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# Social Foundations of Information Society Services

Knowledge of Society White Papers 11

## The Social Foundations of Information Society Services

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## The Social Foundations of Information Society Services

### Abstract

Knowledge Management, Information Security and Information Society Services constitute the decisive functions of modern administration and social welfare maintenance. Social rationality and integrity forms that build social on network – Globalnet – are founded on them. Information security is principal in global social relations; it is building meaningful knowledge mediating social interaction.

Knowledge relations are created on managed risk and probability relationships in global-history continuum. They constitute probable knowledge on historical, empirical or global probability building. Social relations are built on mediation of probable knowledge.

Global probability building creates network information where information society services are based on. It is constituted on contingent relations of social objects and their contingent development processes. Objects and events constitute unlimited sets, based on unlimited transferability of knowledge. On this foundation is created network type of rationality and integrity

Information Society Services consist on social action in network rationality and integrity. There relationships of social means and ends are based on social properties probable existence. Production based on probability match of means and ends presupposes structure type of social relations with instrumental rationality as historical rationality form. In information society services such relations may be part of production.

Information society services result in welfare maintenance of customers. Producing unit is service, organization may be part of process. Service is global in production, on foundation of knowledge transferability in global network.

Knowledge on relationships of risk and probability and on them created social dimensions, global and history, is based on information security. In information society services this is apparent and requires continuous information security development for services functions. In social structures, as organizations and societies, social relations continuity on mediation of conceptual knowledge is itself information security factor and requires protection of information assets on given basis.

Information society services have following properties:

- Foundation on knowledge relations and their probable forms (network information, conceptual and active knowledge).
- Social processes, which produce the actual services, interaction mediated by knowledge forms.
- Communications environments, transferability environments for knowledge and processes.
- Social welfare maintenance as general result of by content determined services.
- Network organization for production on foundation of service.
- Information security of knowledge and service components.

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### 1. Knowledge Continuity and Transferability

Knowledge Management, Information Security and Information Society Services, supported by network, process and ICT development, constitute a complex which is decisive for functioning of modern administration and social welfare maintenance. They constitute social rationality and integrity forms that build social on network – Globalnet.

Knowledge relation constitutes on management of relationships of active and conceptual knowledge, information (Mäkinen, 2012/9)<sup>1</sup>. This is relationship of risk and probability. Forms of knowledge are to be defined as continuity and transfer in interaction and based on development of knowledge meaning on foundation of management of global contingency. Conceptual knowledge is constituted on risk and knowledge continuity on probability build on social processes. These processes are contingent but knowledge is unlimitedly transferable. Coincidental knowledge exists not but only continuing and transferable knowledge that exists in action as subjectively meaningful knowledge.

Information is not transferable in communications network because it is information, but because it is conceptual knowledge based on risk. Knowledge is not transferable and continuing in interactive network because it is knowledge, but because it has probability. Information and network information are deliverable in various network environments and processes concurrently. Information means transferability in network where social space and time specifications are relative to experience at social structures. 'Network information' has management and meaning in ubiquitous network where global dimensions of knowledge may vary regarding continual social action; continuity may be based on several global dimensions and global dimensions may be present in several continuities (Mäkinen, 2012/9).

Social relations are mediation of continuity and transferability of knowledge. They are constituted on management of contingency of rational selections in action. Social relations are not relations existing in 'society' or events in 'history', but they are properties of knowledge relations connected with social interaction, risk and probability.

Information society change is change of knowledge. The concepts of society and history do not change but social integrity and rationality types at changing properties of knowledge, its building processes. These are background for inception of information society services as forms of social welfare maintenance.

#### Knowledge Relation

Man is a concepts making animal. This is same thing that he is able to become aware of risks and their management by probability. This creates knowledge and purposive action.

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<sup>1</sup> Documents in [yhteiskunnantieto.fi/White Papers](http://yhteiskunnantieto.fi/White%20Papers) series are referred by year and number in series. These do not correspond to each other; the updated versions of documents keep their original number. Documents in Knowledge of Society Training Papers are referred by year and number in series with a prefix 'Tr'.

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Knowledge is created on probability building processes which create its meaning. Meaning denotes a probability, continuity of knowledge that is mediated in social action. This means development of probable courses of social action, social relations (Weber, 1921/1976, 13). Social conditions should be considered knowledge relations mediating social action.

