the relationship between money and economic systems. This relationship is

simultaneously tight and loose. It is tight to the extent that money appears as a

fundamental dimension of the economy, a yardstick by which its growth and

wealth accumulation are measured. The difference in monetary systems can be

used to discriminate among various economic systems. Thus, fiduciary money was

the dominant monetary system in the feudal economy, and the emergence of the

capitalist economy was accompanied and facilitated by the development of scriptural

money. Monetisation of the economy – the general use of money to effect

transactions and establish prices – was seen as a major vector of transition from

the feudal to capitalist economy. But the relationship goes deeper. Money has

been the lever of power, whether economic or political, in what Carlyle [and more

recently Fergusson (2001)] called the “cash nexus”. It is also a vector of statement

and measurement of social value and preferences.

And yet, relationships between money and economic systems can also be

characterised as – if not loose, at least relatively autonomous. Both fiduciary and

scriptural money were created long before the emergence of feudal and capitalist

systems. The path of their evolution has been long rather than short, circuitous

rather than linear, agitated rather than smooth – and rarely guided by a grand

\* Opinions expressed in this paper do not constitute an official position of the European

Commission or FIWG members.

overriding design. Most often, changes in monetary systems result from limited

actions aiming to solve particular problems. It is an accumulation of incremental

changes that periodically leads to massive systemic shifts. Money itself is a multifarious

phenomenon. The two broad categories cover a wide variety of specific

currencies, which are backed by distinct institutional arrangements for issuing and

settling them. Over time, these arrangements have become ever more complex, a

fact stemming partially from the coexistence of various currencies and forms of

money. Thus fiduciary money managed by central banks coexists and interacts

with scriptural monies managed by commercial banks. National, regional and global

monetary systems are all composite; their internal structure and boundaries

are constantly changing.

Clearly, the evolution of monetary systems has been strongly shaped by economic

and political requirements: trade facilitation for the private sector, debt

funding for the public authorities. But the causality has been bi-directional, with

monetary developments strongly impacting economic systems and their performance.

This impact has not always been symbiotic. Money has often proved a

recalcitrant instrument, its logic defying goals imposed by its putative masters

and triggering, in the apt sentence of Charles Kindleberger (1978), “manias, panics

and crashes”. Management of money has never been a deterministic endeavour

that could be put on automatic pilot. Rather, it is a discretionary undertaking

requiring constant attention and a deft touch.

The relationship between monetary and economic systems is a dynamic process.

There is a broad public consensus that the underlying trend is one of a growing

importance and visibility of money. As money becomes more ubiquitous

throughout the economy, it morphs into a self-sustained financial system, simultaneously

the support and the object of economic exchanges. Its complexity

increases, its transparency decreases and its behaviour becomes ever more difficult

to comprehend and to predict. The omnipresence of markets has changed the

nature of value determination. Value is no longer established by reference to

objective and immutable rules and yardsticks but by a trading process, which

makes it unstable and path-dependent.

As a result, the economic system is subject to chronic volatility and frequent

shocks. The invisible hand becomes conspicuous, but more importantly its benevolence

can no longer be assumed. For many observers, the financial system got

out of hand and the hypertrophied “artificial” financial economy is literally a vampire

that drains the “real” economy. And money, electronic, global and uncontrollable,

is the weapon of destruction. For instance, Joel Kurtzman – who, having

worked as Editor of *Fortune* and *Harvard Business Review* and having collaborated

closely with Michael Milken, can hardly be suspected of an anti-capitalist bias –

deplores the emergence of “megabyte money”, which he believes will destabilise

the world economy and provoke financial chaos (1993).

Criticism of the excessive importance of money is a long-standing tradition in

social sciences. There is, however, a crucial difference between past and current

criticism. Thinkers such as Marx or Simmel (1900) accused money of being a tool

that put society at the service of the economy. They saw money as the all-powerful

lever of economic uniformisation and integration. New critics agree on the pervasive

nature of money but paint the financial system as a mechanism that

destructures and destroys the economy. They question its utility and rationality.

The financial economy also has its vocal and enthusiastic defenders, who

applaud its ability to transfer resources and allocate capital rapidly and massively.

They see it as a vehicle of creative destruction, a ruthless but efficient mechanism

to promote innovation and eliminate obstacles to growth and development.

