

Towards a System of National Information Accounts

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1. Introduction

When

- such **information related** and less-economic **factors** as deeply rooted desire of people for freedom of speech, privacy, personal freedom, democracy, national identity, sovereignty, autonomy and freedom of the nation **seem to be more and more important role** in national and world affairs,

- rapid **integration, homogenization and restructuring of the traditional information activities, occupations, professions and industries** are doubtlessly the prevailing general processes in the developed and developing world, and

- various kinds and media of information become increasingly **substitutable** and **commensurable** for the users due to the impact of digital information technology and networking, and

- **knowledge stocks and information flows** are expected to become the foundation of information societies,

it is quite reasonable that a harmonised and consistent comprehensive macro-level system should be available to model and explain them.

In an information society all controversial aspects of information, as information as power, as resource, as commodity, as cultural and moral value and as object of protection should be assessed together both in public and private sectors and these aspects should be harmonised in the frames of a **comprehensive information policy**. A comprehensive information policy is a policy whose object is an industry-independent transaction or whose effect extends to all industries or all individuals. A comprehensive information policy assesses the real-world (material) and financial implications of information transactions and needs value and physical-unit assessment.

Such a comprehensive policy -- just because of the vast, growing, interwoven and ever-changing subject-area -- must be partly based upon comprehensive statistics expressed in common units of measurement. Subject area of such a comprehensive system should cover all transactions when or where information goods, services or human knowledge are involved.

2. Existing value-based and suggested natural-unit-based systems

In **value (financial) terms**, **SNA** -- with a number of modifications few of which will be discussed later -- may provide a suitable **frame for policy making and some science issues**.

Concerning **physical-unit-accounts**, the statistics of the specialized international organizations as UNESCO, UPU, ITU, WHO and others obviously extend to their problem area for their particular purposes and don't even aim to provide a comprehensive framework. Japanese experiments and the cooperative study by De Sola Pool were pioneering in the comprehensive approach based upon common natural-units of measurement. World Communications Reports were the first, significant, world-scale, international efforts to describe information phenomena altogether in a complex, comprehensive and standardized -- but not yet commensurable -- way, within the frames of official statistics. The recognition of the lack of a comprehensive, common-unit system and the attractive opportunity of measuring and modeling knowledge stocks and information flows lead to the invention and implementation of **SNIA, a comprehensive, bit-based system**.

SNIA may help to understand society -- old and new phenomena -- from a new aspect. This doesn't mean value-based assesment would be worthless or outnumbered., just the contrary.

3. Instead of Generalities

Instead of a scholarly ordered and boring way of demonstration of opportunites SNIA offers, five examples will be given below.

3.2. Possible Application Area: Supporting the Decisions Related to Hungarian minorities in the Central European Region

Assumably you know that there are Hungarian language minorities since Trianon treaties - assume 4 million in the neighboring countries - which keep expressing their intention to maintain and protect their identity. Their survival is a self-contained major political issue and priority in Hungary. There is a general majority agreement that Hungarian government should support the pursuits of minorities inside and outside of the country to maintain their identity. The Hungarian minorities from time to time are subject to various oppressive measures by various governments. The measures extend to not providing or even forbidding native Hungarian language education, forbidding use of Hungarian before courts and local authorities and banning or reducing Hungarian language radio and TV broadcasting, cultural events and press and others. The latest issue was on the road tables denoting the Hungarian name of the settlements in Slovakia. These tables were taken off by Slovak national road and transport authorities backed by police in spite of massive protest by local

population and municipalities. These European standard tables were said to be dangerous for traffic with diverting drivers' attention. Behind of all of these, sometimes ridiculous, actions there is the intension of some neighboring governments to assimilate these minorities. Assimilation is a complicated social process, which has not only linguistic aspects. There are, however, some technical cognitive musts. Such is a certain influx of foreign language information to be permanently heard or read independently of the kind of media. A much higher flux is needed to replace native language. These governments are aware that their measures will cut the use of Hungarian language information and will contribute to assimilation. The minorities at the same time want to maintain themselves and demand even clamour that amount of Hungarian language information that they need for that purpose. The game then obviously stands in supplying minority Hungarian language information and majority language information and supporting its use or blocking them.

These issues cannot be treated in value terms as cannot in kilowatt terms or in terms of broadcast hours. The complex figures of exports, imports, use of exported and imported information all expressed in common natural units may supply a more solid background. With having this, the efforts of governments and the behavior of population can be surveyed and assumable outcomes can be better forecast.

3.2. The Issue of Hungarian Broadcasts to Abroad - Lack of Comprehensive View of SNIA Leads to Wrong Measures

That there is a real need for a comprehensive view and data and their lack may make harm, I present the issue of Hungarian broadcasts to abroad.