Knowledge is constituted on conceptual relation, also risk relation into reality. There is no infinite processes, for example empirical, for knowledge creation, but knowledge creation is limited by risk and probability determination. Also certainty of present (Mead, 1932/1980, 1 - 31) is conceptual, based on relationships of global and history. Every relationship is presented in action at limiting values for social and history. There are created moral judgments.

Probability building processes - called historical, empirical and global (Mäkinen, 2011/Tr3, Mäkinen, 2012/9) - create types of knowledge relations. They are conceptual relations into reality, also relationships of risk and probability. They may be interpreted various forms of experience. Empirical form of experience is based on knowledge relation existence in connection of global - constituting society - and history which are conceptual relations build at relative certainty in action. At global relations knowledge exists in contingent connections of risk and probability which build sets of relations which are unlimited in number due to unlimited deliverability of knowledge. This is conceptual relationship into reality on conditions of concurrent evaluation of risk and probability relationships.

Active knowledge, creating probability and continuing, meaningful knowledge builds rational content of action. Conceptual knowledge is presented in a form, often external, where it is possible to develop and transmit independently of action where it is mediated. It creates integrity of social interaction. Its generalized form of constant relation of global and history is one form of integrity. Conceptual knowledge has no global-history dimensions. It can exist concurrently in several rational continuities as processes and networks. Then there is no constant global-history connection and integrity is based on dimensions probable relations determined at interaction.

Conceptual knowledge management is based on management of information assets which may have material form – for example documents, files or databases. These material forms have no intrinsic meaning in global transmission bath. They may have absolute meaning only in constant relationship of global and history dimensions. This relationship exists at relative certainty in action; its general meaning is generalization of relative certainty. When this relationship is determined on probability foundation, also knowledge is probable. Network information is presented in communications network determined by risk management, also continuous and concurrent risk and probability determinations. On foundation of network information are developed network relations where continuity of action may constitute of several global dimensions on probability basis. Network information is managed by statistical distributions in network and social processes of information security acceptance (Mäkinen, 2009/7, Mäkinen, 2012/10).

In case of instrumental rationality continuity of social relationships, development and maintenance of meaningful knowledge is connected with protection of information assets. Instrumental rationality consist of management of global dimension of social determined by means to be used to achieve certain ends. There also exist a social relation where means-ends probability match is possible (Mäkinen, 2011/Tr3, Mäkinen, 2012/9). It is as such a security function.

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Network information exists in environment that is entirely determined by risk management and information security. Global network is transmission path which has no information security, social structure or social relations defined (Mäkinen, 2008/3). Knowledge there is determined by probability distributions.

### Social Relations

Probable courses of social action - social relations - are constituted on social rationality. It has subjective meaning but rationality is based on constitution of knowledge relations, also social phenomena. It considers social relations of means and ends, purposive action. These are social relations of risk and probability (Mäkinen, 2011/Tr3, Mäkinen, 2012/9).

Rationality is also created on foundation of being aware of risks and their management on continuity build on probability. Ends and means are determined socially, not as intrinsic properties of human action. In knowledge relations conceptual knowledge may be created 'freely', it is coincidental, when building of active knowledge is based on probability, actually relative certainty in action. This may create reproduction processes for conceptual knowledge. Ends are created by conceptual knowledge and their dominance in social action creates value rationality. Means build conditions for ends realization, are based on active knowledge and continuity. Realization in probability matches at constant relationships creates instrumental rationality, their relation on probable foundation network rationality.

Risk based continuity, network rationality, presupposes risk evaluation principally in every individual action. No suppositions about continuing social relationships are possible but risk evaluations are conceptual relationships. In social interaction these evaluations create probable courses – relative certainty - consisting social approximations at networks. These may be regulated by information security measures.

Rationality forms on conceptual transferability create social integrity. Its society form is based on probability match of ends and means in instrumental rationality, also on empirical probability building processes. These constitute structural social relations. This type of integrity is decomposing – if not disappearing - in creation of global probability building processes and on them based network rationality. Foundation for this is probable connections of global and history based on concurrent risk and probability evaluations. There exist no continuing social structures supporting integrity, but it is based directly on properties of social interaction. As it always is, but on global relations it does not create any other continuing social formations than networks of interaction. There should be determined conditions for building of social relations and their continuity in social processes. Social integrity in global relations is based on individuality. This means also changes in concepts for social welfare maintenance and production.