In any case, the view that the financial economy is running amok is an oversimplification.

Its hypergrowth has not taken place in a vacuum but is favoured by

the peculiarities of the evolution of the real economy, which will be discussed

below. Furthermore, this evolution has impacted the nature of financial markets.

The history of the relationship between money and the economy is instructive

as a general framework to provide broad analogies. Revolutionary change is a

useful example of such an analogy. We live in a period of radical transformation of

the economy, comparable to that of the earth-shattering transition from feudal to

capitalist economy. To the extent that this transition was accompanied and stimulated

by the emergence of an institutionalised banking sector and the concomitant

development of scriptural money, it can be asked whether the current

economic transformation will stimulate the emergence of the new financial intermediaries

and a new form of money. This indeed seems the case: the emerging

new economy, which we call the “intangible economy”, fuels the spread of the

market as the primary intermediation mechanism and the deployment of electronic

money, both of which in return accelerate the transition.

History can also enhance our understanding by highlighting critical differences

between the past and the present. One such difference is in the technology

of money. Both fiduciary and scriptural money require specific technologies and

infrastructure to produce, circulate and settle currency. However, these technologies

were confined to the monetary realm and thus tightly controlled by the

money issuers, who did their best to keep them away from public scrutiny. In the

case of electronic money, technology is pervasive and transcends the monetary

domain. The technology of money becomes more visible and hence more widely

used. At the same time that technology becomes embedded in money, it

becomes more difficult to control by those who traditionally regulate the monetary

and financial systems.

This chapter will elaborate on the postulate of a close and mutually reinforcing

relationship between the intangible economy, the triumph of markets and the flow of electronic money. It will first review the key characteristics of the intangible economy before looking at the dynamics of markets. It will then examine various

definitions of electronic money, before providing an alternative definition that

stresses its systemic character. Afterwards, it will outline the core alternatives

for future developments of money and highlight their interactions. Future developments

will then be reviewed from the viewpoint of the risks and opportunities

they are likely to generate. The chapter concludes with a look at the future trajectory

of electronic money and its critical policy challenges, the need for new technology-based governance frameworks.

**1. Background: the new economic landscape**

***Measurement gaps and Griliches’ paradox***

That the economy is undergoing far-reaching changes would seem a largely

incontrovertible statement, practically conventional wisdom. Knowledge Economy,

Digital Economy, Information Society, Third Wave... names for the new economy

proliferate to the point of becoming omnipresent buzz words. Yet, can we say

that we really understand the current economic evolution? Do we agree on its

rationale and development path? The answer to those questions is clearly

No. Economists and statisticians, whose role it is to explain the workings of the

economy and to provide performance and value metrics, are perplexed and

bewildered. Despite increased data sophistication and availability, substantive

deficiencies concerning such key economic variables as productivity, foreign

trade, investment and financial accounting measures remain. According to

Zvi Griliches, author of ground-breaking work on measurement, the share of economy

measured with a degree of accuracy by official statistics fell from 50% to 30%

between 1947 and 1990. Weaknesses are most pronounced in the areas that are

most dynamic and trendsetting, such as services and information technology. Call

it Griliches’ paradox: in this age of “information revolution” and “knowledge

economy”, measurement systems shed little light on activities where information

and knowledge are generated.

*Three key trends*

This paradox may seem amazing, to the extent that the key trends appear

well-established and documented. We can identify three such trends:

• *The changing profile of employment and the output structure.* The shares of industry

and agriculture in both total output and employment are falling steadily.

Services represent the lion’s share of both employment and output, and

constitute the principal source of employment growth.

• *Globalisation.* Foreign trade has been growing more rapidly than the world’s

output for decades. International organisations such as the World Bank and

IMF base their activities on the assumption that world trade will continue to

grow at roughly twice the rate of world output. The international trade of

final goods is accompanied by a massive cross-border deployment of production

facilities, distribution networks, technologies and people. Global

deployment of supply resources, in particular foreign direct investment

(FDI), has been growing at an even higher rate.