The Hungarian broadcasting for abroad -- both in Hungarian and foreign language -- has a many decade history. In the 30's and 40's Hungary - backed by its then relatively developed radiotechnic industry - was a regional broadcasting power in Central Europe. After World War II those were the neighboring countries which outpaced Hungary in development of their broadcasting park. Hungary - in its effort not to being accused of conducting a nationalist policy - limited herself so that there are still now areas where even national main station is hardly receivable.

After the change of regime, in the frames of a general action to tighten the state budget, the volume of broadcastings to abroad was significantly decreased. While doing so, just an insignificant amount of money was saved but Hungarian information export was cut back roughly a quarter. The political and social significance of the measure was incorrectly identified with the economic value of these services i.e., the amount of money spent for this service. This was obviously a bad decision; political significance could be bound to volume of information supplied. The wrong decision was then later corrected by launching Hungarian satellite broadcasting- and other projects. This bad decision could have never been made if its impact in terms of information amounts at level of SNIA had at that time been known.

3.3. Possible Background in a Number of Countries - The Debates over "Cultural Imperialism"

The decade long debate in several countries over the amount of foreign films, TV programs and press subsists upon the interests of domestic -- small scale -- producers and upon the anguish of responsible personalities concerning with the consequences of use of foreign information it exerts on governability of the country. The first issue is clearly something which can be related to the general terms of the protection of domestic production and international trade agreements. There is a special agreement for the trade of cultural goods. The second issue, however, is much more complicated. The surplus consumption and use of foreign media may indeed divert the attention of the community from essential issues. This technique has been used many times consciously by domestic governments. In the fifties, Hungarian news fora were full of news on new production records achieved in various factories, while information on really important policy and local issues were banned. Furthermore, the surplus consumption of imported "entertainment services" may lead to attitudes that are far not optimal for citizens to meet daily challenges like it has been believed in France. It may divert people from those values whose seeking maintains their own civilization favoring their own interests. Several examples from the centuries of early colonialization or India can be cited. Anyway, the real situation and the danger, if there exists any, cannot be assessed without media-independent surveys, because the effects of various kinds of media appear summarized.

3.5. Concepts of SNIA Help to Define Government's Comprehensive Information Policy

Concepts of SNIA in the late 80's and early 90's in Hungary helped to define and publish the political commitment and objectives of the government.

4. SNIA: State of the Art, 1993

As for now, SNIA has a *manual* with a general description of the system, explanations of main ideas, classifications and accounts. To provide a limited compatibility with SNA92, SNIA has been based upon the same fundamental general concepts: *actor, institutional unit, sector, good, service, commodity, transaction., stock, flow., account, balance*. The vary same concepts, however, have sometimes been interpreted in a wider environment to include events and objects that are beyond the scopes of SNA, but seem to be important.

New integrated sectors; the main groups of social actors of information affairs, those that are relevant to policy making, should also be added to those of SNA to reflect real situation, phenomena and processes.

The fundamental question of SNA is "Who does What by What means for What purpose with Whom in exchange for What with What changes in Stocks?" Accordingly in SNIA, a general transaction assumes at least two actors, at least

one of which outputs a good or service to the other. *Information* is understood here as something which *forms* or *formed within* (the brain of) either human or machine actors, or is represented in/on the goods/services outputted. Volume/amount of information carried by physically existing goods and services - as defined here - is an attribute of goods and services which is very similar to some physical parameters. This interpretation seems to be in harmony with exact theories of information.

In accordance with this, a transaction can be called an *information transaction*, if the output carried/conveyed information. There is a set of goods and services whose main function is just to convey/carry information, these are called *information goods and services*. Information goods do not include machines like computers, office and telecommunications devices.

The main categories, in terms of which SNIA describes information phenomena, are *information-input, -output, -production (gross and information added), -consumption, -use, -asset, -accumulation, -capital, -stock, productive -consumption, -capital consumption, -export, -import and externalities*. This is a non-exhaustive list. As an opposite to SNA, SNIA makes difference between use and consumption: while consumption assumes annihilation of the good or service, use doesn't. Almost the whole arsenal of macroeconomy is expected to be transformable to SNIA.

The most outstanding difference between SNA and SNIA is in valuation. While valuation of transactions in SNA has practically been based upon *general substitutability for money*, opportunity of exchange, in SNIA it is based upon *general substitutability for a digital record*, opportunity of recording. Accordingly, it is not information in SNIA which is considered as resource or product, but goods (including non-durable signals) which carry/convey information. This is in a good agreement with SNA where it is not "value" which is considered as a resource or product, but goods which have/carry value. Information interpreted in such manner can be treated similarly to energy. Various versions account the information that goods and services convey at "sensory" or at "perception" level.

SNIA should be *standardized at the international level*, so that it can be used in the same way in various countries. It should reflect the individual features of the countries and would provide information for a comprehensive -- non-industry and non-department level -- information policy.