Knowledge continuity and transferability are developed when contingency of events is managed. This builds rationality. Contingency has an actual and concurrent form of global networks at transmission paths. In social relationships where instrumental rationality has developed, contingency of social incidents appears as threats for continuity of social relations. Their protection builds information security. In global relations knowledge and rationality creation requires information security; social is constituted on it.

Certainty at social action and tradition does not mean absolute certainty: action is always mediated by knowledge; absolute certainty should presuppose an infinite

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regulation - risk management - of social relations, which is impossible (Mäkinen, 2012/10). It is possible to define relative certainty, approaching certainty. When contingency is managed in other forms of knowledge than those based on relative certainty, are developed risk based forms of sufficient certainty, probability, for social relations. They may be instrumental rational social structures but also network relations. When knowledge is mediated in external forms, certainty is relative to continuity and transferability based on this mediation. Relationships of risk and probability determine ways social relations are constituted on that mediation. There may develop social structures mediated by a form of certainty sufficient for social action. In services based on network, certainty is based on information security measures governing contingency.

Social continuity and transferability - presuppositions of social relations - are properties of social interaction, also knowledge probability and risk. They are not determined as action 'happening historically in society', because neither history nor society independently of action exist not; or they exist in certain conditions where experience and knowledge connected with action can mediate constant relations of global and history, developed social structures, community or society type of integrity. Also then they are based on risk, but so managed, that it has no central meaning in action. Social is based on a coherent global-history continuum of interaction.

Welfare maintenance or production organization in network involves risks based on contingency of knowledge in network. Information security is a principal factor of social welfare maintenance. The producing unit is service, not organization having 'intrinsic' information security. Organizational forms are risk management environments based on historically developed instrumental rational activity on principally contingent incidents. These have a continuity that is relevant in relative certainty at action. In global relations such exist not but also relative certainty and social welfare maintenance are based on probability.

## 2. Information Society Services

Information society change of knowledge means changing forms of rationality and integrity. Social relations creation by management of global contingency applies also on knowledge by global probability building. There created forms are based on networks, network rationality and network social. Their foundation is in concurrent determination of risk and probability.

Information society constitutes network society (Castells, 2000) and risk society (Beck, 1986, Giddens, 1990). Its social qualities may be conceptualized by postmodern theory (Bauman, 1992) and creation of informationality type of sociality (Lash, 2002) (Mäkinen, 2011/Tr4). These are not at all technological questions. Rather the information society change in production and administration leads into diminishing role of technology in social welfare maintenance. Main trend of innovations is built on information society services. Their development is based on change in social relations, rationality and integrity.

The form of rationality by global knowledge relation is constituted on development of purposive action. It is determined by risk awareness and its relation into probability. Change in dominating rationality happens when there is no constant probability match of means and ends which is foundation for instrumental rationality. It requires continuing risk and probability relationships and social totalities, structures where they are determined. If this kind of continuity exists not, risk is determined by concurrent and continuous assessment and management.

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Knowledge, whose mediation social action is, is probable, exists only on information security conditions of continuity. Means exist in relation to ends by probability of risk and knowledge determination; they have no continuity of their own. Means are means by probability, not determined on constant social relationships. This must be evaluated in every action and social formation constituted on them. There is no instrumental or structural continuity.

Concepts for global relations should be defined according to services based on information society mode of social. 'Electronic services' or 'electronic business' concepts for services in communications network may be interpreted degenerated information society services<sup>2</sup>. They describe situations where social relations are still based on instrumental rationality and on it build rationality formations, as organizations using communications as part of their processes. This leads into situation where information processing and security are considered separately in action, instrumental functions at division of labour and network. In global network separate information processing or security solutions form risk networks and risk society relations (Mäkinen, 2008/3, Mäkinen, 2012/10). Security and meaning of knowledge in network are developed in services based on genuine network rationality based on constant risk definition foundation for interaction.

Social integrity on global relations is constituted for risk probability equal to 1. Infinite formation or regulation of social relations considers only risks. Every social relation is build on probabilities of risk smaller than 1. They are historical, constitute on social rationality on risk management. Social relations and social totalities are contingent, finite, begin and end. Genuine network rationality requires social relations based on contingent regulation processes on foundation of risk properties, information security.