• *The ubiquity of information technology.* IT – computers, telecommunications and

associated products and services – is recognised as a structural vector that

influences all economic activities. The speed and magnitude of technical

progress are staggering and combine tremendous increases in quality with

a continuing decline in prices. A Pentium-based PC today offers several

thousand times as much processing power as the mainframe of the 1970s, at

a price that is less than 1% of 1% of the latter. Increase in the capacity of

telecommunications and concomitant price reductions are even more

impressive. The development of IT has engendered a huge economic

domain, whose global size is estimated at between $600 billion and

$1 100 billion. In the United States, since 1991, capital investment in information

technology exceeds investment in traditional machinery and

equipment.

While there is broad agreement on the existence of these three trends,

there is no real consensus on their magnitude, their underlying drivers or, more

importantly, on their economic impact. Each trend is a subject of intense yet

inconclusive controversies.

Although services represent the largest share of GDP and employment in all

OECD Member countries and their share continues to grow, their measurement is

still based on what can be called a “residual” approach: services include all activities

that cannot be classified as either manufacturing or agriculture. This results in

a tremendous heterogeneity. Services range from low-paying, low-productivity,

labour-intensive and very local activities such as restaurants to highly paid, highproductivity,

capital-intensive and global activities such as financial trading. Some

services are immobile and non-tradable, others are extremely mobile and highly

tradable. Certain services are subject to diseconomies of scale (household services),

while others are the prime beneficiaries of economies of scale (telecommunications).

This heterogeneity makes it difficult to agree on a meaningful aggregate

definition of services.

In turn, confusion over the definition of services is a key element of the

controversies about globalisation and information technology.

The conventional view of services is that they are less tradable than physical

goods. This view is apparently corroborated by international trade statistics,

based on IMF balance-of-payments data, showing that services represent some

20% of world trade, a share that remains relatively stable. There is, however, compelling

evidence that trade in services grows much more rapidly than trade in

goods. More importantly, cross-border services flows – telecommunications,

media and finance – constitute the very lifeblood of globalisation. International

voice traffic has been growing at some 16% a year. Based on firm-level information,

the cross-border data traffic is growing much more rapidly than voice. According to a study by Varian and Lyman in 2000, the global production of magnetic support data grows by 70% a year.

Direct satellite and mixed satellite-cable networks flood our TVs twentyfour

hours a day, seven days a week, with streams of images from around the

world. Each year, some 40 million hours of original TV programming are produced, corresponding to over 100 000 hours per day, of which 10% to 20% is

exported.

Global financial transactions dominate physical trade flows: the value of foreign

currency trading alone averaged $1.1 trillion a day in 2000, more than

50 times greater than the daily physical trade volume of approximately $20 billion.

Yet despite their size, visibility and intensity, global telecommunications,

media and financial flows remain at the periphery of conventional economic measurement

frameworks. This leads to misleading statements such as the claim that

the level of globalisation today is not higher than it was in the 19th century. That

assertion is based on physical trade data but ignores the other flows, which weave

an ever more dense global mesh of economic activities and entities.

The economic impact of information technology remains highly contentious.

The controversy revolves around what Robert Solow called in 1987 a “computer

paradox”: computers are visible everywhere except in the final output. Actually,

the period of massive IT investment in the 1980s coincided with a productivity

slowdown, particularly apparent in services.

The computer paradox prompted a large number of studies, many of which

were based on detailed sectoral and firm-level data. Yet, opinions remain as

polarised at ever. One group of analysts affirms that the computer paradox is simply

a by-product of inadequate data and that detailed studies show a significant

technology payoff, with return on investment often in excess of 50%. They believe

that IT investment was a major factor in the excellent performance of the US economy

in the late 1990s. Thus, Dale Jorgenson believes that information technology

has permanently raised the long-term growth rate of that economy. On the other

hand, sceptics persevere. For instance, Robert Gordon forcefully argues that the

impact of IT has been limited and temporary.

Despite their intensity, the apparent wealth of data and the critical importance

of their subject matter, controversies about the economic impact of services,

globalisation and information technology remain inconclusive. Beyond the arguments about data accuracy and measurement approaches, the core issue is the

relevance of underlying conceptual models and assumptions. The crucial assumptions of the existing macroeconomic framework – focus on the production and trade of physical goods, stable sectoral groupings and classifications, neglect of non-material cross-border flows – are grounded in a specific vision of the economy, fundamentally unchanged since Adam Smith, that postulates the production of physical goods as the main source of value. These assumptions and the underlying vision can no longer be considered universally valid. Alternative approaches such as the service economy or the information economy are widely known, but there has been little progress in making them conceptually more robust or operationally more relevant. Both approaches remain largely on the periphery of mainstream economics and statistics.

