

Need for Information Economics Framework: Information *economics* (economics of constraints) versus *Information* economics (economics of opportunities)

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Information Integrity/Integrity Information System/Management Information System

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Lecture # 26:
Need for Information Economics
Framework
Information *economics*
versus
Information economics

OVERVIEW-1

- Change Implications of IT Development
- Information Integrity An Interdisciplinary Area
- Many options of Integrity mechanisms
- Economic framework for I*I – A Workable Answer
- Information Economics – its scope

OVERVIEW-2

- Information *Economics*
- *Information* Economics
- Emerging Findings – Pointer to A Product View of Information
- Exercises

CHANGE IMPLICATIONS OF IT DEVELOPMENT-1

- From a technological angle, increase in importance of Information Integrity is due to the direct and indirect consequences of computerized information systems (data driven technologies).
- Before the advent of computers, procedures for internal accounting control and their complements in auditing were well developed, and comparatively dependable.

CHANGE IMPLICATIONS OF IT DEVELOPMENT-2

- The new information technology made these mechanisms inadequate, in the sense of not cost-efficient.
- New mechanisms were needed.
- Computer scientists, from such fields as computer security and database systems, have proposed new mechanisms (e.g., Clark-Wilson Model (1987)).

CHANGE IMPLICATIONS OF IT DEVELOPMENT-3

- But clearly these measures alone are inadequate in the context of information systems, which comprise objects, people, communication, norms, software, rules, policies, and financial mechanisms (e.g., computerized accounting system, computerized healthcare information system, computerized electoral information system).
- Information systems are social systems, whose sub-systems and their components and they themselves are modeled as open systems, and do not solely consist of a computer.

INFORMATION INTEGRITY AN INTERDISCIPLINARY AREA

- I*I in computerized information system, which has a context specific application – accounting, healthcare or electoral as the case may be, is an interdisciplinary area.
- There are computer-technological aspects as well as organizational and field specific aspects.
 - For example, in the issues relating to information systems considered above, the auditing profession, the medical profession, or politicians, media and voting public at large, respectively, have a keen interest.

MANY OPTIONS OF INTEGRITY MECHANISMS -1

- If one wants to increase the integrity of the information that an information system provides there are, therefore, many possible measures to take, some of them complementary, and some are not – and these measures are drawn from a number of disciplines as separate as behaviorist psychology and electronics.

MANY OPTIONS OF INTEGRITY MECHANISMS -2

- An inventory of handbooks for the practitioners from different fields, e.g., EDP auditing, accounting information system internal control, computer security, privacy of healthcare information, etc. reveals a stunning supply of available mechanisms and measures, but no apparent coherent structure. The state of the art is, more or less, a jungle of rule of thumb.

ECONOMIC FRAMEWORK FOR I*I – A WORKABLE ANSWER 1

- The need for changes in the methods employed to preserve and evaluate Information Integrity is due to technological developments.
- Nevertheless, a theoretical framework for analysis of I*I developed from an economic point of view would have several advantages.
- Foremost stands the consideration that situations like these can in the final analysis only be tackled by considering cost benefit analysis framework.

ECONOMIC FRAMEWORK FOR I*I – A WORKABLE ANSWER 2

- From an economic point of view, the problem facing, say, an information system designer is, in principle, a familiar constrained optimization problem: to maximize total utility, in this case with respect to I*I, by selecting the most efficient combination of inputs, in this case I*I mechanisms, subject to budget and other constraints.

ECONOMIC FRAMEWORK FOR I*I – A WORKABLE ANSWER 3

- In order to do this the designer needs a model of the costs and benefits associated with different input (integrity mechanism) combinations.
- This, in turn, requires a theory about what the benefits of I*I are, and how I*I is determined.

INFORMATION ECONOMICS – ITS SCOPE

- The primary concern is, then, to develop a framework that enables one to analyze
 - *how the value of information is affected by its integrity.*
- Information economics as a category has, in economics and accounting, and sometimes even in computer science, both a narrow and a wide interpretation with respect to its scope.

INFORMATION *ECONOMICS*

- The wide interpretation classifies as information economics any such studies, analytical as well as empirical, that somehow deal with the value of information.
- This, incidentally, is the way the term is used in computer science; information *economics* as opposed to information *technology*.
- It encompasses all kinds of cost-benefit analyses that pertain to information and its uses.

INFORMATION ECONOMICS-1

- The narrow interpretation of information economics is the one found in microeconomic theory (and that part of academic accounting, which borrows its paradigm from neoclassical microeconomics). Here, information economics is quite specialized sub-discipline.
- The demand for information is assumed to derive from two things:

INFORMATION ECONOMICS-2

- Decision makers evaluate risky future outcomes according to subjective (Savage) expected utility, and
- They do so by utilizing information to revise their prior probabilities concerning future outcomes according to Bayes' theorem.
- Information economics is then largely concerned with building partial equilibrium models – information is then the commodity – the product, which is the subject of analysis.
- This is *information* economics as distinguished from “other” economics.

EMERGING FINDINGS – POINTER TO A PRODUCT VIEW OF INFORMATION

- Interesting findings emerge from this kind of models.
- Information, when viewed as commodity, has some special properties
 - It is intangible, and
 - Intrinsically worthless once consumed.
- Less heartening to note, however, is to note there is really not very much in these models, which would enable one to speak of accounting I*I in a reasonable way.

EXERCISES - 1

- (E8.1) What is the change implication of IT development for procedures for internal accounting control and their complements in auditing? (Hint: Change is in terms of developments in IT. Implication is loss of cost efficiency, I.e., shift in cost benefit equilibrium for information attributes.)
- (E8.2) Why are the improvements in computer security and data base mechanisms not adequate to take care of resulting inadequacies in internal control and auditing?
- (E8.3) “I*I in computerized information system, which has a context specific application, is an interdisciplinary area”. Explain briefly.

EXERCISES - 2

- (E8.4) Explain very briefly why, as things stand today, if one wants to increase the integrity of the information that an information system provides there are many possible measures to take, some of them complementary, and some are not? That is explain why the state of the art is, more or less, a jungle of rule of thumb?
- (E8.5) “Given the situation as in Exercise (E8.5), way out is to have a model of the costs and benefits associated with different integrity mechanism combinations”. Briefly elaborate.
- (E8.6) “A wide interpretation classifies information economics as study dealing with the value of information. Termed as information *economics*, it encompasses all kinds of cost-benefit analyses normally to found in computer science that pertain to information and its uses.

EXERCISES - 3

The narrow interpretation of information economics, termed *information* economics, is found in microeconomic theory. Under it, information demand is assumed to derive from two things:

- Decision makers evaluate risky future outcomes according to subjective (Savage) expected utility, and
- They do so by utilizing information to revise their prior probabilities concerning future outcomes according to Bayes' theorem”.

Write in your own words what you understand by terms *information economics* and *information economics*?

EXERCISES- 4

- (E8.7) Though *information* economics as one found in microeconomic theory takes individual decision view and utilizes information to revise prior probabilities concerning future outcomes, why is it inadequate to find how information is affected by I^*I ? (Hint: it does not account for cost of analysis and evaluation of information.)

THANK YOU