Network specifications are based on concurrent information security. Its formal implementation is possible for example on global dimensions - determining application scope of information security - by information security bindings. They define network users' connections on network objects by subjects. In social processes information security is implemented by profiles applied at interaction (Mäkinen, 2011/Tr4, Mäkinen, 2012/10, CommonCriteria). Both are transferable social relations that may be applied in several social continuities concurrently.

Instrumental rationality formations in social division of labour are based on relative certainty in action where is not defined the limiting processes of information security for their building; they are considered 'given'. Actually they are historically developed in social risk management processes but have continuities of their own. Social forms of instrumentality, relations between these formations as organizations and enterprises, constitute economic relations. This is foundation for society type of social integrity (Mäkinen, 2011/Tr4, Mäkinen, 2012/10).

In global environment risk probability smaller than 1 is based on networks build on concurrent risk-probability definitions. They constitute a relative certainty in action build on probable foundations. Rationality and information security are to be defined at network which means specification of conditions for probable knowledge and social action on mediation of it. They cannot be specified by generality or common features of social relations where knowledge is protected, but in global and history in contingent, socially probable networks.

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<sup>2</sup> Actually 'electronic services' or 'electronic business' are more modes of expression than defined concepts. There is not defined specific properties for these types of activity; question is rather about (instrumental) services and business using 'electric', actually network technologies.

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Communications networks, which are background for service definition as 'electric', are relevant in this connection. The distinctive property of knowledge in information society is that it can be presented independently in files and databases and their transfer. This property has earlier been carried by documents, books, transport and communications in elementary forms (post, telegraph). Social formations have in networks new technical management forms for knowledge transmission and meaning development - search engine technologies, statistical methods and information security procedures with diminishing support of organizational structures (Mäkinen, 2011/Tr3). Relevance of discussion about a new kind of service or society, information society, presupposes a general change in services and production. It is hardly result of 'increasing' use of information and communications technology, but an issue depending on probability based changes in risk management environments coming instead of fixed organizational structures and their 'bureaucratic' type of rationality.

Independence of constant spatiotemporal dimensions or structure type social integrity is a central property of networks and Information Society Services. Implementation of services in networks should manage all forms of knowledge and networking based on them. Real services require also interaction, that may use communications network but is by social content active when on information based components of service support service constitution. Services require treatment of information managed on network information foundation, management and information security procedures.

Information Society Services also consist on treatment of knowledge in multiple social relations, interaction, in social structures and networks. These social relations differ in treatment of knowledge, risk and information security. At interaction, based on relative certainty, risks rather exist, in structural social relations, as organizations, they are managed by these structures themselves, and in network by probability based network processes. When production of services is founded on division of labour based on factors of production and specialized knowledge in work, information has an independent transferability only in definite social relations. Social formations constitute of production of individual organizations and their logical network environments of risk management are organisation's interactive and communications networks. In information society services such networks can be only part of the service formation.

Organization production and service processes are based on knowledge and information in network; they presuppose network, at least interaction internal in organisation. Process organisation and ICT-governance are practices to apply knowledge management and information forms into the development processes of organisation (Mäkinen, 2012/9).

Information society services are a social form of maintenance based on knowledge and information processes and networking. Maintenance creating unit is service. The processes and networks environment are defined according to services and network rationality, not according to division of labour and instrumental rationality. This can also mean that service is produced in dynamic processes connecting several instrumental formations, also 'remote' to the customer, even in a general relationship in global network. Then rationality type of totality is also instrumental and constitutes special cases of global rationality and integrity.

Development of information society services does not mean that economic types of social welfare maintenance should disappear; they however do not form the

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dominating social rationality forms. This means also that society type of integrity is recessive. Rationality and integrity are based on probable knowledge determined by conditions of information security (Mäkinen, 2011/Tr4, Mäkinen, 2012/10).

### 3. Knowledge Relations and Rationality Formations

Rationality build up on global knowledge relations creates continuing types of social integrity as do other knowledge relations. The older forms may disappear but must not, as do not disappear traditional communities in society-type integrity. For example organization is working rationality type that has its functions in global relations too.

The main rationality forms in global relations are organization, process and network.

In organization relations of means and ends are formally regulated, evaluated and determined by quite high probabilities. Processes are general elements of rationality that may be used in organizational and network rationality types. They are based on conceptual components of knowledge and also transferable and applied in several continuing process implementations. They may be interpreted in the global rationality concepts where several global components of action are possible to combine in unique historical implementations.