***Defining trend: shift to the intangible***

The need for a new conceptual framework for the modern economy remains

paramount. Such a framework should build upon the contributions of service and

information economy approaches, but should be broader to encompass other

significant trends such as the financial markets explosion.

This chapter proposes an alternative framework, based on an all-encompassing

trend: the shift from tangible to intangible. The economic landscape of the

present and future is no longer shaped by physical flows of material goods and

products but by ethereal streams of data, images and symbols. On the demand

side, we consume more and more content-based artefacts of information and

entertainment. On the supply side, intangible assets such as brand, human capital,

intellectual property and knowledge have become major determinants of companies’

performance and value. Welcome to the intangible economy.

The well-known three stages theory of economic evolution can thus be reformulated.

At the core of the agricultural economy, there was a relationship between

man, nature and natural products. The core relationship of the industrial economy

was between man, machine and machine-created artificial objects. The intangible

economy is structured around relationships between man and ideas and symbols.

The source of economic value and wealth is no longer the production of material

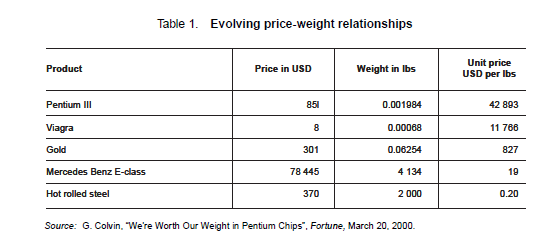
goods but the creation and manipulation of intangible content.

The shift to the intangible is general and long-lasting. It affects all sectors and

all aspects of economic life. According to Peter Drucker, the relative share of raw

materials in manufacturing output has been decreasing at an annual rate of about

1% a year since the end of the Second World War. Conversely, since the 1880s, the



relative contribution of information and knowledge to manufacturing output has

been growing at the same rate. The upshot of this trend is the remarkable increase

in economic value added per unit of weight, as shown in Table 1.

The shift to the intangible is often seen as a purely technology-driven phenomenon,

hence the frequent characterisation of the new economy as the Internet

or digital economy. This is a misleading oversimplification. Although IT is a cardinal vector of the intangible economy, it is not the only one. The emergence of the intangible economy owes at least as much to basic trends in consumer behavior and in the business environment. The shift towards higher relative demand for leisure, information and knowledge is a long-lasting trend in consumer behaviour: for instance, the share of services in household consumption in France has increased from 42% in 1970 to 51% in 1990. Business innovations such as brand-driven competition and cost-based accounting led firms to pay greater attention to the management of intangible assets.

The point here is not to argue a specific causality relationship – an arduous

and ultimately futile task – but rather to avoid the fallacy of technological determinism.

While the trend toward digitalisation and network proliferation is

unmistakable, the economic and business impact of that trend remains unclear

and the range of potential outcomes is wide open. The intangible economy is

non-deterministic and transcends Negroponte’s opposition between bits and

atoms the same way that quantum physics transcends the opposition between

particles and waves.

Difficult to ignore, the intangible economy remains nevertheless hard to

define and does not easily fit into standard economic categories. To under- stand the intangible economy, it is best to approach it from three different but complementary perspectives:

• Demand perspective: *intangible artefacts* – final output for household

consumption.

• Supply perspective: *intangible assets*, used by firms to establish and maintain

their competitive position and survival. These include brands, intellectual

property, human capital, research and development information and

know-how.

• Economic system perspective: *logic of dematerialisation*: – an interrelated set of

trends and forces that affects all economic activities, changing the nature of

economic transactions and market structures.

*Intangible artefacts*

Intangible artefacts include various forms of information and communication,

high and low culture, audiovisual media, entertainment and leisure, and of course

financial services, the ultimate intangible.

