Electronic fund transfer systems and quality of life

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SOCIAL MEANINGS OF ELECTRONIC FUNDS TRANSFER SYSTEMS

Electronic funds transfer technologies are rapidly emerging. The many different technologies, collectively called EFTs, provide for the transfer of credits and debits and for a variety of related information services. They are likely to be widely used and may easily penetrate our everyday lives. If they become pervasive, they can alter the texture of our society with an intensity similar to that of the radio, automobile, jet plane, electricity, telephone, and television.

In their early years, new technologies offer tremendous promises to increase the quality of life for their consumers. However, when high technologies are adopted on a large scale, they often lead to social problems as small problems magnify in size. For example, cars were an optional novelty and recreational vehicle in the horse and buggy Los Angeles of 1900. Today they dominate the social architecture through freeways which link sprawling suburban tracts, regional shopping centers, and widely scattered workplaces.

Most complaints about modern "industrial technology" focus on large scale, relatively inflexible technologies with centrally managed infrastructures. Thus, the automobile, television, jet planes, and nuclear power raise troublesome problems. On the other hand, individually controllable technologies such as the telephone, cameras, stereo systems, pocket calculators, sewing machines, electric typewriters, and photocopiers have been applauded or silently accepted. It is not "technology" per se, but the social institutions that develop around a technology, that result in praise or mistrust and complaint.

Research studies can shed light on the impacts of different EFT arrangements. But investigators make important assumptions when they select particular social patterns and values to study. It is easiest to select "dominant social trends" such as increasing affluence, urbanization, market concentration, and levels of social integration which have characterized American life during the postwar years. However, the criteria for selecting some trends rather than others are rarely made explicit. Which trends will characterize our futures often lie in the eye of the beholder.

Trend analyses often obscure the possibility of important social choices. If the banking industry has been marked by increasing concentration in the last two decades, need that continue? Is it necessary or desirable that all EFT arrangements support that "trend"? While most EFT arrangements are promoted in a way which is consistent with a consumption-oriented growth economy, are any EFT arrangements particularly consistent with a steady-state economy? Such questions are hard to ask, let alone answer with casual trend analyses. This paper provides an alternative form of analysis by explicitly using a theory of social life and a design space for EFT arrangements.

QUALITY OF LIFE

We experience our social worlds and define the quality of our lives in very concrete terms: enjoying coffee with a friend, being frustrated over the noise of a radio or plane, or being disappointed in love, tense over the prospects of losing a job, or amused while watching a child play with a cat. "Quality of life" denotes the subjective meanings we place on our experiences and opportunities. In general, analysts define a good quality of life both by expressed personal satisfactions of people and by the absence of discernible social problems such as crime and unemployment.

Although, there are growing bodies of empirical research about perceived quality of life, theories of "quality of life" are rare. Gerson, however, has developed a position which merits serious attention. It emphasizes the relative power of participants in social settings as well as their relative social resources and satisfactions. Gerson's theory forms the basis of the analysis presented here.

We begin with a concept of social order which develops in and through a process of ongoing negotiation. In Gerson's perspective, the problem of reconciling the good of individuals with the good of the largest social group in which they act is that of "creating and managing a pattern of negotiations which is viable throughout the range of (social) scales at which it takes place."

This conception of social life emphasizes joint participation in multiple settings. The subjects of negotiation in each setting are flows of resources and constraints upon them. Resources include both material goods such as time and money, and social goods such as skills and sentiment (pride, embarrassment, state of mind, etc.). The quality of life of a
participant in a specific setting increases with:

- the resources at his disposal;
- his ability to negotiate new resources.

EFT arrangements may influence the quality of life for participants of a social setting on two different levels. First, they may influence the resources available to individuals in everyday life and the ability of individuals to negotiate with each other and with organized groups. Secondly, they may alter the resources available to specific organized groups and influence their ability to negotiate resources and commitments. In the next section, we will develop six categories for describing patterns of resource distribution and negotiating ability.

CHARACTERIZING QUALITY OF LIFE

We need a systematic way to think about the influences of alternative EFT arrangements upon the quality of social and institutional life. We emphasize six characteristics of social settings.

Resource Distribution

- **Opportunity:** the kinds of resources that an EFT arrangement adds to a particular social setting.
- **Ecology:** The extent to which specific EFT arrangements save or consume disproportionately large amounts of scarce non-renewable resources.
- **Coordination:** The extent to which specific EFT arrangements alter the ease with which a party can manage his activities across all the settings in which he participates.