Network may be based on instrumental rationality, for example on co-operation of organizations or other instrumental rationality formations. Then network builds a structure and unique social construction. This is a special case of network that does not build global relations.

In general case network constitutes of transferable rationality forms based on knowledge relations. These are processes and their historical implementations combined in probability determined ways. Means may constitute networks by variable risk-probability, global-history relations. Objects are defined as means by probability of risk evaluation. In network rationality means and ends exist at individual actions; do not constitute social categories of conceptual knowledge mediation or rules that may be followed by probability in individual actions.

Production, or welfare maintenance is mediated by knowledge relation qualities; these 'determine' production, as purposive action in general. Information society services are purposive action for intended results. These have no instrumental or social structural qualities but qualities on global knowledge relations, also individual. There is determined no 'use' of knowledge, only individual mediation for purposive action.

In instrumental rationality and structural relations division of labour and production factors do define the probability match of means and ends. In these relations is reasonable to determine 'use', rational application of knowledge and consider information as reason for production. At division of labour production factors or labour force are chosen in adjustable ways according to requirements of results. This is possible when production is based on global resources, as on information and communications network. It is possible also at certain probability if resources are global relative to some measures. Thus also 'material' production factors or labour force can be considered global at some range. This requires development of knowledge in conceptual forms and its internalization in social processes of the producing organizational formations. The production changes may be interpreted in the framework of increasing use of knowledge and information in production.

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Knowledge use, its application in production or welfare maintenance is a special knowledge relation. On general knowledge determines meaning at interaction and defines its course and knowledge use is its special case. In knowledge relations based on global knowledge building course of social action is determined in individual interaction. Global knowledge and information are considered knowledge relations mediating social relationship.

Production considered as social relations results on the welfare function of customer; its general content is social welfare maintenance. These are from the point of view of customer part of his services and welfare in general. Process and network organization, arranged according to result, are actually arranged according to welfare functions. This is possible in production based on a knowledge relation. It is a central characteristic of information society service.

Knowledge relations on basis of global network information or social relations on welfare functions are considered as information security based social relations, for example on foundation of information security profiles (Mäkinen, 2009/7).

Generality of information as a production resource, means its unlimited deliverability; it may be used in unlimited number of social processes without being away anywhere. This is based on global, universal transferability in network. This is valid for all forms of information. Their differences exist in the relationship of risk and probability and on it developed global and history dimensions. These on the other hand determine contingent networks specified by knowledge relations and interaction qualities which are operationalized in information security.

Knowledge is realized in action based on consciousness which is relationship of means and ends (Mäkinen, 2012/9). Social relations are probable courses of social action with no principal difference of networks transferring knowledge or forms of knowledge itself. Process and network are functionally coherent. Network has usually material carriers when same tasks in processes are treated by formal process elements. In concrete development cases it is reasonable to separate them, and also to say that process is one boundary value for knowledge networking and technical communications network an other for information networking. Thus in concrete development cases it is reasonable to separate logical network environment as realms of specified probabilities of risks and processes as realms build on this. Both have their formal components and components supporting interactivity (Mäkinen, 2009/7, 2012/10).

Communications network is a special case of 'widely connecting' ('disembedding', Giddens, 1990) social relationships. It has a particular property to be global and 'ubiquitous', always divisible between several logical networks and processes concurrently. Thus every social process and network is global in principle. On the forms of historical development of these formations depends the character of social environment realised.

#### 4. Information Security as Foundation for Information Society Service

Experience consists on contingent but unlimited social processes that determine relationship of risk and probability. 'Pure' experience or on it build infinite generalizations exists not. On knowledge probability building processes of experience is build probable courses of social interaction also social relations. The continuity of these processes is operationalized at information security measures.

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Information security corresponds to the form of probability building. It constitutes probable knowledge conditions and their continuity.

Knowledge relation creation on relationships of risk and probability is at information society services more important than in other forms of interaction. In personal interaction, based on knowledge in general and active knowledge in particular, special problems of risks do not exist; social relations are apparent and need no special mediation except conscious human communication. In social relations where are developed social structures and formations, conceptual information is based on generalization of relative certainty. Risk is managed mainly on procedures based on protection of knowledge and information assets. Information security is protecting empirical probability building processes and on them founded continuity of social structures.