A *Methodical guide for SNIA'92 Hungary* has also been prepared. This describes the data sources and algorithms, that has been applied when compiling SNIA'92.

The *database of SNIA'92 Hungary* covers the period between 1945 and 1990. Raw statistical data were gathered and accumulated for 24 kinds of information goods as books, newspapers, journals, audio records, recorded audio tapes, videotapes, magnetic diskettes, magnetic computer tapes, paper-based government and business documentation together with 19 kinds of non durable signals as radio-and television broadcasting, cable television, education,

phoning, telegrams, theaters' and movies' performances, and for human knowledge. The data were mostly taken from official statistics. Altogether over 500 time-series for raw variables and several constants were included and embedded. These data then were transformed to common natural units: bits.

Then elements of "production", "capital", "income", "rest of the world" accounts were computed for each good and service, for all goods, all services, main sectors of the society (households, "socialist state", corporations etc.), "human consumable" goods and services and for all goods and services altogether.

4.3. Hungary - Some of the Facts SNIA Presents

Three versions -- elaborated in 1990, 1991 and 1992 -- were matched against the known historical events and processes in the country.

We know that human "wired-in knowledge" and accumulated information goods constitute the stable information basis of society. Human knowledge is obviously much more than the volume of information that all accumulated information goods represent. Human input and output channels are narrow when compared with accumulated knowledge. This is from where relative stability of human society comes from.

If we ignore human knowledge not yet directly measurable, *information services* constitute the overwhelming *majority of production, consumption, export, import and use*. Horrifying piles of printed and magnetic matter we meet everywhere and everyday, still are conveying much less information than non-durable signals of services. This also shows the fragility of our societies. *Use* is subordinate to *consumption*. At *perception level*, human use is subordinate to machine use. *Information wealth* is about as great as aggregated production of four or five years. This is a result of averaging the stocks of long *life time*, slow *renewal rate* as of certain government documentation, books and records and the stocks of short life time stocks as of newspapers, certain business documentation, posters and others. As a contrary to the presumptions, share of *government sector sensu stricto* in accumulation, production, consumption and use of information goods remained as little as some percent during the whole period.

Exports and foreign externalities of domestic production constitute the major part of production. *Imports and externalities of foreign production* dominate over domestic production which should be characteristic for small countries.

The *neighboring countries* around Hungary play the dominant role in imports and externalities. At the same time imports and externalities though consumed are not used: they can be considered as *waste* or *pollution*. These features are thought to be the situation with the rest of small countries in Central Europe. Language differences make the assimilation of outputs from the neighboring countries impossible.

In *net intersectoral flow of information* among great sectors, the flow from government sector to private sector was dominant in 1980 and 1990. This can be attributed to the nationalized electronic mass communication and nationalized educational system.

On short and medium terms, *political courses, activity periods of significant political personalities, introduction of new measures or pricing policies, international events* could be identified along the run of individual indicators.

A general *long-range trend of accelerating development* could also be observed on the overall indicators of production, consumption and imports and on the same indicators of several individual information goods and services. A number of goods and services as telegraph showed a well-expressed *life cycle* due to development of technology. In the late eighties the signs of a *general crisis* become obvious. "*Socialist state*" sector kept playing exclusive or decisive role in production and exports of information, while it was the *private sector* which dominated use, imports and accumulation. *Shares of human consumed information* in production, consumption, use exports and imports are rapidly decreasing. Externalities seem to expand what may cast the shadow of conflicts.

5. Significance of SNIA

SNIA is **object, subject and tool of policy making**. At these issues, SNIA with SNA should serve as a permanent background for assessing the political significance and various possible real consequences of various measures to be taken. **Such a system offers a lot of plausible comprehensive categories, figures and models for nation-level political thinking and for formulation of nation-level political objectives and barren zones.** Knowledge stock, information flow, transfer, accumulation, production, use, capital and others have the faculty of vivid description, their use can give a solid background to speculations and models.

From scientific point of view this all is a new thing. **Scientific significance of SNIA hasn't yet been contoured.** It couldn't, since we have no standardized SNIA, these things mostly haven't yet even published. Personally I hypothesize that its significance in statistics, sociology, political sciences, economics will be considerable.

6. Future research perspectives

The situation is obviously premature to suggest a final SNIA. This would be something like to suggest to introduce SNA somewhen in the XIX century. This should be a product of a several year cooperative effort. The *ongoing research aims* at the elaboration of a *draft version of a standardized SNIA* to be discussed then in an international working group under the aegis of UNSO, OECD or UNESCO. *National level studies* would also be desirable to reveal the

difficulties and find the best solutions to the statistical and methodological problems to occur. Meanwhile continuing technical progress will prepare the ground for its introduction. Those people who are interested as *users* (scholars, policy analysts, advisors) and *contributors* (specialists of the individual media like books, journals, data communication) or *supporters* are kindly requested to join the effort.