Negotiating Ability

- **Intelligibility:** The extent to which social, organizational, or technical arrangements can be understood by the participants in a specific setting.
- **Dependency:** The extent to which the participants in a specific setting can choose to use or not use specific EFT arrangements without bearing "excessive" costs in resources such as money, time, sentiment, etc.
- **Agency:** The extent to which participants in a particular setting can influence the social, organizational, or technical arrangements in force.

In an ideal world, EFT arrangements would increase opportunities for all parties, and be ecologically efficient; relative to current arrangements, they would be more intelligible, increase all party’s sense of agency, and generate so little dependency that consumers could choose to get on and off with negligible costs. In actuality, these values trade-off against each other.

This paper analyzes the ways in which alternative EFT arrangements influence the six aspects of negotiated social life. However, first we need to characterize different EFT arrangements.

CHARACTERIZING EFT TECHNOLOGIES

Most analyses of EFTs are developed in terms of either specific EFT arrangements (e.g., point-of-sale networks, automatic tellers) or specific services (e.g., debit cards, pre-authorized payments). However, for shaping public policy, it is important to be able to distinguish between EFT arrangements (technologies and their associated social organization) that have different abstract features. For example:

- A point-of-sale (POS) network which serves the major department stores to help them improve their cash management may be more effective if it is national rather than regional in scope;
- A national POS network may be much more convenient for people who travel cross country than would a set of regional networks;
- The disruption caused by an unreliable POS network would be less severe if it were regional in scale rather than national.

Many discussions of the opportunities offered and problems posed by different EFT arrangements are reasoned through in terms of certain properties of EFTs. For example:

- Discussions of the accessibility of EFT arrangements to smaller banks focus on different ways of sharing facilities;
- The impacts of different EFT arrangements on personal privacy are discussed in terms of the richness of the data they contain and the extent to which people access such systems;

Analyzing alternative EFT arrangements can be facilitated by developing an appropriate set of attributes to characterize them. In this analysis we propose seven "internal" features:

- **versatility:** denotes the variety of services provided with a particular EFT arrangement.
- **scale:** denotes the number of points of contact and people served by a particular EFT arrangement.
- **coupling:** denotes the extent to which EFTs that provide separate classes of service or which could be factored to serve separate geographical regions are joined together.
- **reliability:** denotes the extent to which specific EFT arrangements are trustworthy, e.g., that the equipment will not fail and that data or funds will not "leak" unexpectedly from the system.
- **richness:** denotes the volume and variety of data in a specific EFT that can be linked to a particular account holder or class of transaction.
- **accessibility:** denotes the ease with which people or organized groups may gain access to the services or
data which are collected or provided by a specific EFT arrangement.

- production costs: denote the costs of fabricating, administering, operating, and maintaining a particular EFT arrangement.

These features can characterize a variety of EFT arrangements. For example, under current arrangements, automatic teller machines provide a few specialized services, are not very versatile, operate on a small scale, are not highly coupled, are relatively reliable, are data poor, and are relatively accessible to bank customers. In contrast, national automated check processing networks would be more versatile, operate on a large scale, may or may not be coupled with other services, are of uncertain reliability, would be data rich and very accessible.

This set of characteristics can be used to compose many important characteristics of EFTs. For example, convenience increases with ease of access, reliability, and versatility. Similarly, Rule's concept of "surveillance capacity" combines our concepts of richness, scale, and accessibility. These features are not completely independent. For example, the coupling of two diverse EFT operations (such as a POS network and a credit-card transmission system) could lead to a more versatile system.

These "internal" features characterize EFTs independently from the world in which they reside. We also need to consider the "fit" between specific EFTs and the social, legal, and economic world in which they are embedded. For example, automated checking systems will be substantially more convenient if electronic records are accepted as proof of payment. This motivates our sole "external" characteristic:

- fit: an EFT arrangement has a better fit with a given social, legal, political, or economic arrangement to the extent that the conventions of the two coincide.

ASSESSING EFT IMPACTS

The last two sections developed a design space for EFTs and a specific set of features to describe the quality of life in specific social settings. The analyses developed here will be clustered under each of the six aspects of quality of life developed earlier: opportunity, intelligibility, dependency, agency, ecology, and coordination. Each of these six aspects will be considered from the perspectives of (1) everyday life of individuals and (2) institutional arrangements.

Opportunity

Increases in "opportunity" are the raison d'etre of EFT developments. While EFTs may increase opportunities for some people, they may diminish opportunities for others. Presumably, many individuals would gain access to new financial and related services. Yet, some EFT arrangements might endanger the existence of unpopular political groups by enabling abusive surveillance and harassment.