All artefacts are joint products, combining intangible content with physical

support: a song with a magnetic disc for an audio CD; history and a building site

for a classical monument. Traditionally, content and support were tightly linked,

making them unique or reproducible on a small scale only. The development of

storage and content replication technologies loosened the links. Like a dragon in

a tale, identical content appears in various shapes and disguises: a song can be

sung live, pressed on a CD or shown as a video clip. The dissociation of content

and support led to the proliferation of intangible artefacts in two ways. First, it

lifted capacity constraints. Previously, a sports game could be watched only by

those who could physically get to the stadium. Today, television can multiply the

number of spectators ad infinitum. One could argue that stadium attendance and

watching a sports event on TV are two distinct artefacts, with different consumption,

distribution and pricing characteristics. That is precisely the second dimension

of proliferation: the same content provides the source for a family of artefacts.

Thus a book can be offered as a hardcover, as a paperback, as a CD-ROM or

online. The ability to generate these families is what makes companies such as

Disney successful: each film concept generates not only movies but also videos,

park attractions, books, toys and other sources of revenue, thus leveraging the

content by a factor of two to four.

The consumption of intangible artefacts displays specific and interrelated

properties:

• It is joint (always consumed with other products, tangibles or intangibles).

• It is non-destructive: the same artefact can be consumed repetitively either

by the same consumer or by a different one.

• It is non-subtractive (or non-rival): one’s consumption does not reduce anyone

else’s consumption. In other terms, the opportunity cost of sharing is zero.

Intangibles such as information are often presented as a “public good”, comparable

to fresh air or to national defence, whose consumption cannot be limited

to a single consumer and therefore is inherently collective. A preferable term is

“shared good”, to the extent that sharing is a notable property of intangible artefacts.

It can be sequential or simultaneous. However, simultaneity in time does

not mean unity in space: information technology makes it possible to consume the

same artefact in several locations. Intangible artefacts create their own spacetime,

which lifts the constraints of geography.

Sharing affects critical aspects of intangible artefact transactions, such as the

allocation of property rights. While a seller of a physical good loses his property

rights to it, an intangible artefact seller continues to hold them.

*Intangible assets*

The shift to the ethereal is not limited to demand. On the supply side, it is

stimulated by the growing importance of intangible assets.

At first glance, intangible assets appear better defined than intangible artefacts.

Statisticians and accountants have long recognised that capital accumulation

and asset deployment mean more than the acquisition of physical plant and

equipment.

The share of intangible investment is expanding relative to physical investment.

According to the French national institute of economic and statistical information

(INSEE), intangible investment represented 30% of total investment in

1992 in France and was growing at a quicker rate than the traditional fixed assets.

Partial evidence suggests that in other countries, such as the United Kingdom, the

percentage is even higher.

The notion that the intangible assets are more important to business performance

and the survival of a firm than its physical assets is now conventional wisdom.

For consumer goods companies – Coca-Cola, Nestle, Danone – brand

management is the top priority guiding all strategies. Brand is also essential for IT

companies such as Intel and Compaq, which are spending substantial sums to

build it. Attempts are being made to quantify this “brand equity”. An American

business monthly, *Financial World*, each year publishes a brands valuation survey.

For leading brands such as Coca-Cola, Marlboro or Intel, brand valuation largely

exceeds their total balance sheet.

Acknowledgement of the importance of intangible assets is not limited to

brands. Intellectual property – patents, trademarks, technological know-how – is

considered a critical competitive weapon, particularly in software, electronics and

biotechnology. Its control is often a matter of life and death for companies. It is

through intellectual property litigation that AMD managed to preserve its foothold

in microprocessors, despite Intel’s domination. In merger and acquisition transactions,

apparently extravagant amounts paid for media assets such as Hollywood

studios or newspapers is justified by the value attributed to brands, contents and

publishing rights.

The problem of intangible assets is not the dearth of measurement. Rather, it

is the consistency of approaches. While managers live and die by intangible

assets, many accountants are still reluctant to include them in official accounts.

Microsoft considers software development, its core competence, as an expense

and writes it off in the year incurred. English football clubs do not include the

value of their players in their accounts. Reuters, the leading electronic information

provider, acknowledges that its balance sheet does not include the global

databases of financial information or its software and other intellectual property.