In information society services support from continuing social formations exist not. Risk management and information security are explicitly creating meaning of knowledge used and necessary for developing social relations that mediate service activities. Information society services are on basics dependent on information security.

### Dimensions of Information Society Services by Information Security

Integrity and rationality of information society services are determined by information security specifications. These present transferable, risk, and continuity, properties of knowledge mediating social interaction.

The development of forms of knowledge having conscious relevance at social interaction, presupposes development based on probability determination for coincidental, unique and singular incidents, which only have relatively certain properties and at action relevant risk and probability specifications. Development may be constituted on rational procedures and forms of knowledge may consist on rational knowledge development processes. Process and network are continuity and transfer modes for results of this development. They are based on conscious risk management on forms of experience and transfer of socially developed information.

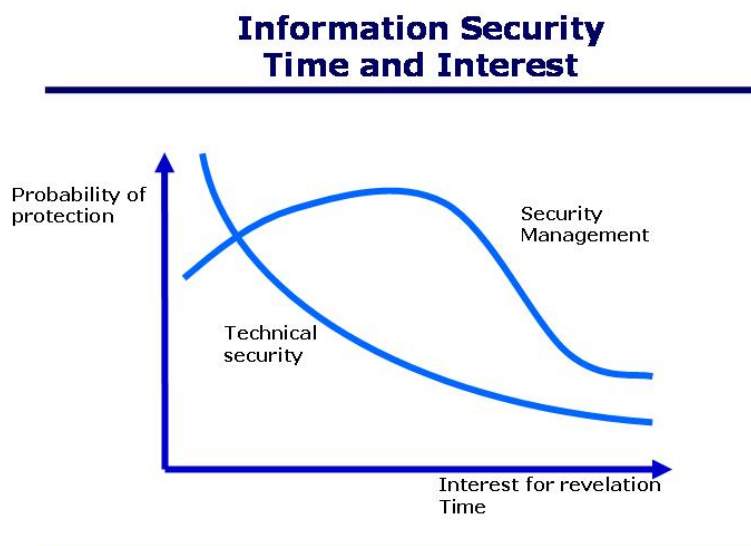
Risk management is based on specification of probability and consequences of risks (ISO 27001, ISO 27005). Incidents treated by risk management are coincidental; that is foundation for their ontology as risks. This creates the conceptual qualities of knowledge but its actual realization in knowledge transference in network presupposes probability developed in action. Specific qualities of social relations are approximations based on relative certainty developed in types of risk management and information security processes. By these processes are developed for example integrity based on division of labour in societies and organization rationality type and networks producing services.

Information security has properties that support transferability and continuity. These are conceptualized on technical and security management components. Security of knowledge requires activities related to individual human interaction. They constitute security continuity by management. Security related on information transferability is based on protecting its carriers by technical and formal measures. Technical components of information security can consist of network, application and process solutions (Mäkinen, 2012/10).

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When history, time, and society are defined by limiting values in global-history continuum - instrumental rationality and society type of integrity are defined - information security may be evaluated according to them. Instrumental rationality defines also interest on assets and their protection. In relation to time and interest for revelation of assets information security components behave as follows.



Duration of information security solutions on transferability with the technical measures is relatively low. Long-lasting formations, based on probability of knowledge, presuppose information security procedures based on interaction. With high enough level of social probability and consequences of risks, incidents based on technical solutions can 'spread out' in global-history continuum but at the same time their duration is probably reducing. In interaction acceptable risk level is reached in 'smaller' extensions but they are long lasting.

Information security solutions create environments where transaction solutions are meaningful and rational; their applicability is contingent. The 'wideness' of information transaction solutions is based on high probability of occasional, incidents concerning, security solutions. Continuity of security solutions on social action constitutes contingent objects of security.

Information security solutions based on deliverable resources founded on conceptual knowledge can create information society services, 'eService'. Long-lasting formations, based on historical development of knowledge, presuppose information security procedures based on interaction. If this is determined in organization security solutions or other society type of integrity, information society services have no interaction qualities. These solutions presuppose type of generality that requires a social totality which is as such continuing. Such totality or type of continuity exists not in global relations. There is no predictable and reliable continuity of eService security (Mäkinen, 2012/10) and logical network type is risk network (Mäkinen, 2008/3).