Most EFTs have been developed by private businesses which seek to open new markets and increase operating efficiencies. And they have been supported by public agencies such as the Federal Reserve Board which seek to enhance their institutional efficiency and effectiveness. Since most accounts of EFT arrangements emphasize the enhanced opportunities the technology provides, they will not be elaborated here. In general, EFT arrangements will offer greater opportunity to larger institutions with increasing levels of scale, coupling, diversity, etc.

Intelligibility

The National Commission on Electronic Fund Transfers argues that EFT developments should be fostered so as to maximize the number of available kinds of EFT-based services. Yet, different EFT arrangements can alter the coherence of people's business relations in two primary ways:

- They can simplify or complicate specific transactions and financial contracts;
- They can alter the demands made upon people to understand available products.

As personal choices increase, so do the demands upon them for understanding the array of options available and the relative benefits of each. We have little understanding of the conditions under which people experience increased choice as bewildering.

Some leads may come from research on human memory. Twenty years ago, George Miller publicized his famous finding that people could retain "seven plus or minus two" chunks of information in short term memory; the number of distinct things that people can remember and compare depends upon the ways in which their characteristics are coded. It also appears that individuals cannot easily remember or cope with the details of an arbitrarily large number of choices. In economic terms, the "information costs" borne by consumers may increase as additional EFT arrangements become available.

A second issue is the complexity of particular financial transactions. Altering the complexity of a few routine transactions, such as paying a utility bill, has minor ramifications. In this case, authorized pre-payment schemes may have mixed effects: they may simplify routine payments, but make it more difficult for consumers to detect and correct foul-ups. However, if EFT arrangements become so widespread that they become the medium for most routine payments for essential services, then individual consumers may find the technology not altogether "labor or attention saving."

One societal arrangement is preferable to another if it can be easily comprehended by lay people as well as by specialists. Versatile EFT arrangements which provide a myriad of related information services (such as funds transfer, accounting, electronic mail, etc.) to a variety of institutions...
can easily boggle the minds of most people. Large scale EFT arrangements should be judged by a criterion of "manageable complexity." This means both:

- that people can understand the contours of an EFT system;
- that EFT arrangements should not confuse the regulatory distinctions between banking, communications, etc. and the domains of the regulatory agencies such as the FCC, FTC, etc.

EFTs become less coherent as they increase in versatility, scale, and coupling. Precisely those features that increase the "opportunities" provided by EFTs to some parties can render them incomprehensible to the people who are authorized to act on behalf of the public.

"Intelligibility" is also influenced by purely technical issues. As Weizenbaum points out, very large computer programs develop in such a way that they cannot be easily understood by their designers or implementors. This issue has many difficult aspects. Some concern the limited ways we have of representing the design and behavior of computer programs. Users and auditors of computer programs have occasion to ask very different questions about a set of computer programs and the hardware on which they run:

- what computations (tasks) can these programs perform?
- What kinds of computing resources will they consume in the course of carrying out a specific computation?
- Under what conditions will these programs fail to operate properly?
- Under what conditions will data "leak" from one path in these programs to another path in these programs?

Currently, computer specialists have very few means of representing system specifications. These difficulties are compounded by the ways in which large software systems are developed; on such projects, many architectural details which are unspecified in a grand design are resolved (or altered) by specialists who are working on complicated subproblems. The net effect is that it is common for many programmers to introduce minor but significant design details which are essentially undocumented.

The quality of available documentation is also strongly influenced by the widespread distaste many professional programmers feel for documenting their work. While different strategies for organizing software production and document preparation are being developed to help minimize these difficulties, there are, in general, no clear and reliable solutions today.

Dependency

To the extent that people depend upon a particular arrangement, they may lose their power to negotiate alternatives later on. Benign technologies provide people discretion in their decisions either to use them or drop them should they choose to.

Dependency means both reliance upon a particular good or service or reliance upon a single or small set of suppliers. While all social life is based on complex patterns of mutual dependency, "good" social relations allow some parity between parties.

New technologies such as computing, in general, and EFTs, in particular, attract many consumers because they extend their "reach." The same can be said for electricity, automobiles, and the telephone. Problems emerge when we develop complex forms of social organization which are dependent upon the reach provided by a single technology or system. Thus, the Northeast power failure of 1965 and the New York failure of 1977 were particularly disruptive because people had few alternative energy sources for illumination and appliances.

Not all pervasive technologies are essential. Plastic wrap could disappear, or even television could be discontinued without a major national emergency. However, we would have a tougher time cutting back telephones, electricity, and automobiles. To the extent that EFT services replace current means of payment, they will become more like electricity than like plastic wrap.