Just as intangible artefacts differ markedly from material goods, intangible

assets are not like tangible assets. First, they are heterogeneous: one hour of software

programming does not equal another hour of programming. The revenuegenerating

capacity of an intangible asset is much more uncertain than that of a

physical one. When a plant adds a machine, it can easily quantify the potential

output increase. On the other hand, when a computer department hires a programmer, it cannot predict with certainty either the quantity or, more importantly, the quality of his/her contribution. Also, intangible assets are difficult to separate from current expenditures. Whether an advertising outlay can be classified as current expenditure or investment depends on its purpose. Similarly, not all training or software expenditures can be treated as investment.

Because intangible assets are, by definition, non-physical, they do not follow

the classical progressive depreciation rules. Some assets depreciate very rapidly;

others, like a good wine, appreciate with age; still others follow non-linear and

often unpredictable life cycles.

Thus traditional asset valuation methods cannot be applied. The historical

cost of acquiring or creating an intangible asset is largely irrelevant. Asset heterogeneity

makes it difficult to calculate the opportunity costs. A market or transactionbased

approach also has serious pitfalls. For most intangible assets, markets are

very narrow and extremely imperfect, and transaction-based values are subject to

wide fluctuations. Thus, the range of methods used to value intangible assets is

getting larger, making the consensus on measurement of their value ever more

*Dematerialisation logic*

The impact of the intangible economy is not limited to intangible artefacts

and assets. The logic of dematerialisation is omnipresent and affects all sectors

and activities, new and old. It profoundly transforms the ways in which firms and

markets are organised and their economic transactions carried out.

Dematerialisation logic is unsettling: it runs squarely against some of the key

tenets of the conventional logic of economics. Conventional logic is concerned

with scarcity, dematerialisation logic with abundance. The former stresses equilibrium;

the latter, disequilibrium. Obsolescence, redundancy and volatility, perceived

in the past as pernicious epiphenomena, now constitute essential and

necessary vectors that shape consumption patterns and supply-side resource

deployment.

• Abundance: the wager economy and the bookstore effect

The intangible economy is structurally abundant. Abundance, of course, is not

a new phenomenon. The productive potential of the industrial economy is enormous.

However, physical goods are subject to physical decay and their consumption

marks the beginning of the end of their economic life. Intangible artefacts, on

the other hand, are not eliminated through consumption. The intangible economy

superimposes on the abundance of production the abundance of accumulation.

Financial systems generate too many transactions; Hollywood, too much entertainment;

the Internet, too much information. The ongoing deregulation of markets

for intangibles, along with technological evolution, continues to extend the magnitude

of the gap between supply and demand of intangible artefacts. For instance,

the number of television channels in the European Union increased from 40 in

1980 to 150 in 1994 and over 200 in 2000. Moreover, the gap is self-perpetuating: to

navigate through the information overload we need catalogues, indexes, documentation,

whose very proliferation calls for more cross-references, hypertext

links and so on. Information about information is a growing business.

A crucial implication of supply abundance is the ubiquity of failure. Flops are

the rule, successes an exception. In Hollywood, one movie is made out of a hundred

scenarios under development, and only one in six movies released makes

money. The flop rule is not limited to intangibles. In the pharmaceutical industry,

one in 4 000 synthesised compounds ever makes it to market and only 30% of

those recover their development costs. In consumer goods, over 80% of new products

launched in the United States fail within two years. Furthermore, the cost of a

new product launch is rising rapidly: $50 million for a movie, $250 million for a new

drug, several billion dollars for a new car.

And yet, despite this dismal outlook, the pace of introduction of new products

is not slackening. This has become a wager economy: higher and higher

stakes against lower and lower odds. As long as a player remains at the table, she

has a non-zero probability to recoup her losses. Only if she quits does her loss

become final.

Another reason for continuous new product generation is what can be called

the “bookstore” effect. The best bookstore is one that offers the widest choice and

thus stimulates browsing, which leads to greater consumption. It is not enough,

however, to have a wide assortment; it is also important to keep it current, hence

the need for continuing new product introductions. The bookstore effect explains,

for example, why Reuters maintains 20 000 pages of data in its online financial

information services, while the overwhelming majority of its clients use only four

or five. The value of its databases is derived not only from particular pieces of

information but also from the total inventory of data.

Structural abundance also has a major impact on the notion of capacity and

the use of productive assets. While in the industrial economy excess capacity is

synonymous with costly inefficiency, in the intangible economy it is widespread,

functional and inexpensive. It is functional, as it enables users and producers to

cope with demand volatility. Excess capacity is inexpensive because the key flows

are those of information rather of physical goods. The economics of adding capacity

for information flows are very different from that for physical goods handling.

