2. An information quality research draft program

We could assume that an information being posessed and kept as a value of strategic dimension should be purposeful, e. i. it represents a nesessary ~~condit~~ condition for some goal to be reached. Thus, apart from traditional viewing the quality of an information, which admits it as a set of atributes, like quantity of information (due to Shanon, 1953), precision and reliability of information (Sackman, 1967;Morris, 1971; Hellerman and Smith, 1975), age of an information (Davis, 1974) and a set of properties which a given (input) ~~informat~~ information displays within its being processed (like response time, compila~~tion~~ tion time, ect.). We dare to think about these ingredients of a quality of information as necessary part of a definition of quality of information, since we proclaimed any information to be purposeful.After reviewing such a traditional part of items which pretend to be a description of quality of an infor-mation we feel strongly temptated to name this set as "personal " quality image of an information which so far has too often pretended to be a self-contained category, not aiming to its "service".

After gathering some set of information for a given business system we behave subconsciously to ask ourselves : what to do with them ? In the context of research program hereby preposed we shall pursue a max-principle of data base creation rather than a min-principle which looks for minimum input information set needed in order to serve as a basis to a given set of output information. Our research is aimed to creation of seconfary or sufficient part of definition of quality of an information which appears as input to the given business system.

To this part we propose to explore a family of functional models of business systems at first. They contain output information; and cardinality, scope and other rather standard atributes of the corresponding output spaces are very important components of a quality of information since they codetermine a large portion of implementational issues to the business system model. A rather intuitive temptation is also .included: a number of output information pieces could be a part or measure of quality of a given input information.

Furthermore, as the nature of output components of information is likel to influence an information technology in broader sense of meaning, we also propose to study key properties of transformations (algorythms) of input into output information.Thus, for example, a given input information could be more desirable (or it has higher score within its multidimensional quality image) if it requires less sofisticated software in order to produce the same output information.

When switching to control model s of business system, a new part of the sufficient-condition -like part of quality definition for a given input informa-tion accrues. Each input information being purposeful, induces a finite set of goals business system wants to achieve,at a given control horizon. A number of golas ,the level of their consistency and other properties modern control the theory deals with , could be considered as a part of quality of input information

In addition to that , output information does not in general serve as a domain of goal functionals. Insteda, criteria are being sought as intermediate link between them so as to find some pragmatic ways of control and management of business system. Again, number and all other standard system theory categories pertaining criteria could be the components of quality definition for given input information.

Following the analogy for the case of output information we propose to include transformations of output information into criteria as well as transformations of criteria into goals with respect to their fundamental properties as component of information quality description.

Since a systems approach may have many different mathematical structures involved, an examination as proposed above can take place in some preselected manner. This project, in its first stage would amount to linear short run models which enable us to formulate a tool for non-terminal control over a business system of an arbitrary type as much as possible.Following a general xx systems theory we are to find structural properties of business system so that results would enable someone to give a diagnostic cross-section over the set of chains "input information-output information-criteria -goals" which are rolling through a business system in genegal.

The quality of information thus consists of input information as primary set of quality components (in the classical sense). Starting from this primary set we intend to generate and optimise a secondary set of quality components , where this set consists of output information, criteria and goals belonging to the same business system as input information. Transformations which interconnect these four sets could sometimes be variable ; in such a case we can suggest the optimised transformations (if they exist) in order to improve the three sets npix of the secondary part of quality. It may give an additional boost to business system measured by levels of goals and at the xxx same time increasing the quality of input information. It is worth to notice that we would like to maintain the quality definition even in a case where transformations are not capable of formal presentation.

3.An information evaluation *research* draft program

An information gets an increasing importarnce in today´s world, since
it represents a link between the reality and decision makers´existence.
So far, it has been thought that the success in developing and improving
a particular decision maker´s decision mostly depends on the quantity
(or volume) of information available ; a good example of this is given by
MIS Copenhagen Conference(1970).The entusiasm of senethies soan showed in
the dangers of being a straithforward advocate of extensive MIS apart from the
shocking costs occured within these projects. Thus, MIS have studied from
additional aspects, like W. B. Morris (NCC, 1971),Langefors (1977) and
Chrysler (1980).

Thus, gradually a concept of information economics has stepped forward,
although Frielink (1965) could be considered as a pioneer of the concept
of economics in information processing. Evaluation of information systems
was treated as an analogy of production system (see Morris) and later on,
a concept of rate of investment principle started (ROI) to appear as a tool of measuring
the goodness of information systems with respect to business system supported
by such an information system.Increasing complexity of business systems
led to an increasing complexity of information system and thus ROI principle
primarily based on cost-benefit analysis (CBA) started loosing its analytical
power. The ROI principle , apart from CBA, adopted new concepts like value
linking,value acceleration, value restructuring, innovation and investment
valuation(Parker and Benson, see Datamation , Dec 1, 1987). All of these exten-
sions rest upon a value as an economic category, mostly in an indirect way.
Thus, we are forced to face a set of financial terms and financial techniques
in order to evaluate information system. There are two problems which make us
concerned with information economics :
a) since an information system can be reduced to a set of information proces-
ses (with correponding set of induced "non-information" processes) and, further-
more, not an information process can be decomposed into "stage" information set,
we can avoid such evaluation components of information which do not posses its
a financial term as a means of evaluation;
b) due to Parker and Benson, for example, the increasing level of "pragma"
has made us to expand the classical term of value towards items , like
enhanced wievs of return on investment,strategic match, competitive advantage,
management information, competitive response and strategic IS
architecture, all of which embrace the elemnts which are not measurable in

classical econòmic sense;