Particular individuals may organize their lives so that they are more or less dependent upon a given technology. Thus, in Southern California, some individuals insist on driving their cars even one city block, while others make elaborate arrangements so they can bicycle to work amidst a maze of freeways and boulevards. It is a quite different question whether a social collectivity can easily switch from one technology to another.

Payments mechanisms are an essential part of a social infrastructure. In that, they are like transportation and personal communication. Once an attractive new technologically based capability is developed, many institutions can alter their style of business so that they effectively depend upon it.

Large scale, specialized, complex technologies take a long time to plan and implement. In the course of developing a plan, thousands of people may become involved. Thus, even "feasibility plans" develop tremendous inertia. Even when major design flaws are found, it is difficult to redesign or retrofit large scale systems. The BART system in the San Francisco Bay Area provides a particular object lesson here.

In general, the larger the scale, versatility, and accessibility and the less costly an EFT service becomes, the more likely we are to become dependent upon it.

Agency

In the western liberal tradition, personal influence is a central moral and political value. In the American political system, in theory, the voter is sovereign. And in the neoclassical theory of the free enterprise system, the consumer is held to be sovereign. Social and technical arrangements should be valued to the extent that they enhance the sovereignty of individuals. To the extent that they enhance the
influence of already powerful groups over weaker groups, they should be viewed with caution.

We have little understanding about the ways in which different EFT arrangements alter the influence of people in their daily dealings with business enterprises and government agencies. EFT technologies can enhance the control of either individuals or EFT-using institutions. The actual patterns of control that emerge have less to do with technical capability than with institutional prerogatives. For example, while it is easy to implement "stop payment" mechanisms in automated check processing systems, proposals for such systems usually neglect these features. In fact, studies of consumer preferences seem to show that most people who use some combination of cash, checks and credit cards are satisfied with the sense of control over their finances that these payment media offer.

One may wonder whether particular EFT arrangements alter the ability of the polity to act as a collective agent on its own behalf. The recent court cases brought by the U.S. Department of Justice against IBM indicate that it is easy for a corporate giant to overwhelm the resources of a federal agency. Specific EFT arrangements may lead to an even weaker balance of power between Federal or state regulatory agencies and large EFT using institutions. This may happen by:

- certain EFT arrangements fostering further concentration of capital in selected sectors of the economy. The emergence of "superbanks" would be one such development. While there are over 14,000 commercial banks in the U.S., over 70 percent of all deposits are controlled by the 100 largest banks.
- EFT arrangements becoming so complex that EFT operations could not be easily influenced by focused collective action such as Federal legislation or regulation.

These observations don't lead to easy policy positions since federal regulatory agencies have also been an imperfect device. They have been criticized for both insensitivity to the public, and for being whimsical agents for businesses to deal with. In general, the larger the scale, the more versatile and the more highly coupled EFT operations become, the more they are likely to foster large enterprises on one hand, and demands for Byzantine regulatory devices on the other.

Ecology

In a period of limited resources, we must emphasize technologies which are energy and resource efficient. Projections about energy and resource efficiency and conservation have to be carefully assessed for specific technologies in specific settings. For example, narrow estimates of the paper-saving efficiency of photocopiers would focus on the amount of carbon paper saved. However, in most settings where copiers are used, paper and energy consumption has probably increased. This is not to say that photocopiers ought to be restricted; rather that projections for resource conservation need to be made based upon expected volumes of service rather than upon efficiency criteria alone.

On a larger societal scale, the resources consumed by particular EFT arrangements must include the costs of capital construction as well as the resources to operate them. In a recent analysis of the economics of mass transit, Lave has argued that rail systems have lower operating costs than automobiles and buses; However, they have higher overall costs when one factors in the costs of constructing rails and vehicles. Is it possible (or likely) that the same patterns hold for large-scale EFT arrangements relative to their manual (paper-based) precursors?

An ironic development with some current EFT arrangements used by banks is that they are used to increase the volume of financial transactions generally. Thus, a current side-effect of some "paperless" EFTs is a net increase in the net amount of paper flowing through the banking system.

If energy prices continue to rise, the relative attractiveness of EFT based services and its traditional alternatives will shift. If particular EFT arrangements are clearly conservative of resources, they might be promoted through positive public policy. On the other hand, those EFT arrangements that are relatively expensive in energy and non-renewable resources might be discouraged.