The latter is clearly subject to diminishing returns and thus its marginal costs are

high. In the information technology realm there might be diminishing returns at

some point, but they are unlikely to be reached in the foreseeable future. The

long-term trend is for an exponential progression mode and for a dramatic fall in

unit processing and transmission costs.

• The changing nature of the firm

The intangible economy undermines traditional frontiers and distinctions.

Sectoral boundaries are crumbling: previously separate activities of telecommunications,

informatics, electronics and audiovisual media are now overlapping.

Time-honoured distinctions between work and leisure, home and workplace,

intermediate good and final output, consumer and producer, product and service,

become blurred. Not only are the boundaries porous and overlaying, they are

unstable. This is not a one-off effect but a fundamental trend. The intangible economy

does not follow the rules of binary logic, of exclusivity, but those of fuzzy

logic, of overlapping.

The interpenetration profoundly changes the nature of the firm and its relationships

with the environment. Internal links, between firms and their employees,

become weaker; external links, between firms and suppliers, become stronger.

While employees are told to work at home, suppliers are invited to work on the

premises. Functions traditionally considered as central to the very existence of

the firm are now subcontracted or outsourced. Nike, a leader in sports shoes, does

not manufacture any shoes. Nor does Dell, a leading supplier of computers, own

any production plants. In computer services, outsourcing is one of the highest

growth sectors.

Dematerialisation logic ends the information asymmetry between producers

and consumers and thus alters the market power balance. Today in many businesses,

the customer knows as much about products and markets as the supplier.

This entails not only substantial end-user price declines due to the loss of the

supplier’s market power, but also an unbundling of the production and assembly

processes. The unbundling is particularly apparent in the information technology

domain. Software applications and corporate networks are often designed and

built by customers, using inputs from different suppliers. Of course, they can also

be created by suppliers with inputs from customers. “Make-or-buy” decisions are

becoming more convoluted. The nature of competition changes: for computer services

suppliers, such as IBM or EDS, their biggest competitors are not the other

suppliers but their clients.

These developments suggest that the traditional rationale for the existence of

the firm, articulated by Ronald Coase (1937) as the minimisation of transaction

costs, is no longer universally valid. An alternative and broader rationale for the

firm needs to be developed, one that would stress the brand umbrella, the intellectual

property repository, and control of distribution channels as key cohesion

factors and functions of the firm.

***The changing nature of value and value discovery mechanisms***

The intangible economy changes not only the fundamental nature of economic

value but also the value discovery and capture process. Conventional pricing mechanisms

are largely inadequate to capture the economic value of intangible artefacts.

The two standard approaches are difficult to apply. Production costs/

marginal costs cannot be used as a guide for pricing when marginal costs are falling

or nil. Moreover, there is no proportionality between inputs and outputs. Mass

consumption does not imply mass production. Economies of scale for intangible

artefacts are often determined by consumption rather than by production.

The willingness-to-pay approach also has serious pitfalls, given the ease of

replication and sharing and associated externalities. For intangible artefacts, purchase

does not equal consumption (how many people read all the books they

buy?) and consumption does not necessarily imply purchase: in newspapers and

in broadcast television, the number of “free riders” far exceeds that of paying

consumers. Another problem, which particularly affects informational artefacts, is

what Stiglitz (1985) called the “infinite regress”: it is impossible to determine the

value of a given piece of information without having this information.

Traditionally, the pricing of intangibles was a function of convenience and was

based on the support rather than on the content. Thus, the price of a book was

determined by its thickness and the quality of the printing, and largely ignored

the content variation: the price of an excellent book was the same as the price of a

bad one.

The greater dissociation creates opportunities for unbundling: the content

can now be priced separately from the support. Price discrimination becomes

more common. Commercial online services, for instance, differentiate between

standard and premium services, which are sold at higher prices. Yet bundling has

its advantages, in particular the simplicity of administration. It facilitates pricing of

composite artefacts (multimedia software or amusement parks). Bundling also

allows cross-subsidies between artefacts that are profitable and those less profitable

but nevertheless essential for a full service offering. In financial services for

instance, equity research is bundled into brokerage commissions. Thus, the range

of pricing schemes for intangibles is getting broader and more complex. Furthermore,

different pricing arrangements can apply to apparently similar artefacts.