In both cases we therefore came to the crucial point we propose to investigate within the reserach study scheduled:how to define a generalised value of information? (Reserach item I)

In addition to that

c)information technology has to be judged either within the context of so called alignement -oriented application to business (where standard software packages support MIS bodies, for example) or within the impact oriented application (like taylor-made software is applied to prototypes of MIS projects). In order to compare the two of them, after transformations as apllied in a) above, we see that a unified approach to information evaluation is needed (Reserach item II).

d) Following the ROI principle evolution, we finally get stuck as to the task of summing up the evaluations of all the components of extended ROI components which in general are not allewed to be aggregable or,at least ,co-measurable without limitations. Furthermore, such a sum, in turn , is very unlikely to act as a "means of ranking alternative information system projects" (see Parker and Benson as well). This arguing brings us to Reserach item III: how to construct an acceptable and efficinet information evaluation algebra?

e)as a dual to d) we have to find some generalised cost attributes to any information (which, in turn,enables us to afford a generalsied cost description of information process as well as information system),since recent development tends to invtlve different classes of risk and uncertainty as "full dimension of cost" categories (see Parker and Benson gx again) as ontological counterparts to "values".This phenomenon is a challenge to us to fermulate Research item IV: to put information evaluation algebra into a multidimensional space.

From the four reserach tasks formulated above we could defive a unified approach infermation evaluatian in such a way that

- different investment pregrams for a given information systems are unambiguously comparable,
-the impact a given information system has or may have on a particular business system is described in the same space as the information system itself,
-the twe systems introduced, e. i. business system and its satelite information system (as well as management information system) have conform performance "identification " card,
- an information system can be treated within the same (informational) space as its "master" system, e. i. business system.

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SUMMARISED CURRICULUM VITAE

Born: May 21st 1933

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Basic background: degree in theoretical and applied mathematics(1956)
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Academic carrier: PhD in mathematics (1978)
PhD in economics (1962)
PhD in technical sciences (1986)

Past professional experiences:
- research fellow of Prof. R.L. Ackoff OR group (Univ. of Pennsylvania, Wharton School, 1964)
- research associate to Prof. R. Bellman (UCLA, 1965,Los Angeles)
- president of Yugoslav IFIP ADP group (1969 -1975)
- head of Research Center of Faculty of Economics (1971-73)
- regular member of Yugoslav academy of sciences and arts Section of oil economics
-part time consultant to International center for public enterprises in developing countries (UN agency) in Ljubljana (1982-85)
-about 2oo industrial projects and expertises since 1956 within the country
-formation of 6 OR consulting groups
-having been an adviser and consultant to 5 research institutes since 1969 over our country
-5 books and 12o papers and articles (24 of them abroad) in the field of OR and systems theory.

Teaching experiences :

- linear algebra
- advanced calculus I, II and III
- business mathematics
- network programming   (for graduate students)
- linear programming
- mathematical prgramming I and II
- general system theory
- deterministic systems   (for post-graduate students)
- system oriented production theory
- system modelling of open national economies

Research experiences:

- a methodology of optimal economic fusion and optimal design of business
  organisation
- a concept of multidimensional data base architecture
- a continuously adaptive on-line management and control of micro-economic
  systems
- a fluid modelling in business
- a generalised theory of economics in informatics
- as a head of postgraduate course in economic informatics supervising and
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Consultant at the Institue for Productivity (1957-61), Researcher at the Institute for Social Studies (1962-69), Lecturer at the Faculty of Economics (from 1970) - all in Ljubljana, Yugoslavia. Part time as Project Leader at the International Center for Public Enterprises in Developing Countries (1975-86), Head of Training Center for Management at the Faculty of Economics (1985-89).

Creative Works (Books)

Organizational Objectives in Enterprise (1973), Personnel Policy in Enterprise (1974), Psychology and Sociology in Marketing (1975), Planning for Personnel Development (1977), Innovations in Organizations (1978), Information for Selfmanagement (1979), Training for Managers in Public Enterprises (1980), Job and Roles of Managers (1981), Japan: From Imitation to New Ideas (1982), Marketing of Organization for Export (1983), Personal, Group and Organizational Development (1984), Creative Communications (1985), Management of Organization (1986), Leadership in Enterprise (1990). More than 300 bibliographical units (articles, books, monographs etc.).

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