Coordination

It is an open question whether specific EFT arrangements increase or decrease the ease with which users and others can manage their social and business relations. It is a commonplace observation that "labor saving" devices seem to have exacerbated the plight of the "harried leisure class." While EFT advocates proclaim the array of "conveniences" that EFT arrangements may provide, these claims seem to be oddly isolated from the overall problems that they may induce. When they work well, some EFTs may lead to small increases in convenience for consumers. In addition, new information services, such as accounting-like payment summaries, may help people organize their business affairs. However, when payments records are in error, the "costs of coordination," e.g., correcting errors, may increase. Generally, people can spend less effort coordinating their lives in a society that depends upon a large variety of EFT-related services to the extent that they lead to greater intelligibility, greater agency, and less dependency for people.

In a recent article, Rose suggests that small and large businesses may be able to increase their fiscal control through bank-related cash-management services. In theory, the same characteristics of EFTs that lead to lower costs of coordination for individuals and larger institutions should be identical. In practice, the larger institutions can "purchase" greater expertise than smaller businesses and individuals. Thus, we expect larger institutions to gain more from EFT-based information services when they work well. However, organizations, large and small, will ease their burdens of coordination to the extent that EFTs grow in versatility, richness, and reliability. In addition, enterprises with geo-
graphically dispersed activities—already a large and growing fraction of private enterprise and public agencies—will benefit from increases in the scale of EFT arrangements.

**EFTs and broader social patterns**

This paper has developed a design space for analyzing different EFT arrangements. It appears that certain EFT designs (e.g., smaller scale, less coupled) present fewer potential social problems that EFTs of alternative design.

Despite these normative considerations, EFT developments are rapidly emerging in the current industrial system and the existing legal and regulatory arrangements. Growth is a dominant feature of large enterprises; both the computer and financial industries are highly concentrated. For expansion seeking suppliers of computing equipment, EFTs offer a lucrative new market. For financial institutions, EFTs offer strong potential for increasing their market share. Firms in both industries may gain from large scale, rich, and versatile EFTs.

As EFT services spread, failing to integrate several related services that are manually linked by different users or consumers may appear oddly "inefficient." Thus, the integration of large scale, highly versatile EFTs may be less the product of a grand design than the by-product of many small "locally rational" decisions. Unfortunately, the "tyranny of small decisions" easily leads to an overall arrangement which no one would have sought had the long run designs been made explicit early on.

It is commonplace to notice that some values trade off, that others are mutually supportive, and that some design values and social values conflict. More reliable technical systems often have higher production costs. Larger scale and more versatile EFTs which provide more opportunities for users and consumers. But they are also likely to be less intelligible and diminish agency when compared with less expansive EFTs.

Whether one speaks of value conflicts or "tradeoffs," the social choices we face are no longer very simple. There is a cartoon caption that reads:

"There's a price tag on everything. You want a high standard of living, you settle for a low quality of life (quoted in reference 27)."

In order to help make our choices less grim, I believe that we should have clear answers to several questions. These are elaborated in the next section.

**RESEARCH AGENDA**

The analyses of this paper indicate some of the social dilemmas posed by EFTs. EFTs are not all alike. Some, such as automated tellers, may be more amenable to small scale operations than, say, automated check processing. To the extent that EFTs increase the intelligibility of social arrangements, ease of coordination, and social agency, while decreasing dependency for the public, they may be thought of as especially benign technologies. These hopes may be problematic at best and naive at worst. Studies which need to be done include those to:

- Examine the market structure of firms which use and provide EFT services to determine which EFT arrangements foster increased concentration amongst a few firms and which arrangements support a diverse array of smaller scale businesses.
- Identify important social costs and develop ways to internalize them into pricing schemes for EFTs. Many of the social costs of EFTs suggested in this paper and elsewhere are intangible. Furthermore, they may appear only after EFTs reach an advanced form of development and widespread use.
- Understand what it means for consumers to have "perfect information" about the choice of EFT services. If social costs cannot be internalized into EFT pricing, as is likely, determine how the public can be best informed about what they are.
- Develop stronger forms of consumer sovereignty in oligopolistic markets. It is easy to assume and difficult to demonstrate the sovereignty of consumers in complex business and financial markets. The structural role of consumers relative to EFT providing institutions ought to carefully investigated.
- Understand which EFT arrangements are most consistent with a low growth rather than high growth economy.
- Understand how to develop EFT technologies and their associated social arrangements so that they are easy to roll-back, if necessary, without major social upset.

Effective public policies to resolve many of the dilemmas raised by pending EFT developments must foster broad consensus among social groups with conflicting values and interests. In setting a research agenda, we should be fully aware that by selecting important values for study, we may superficially threaten active interests. This is a problem of doing serious research in a highly charged setting.

**REFERENCES**

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