Computer software can be sold as a stand-alone product, or it can be bundled

with hardware or be distributed as a shareware or freeware over a network.

The Internet provides a fascinating laboratory of pricing approaches through

various combinations of selling, sharing and giving away. The debate over the

respective merits of those approaches is quite lively. Some argue that the development

of metering technologies, which measure the detailed use of a given software,

makes variable usage-driven pricing feasible. Others plead in favour of a

fixed access charge, independent of actual use. Still another group considers that

the ease of replication makes content practically free and therefore the only feasible

approach is to charge for ancillary services.

As pricing of intangibles focuses more on content it highlights an inherent

instability, and the volatility of valuation becomes structural. Fixed yardsticks and

benchmarks lose their relevance. It is no longer possible to define absolute value:

everything becomes relative. Economic value is now highly context-dependent

and time-sensitive: from one transaction to the next, the price can change dramatically.

This structural volatility contagion affects not only intangible artefacts but

also traditional industrial goods, as well as production inputs.

***Markets for intangibles and intangible markets***

The loss of stable benchmarks leads to greater use of markets as the prime

value discovery and transaction mechanism. The growing importance and visibility

of markets constitutes one of the essential traits of the intangible economy. This is

the era of markets triumphant and, as Bryan and Farrell (1996) put it, unbound.

At the same time, markets themselves undergo a substantive alteration. Their

main purpose is no longer to support the trading of physical goods but to facilitate

exchanges of intangibles, such as information. This does not mean that markets for

physical goods have disappeared or become irrelevant. They are alive, well and

growing. However, markets for intangibles are growing considerably faster. Furthermore,

the evolution of physical goods markets is heavily influenced by the

dematerialisation logic.

The peculiar characteristics of intangibles lead many analysts to argue that

they should not be traded through traditional markets. Ronald Coase attacked this

argument (1974) and suggested that the market for ideas should be approached in

the same manner as the market for goods. To put forward a variation of this suggestion,

markets for goods should be treated as a special case of markets for

intangibles.

In any event, the distinction becomes increasingly tenuous; all markets

become more and more intangible, both in terms of underlying products traded

and in the way they operate. Take their most visible form, the financial markets.

Over last thirty years, these have become enormous: the foreign exchange transactions

volume is close to $1 100 trillion a day. While international trade is growing at

a single-digit rate, international financial transactions grow at a double-digit rate.

Capital markets became a principal conduit for funding technological innovation,

accelerating its diffusion and, in the process, radically changing traditional notions

of economic hierarchy and capital mobilisation.

This rapid growth would not have been possible without a comprehensive

substitution of intangible data for physical objects, made possible by the massive

use of information technology. What changes hands in those markets are not banknotes

or stock certificates but book entries in digital databases holding banking

or securities accounts. This dematerialisation and the resulting drop in transaction

processing costs is one of the explanatory factors behind the explosive growth of

financial transactions.

Furthermore, progress in financial economics theory has led to the creation of

new markets that trade dematerialised derivatives of traditional products such as

foreign exchange, interest rates or equity portfolios. Derivatives markets, futures,

options, swaps, etc. have dramatically expanded the notions of tradability and risk

management. They are growing more rapidly than cash markets in the underlying

instruments.

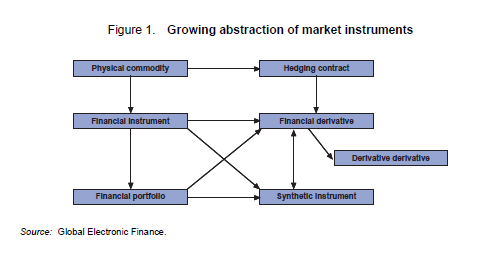
The financial markets explosion is information-driven. The globalisation of

the economy and the increasing variety of economic transactions create greater

uncertainty and thus generate a strong and continuous demand for information.

Financial markets are a web of conduits for displaying and exchanging such information.

Exchange of information, viewpoints, judgements and opinions has



become their main function. Higher levels of risk and uncertainty also create a

strong demand for information about the future. Derivative markets can be seen

as an aggregation of collective views about the future.

**2. Financial markets and electronic money…. Next lecture**