At knowledge in social processes can be separated formal, 'global', components based on information and interactive, 'historical', components based on knowledge. Their combination by information security must be determined on service level. It constitutes also the defined network environment. Information based process components build transferability of processes. This requires structural relations or

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should be based on probable information security. There can be applied technical solutions.

Processes as whole require information internalized in social action and socialized in the probable social relations. Only in action are realized the properties of even formal process elements, and the last ones, technological properties included, are their relation to global risk. At service should be determined the conditionality created by in risk management created probability. This is based on security use of components that are applicable on probable conditions of processes.

Social relations constituted on global contingency are approximations of probability distributions of incidents; they are always relative certainty in relation to social action. Also information security components should be expressed in this kind of formations. They have a network and process component, both based on concurrent risk and probability determination; neither social dimension has a continuity of its own but continuity qualities are determined in action.

Network dimensions are mostly based on Bindings. They may constitute relative continuities as in social division of labour and organizations but may also be based on probability evaluation on singular action level. The processes for security management are based on application of information security profiles in continuities created by information society services. There exists no singular environment for probability match of means and ends but their singular occurrences in service processes.

On information are based activities that exist in communications networks and their processes. In information society services this risk management environment is emphasized Risk management environment is transforming to probability foundation counted on protection of concurrent occasions instead of relative certainties at action or social structures.

If probability of technical security solutions, based on information carriers, is high enough to be socially functional, is build a 'Information Society Service' in the sense 'electronic service'. It is a boundary value of service realized if participants have social trust on it. The other boundary value is interactive service based on presence of participants. In the first case, trust, continuity, is problem in the service, in the other case tolerance of network risks, transferability. In every case action environment is based on network, but the type of network, or its 'degree of electricity', is varying. Also interactive activity can use and uses electrical network connections.

In last instance information security and information society service dimensions denote varying forms of social. Based on probability and consequences of risks, social varies according to the level acceptable for social action and consciousness. Solutions based on information treat global risk but they do not imply continuity. It is based on knowledge based solutions. These relations have a statistical connection with the extension and duration experienced in relative certainty.

### Information Society Service Forms by Information Security

On forms of knowledge and their security solutions at transferability and continuity dimensions may be build components of information society services. They are constituted of information based solutions, delivered in 'extension' of services, and knowledge based solutions continuing in history of services, interaction where contingent qualities of services are determined. In concrete development processes

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is important to separate process elements where can be applied transferable service solutions and ones where interactive solutions are necessary. The former ones may be applied in several development processes and services<sup>3</sup>.

These qualities of services are as general as knowledge in conceptual and active, transferability and continuity forms are. But transferability and continuity do change with probability building processes. The change of risk and probability relationships appears at process determination by content of information transference. This depends on information security solutions, on applicability of information based, 'wide' security solutions and possibility to determine their continuity. When probability building process changes, contingent world where services are developed is based on network type of rationality and network social.

The direct specification of transferable and interaction components is possible in social structural relations. In general case process or network elements are created but they do build social structures only at special cases and may vary in continuity of action. Service components defined on this foundation behave like profiles of social relations to be applied according to social acceptance processes, as information security profiles do. Actual social formations may be directories of network, process and information security profiles (Mäkinen, 2009/7).

Social is contingent. Generalizations on components of social relations, are they based on any forms of knowledge, are constituted on limitations of knowledge creation processes which constitute the type of information security. When components of services are defined, they may be applied as profiles constituting combinations of social relations. Social has versatile forms at interaction based on global probability building. The global dimension of social 'liberates' them and makes possible several meaningful forms of action on foundation of knowledge meaning, based on information security.

Information security is on that case not to be interpreted as protection of information in division of labour but means to create, develop and maintain meaning of knowledge on foundation of users identification, authentication and non-repudiation of their network connections (Mäkinen, 2012/10).

### Information Security and Welfare Maintenance

Information society services are social welfare maintenance processes. In this sense they are comparable to economy; their difference lies in the form of rationality and integrity they are based on. Economy constitutes on means-ends probability match which on its turn is build on existence of social means as social relations, probable courses of action, in a structural form. On this is based society type of rationality. Social continuity is continuity of probability match and structural relations (Mäkinen, 2011/Tr4, Mäkinen, 2012/9).

At economy maintenance processes are determined by factors of production, means realization probabilities of ends set. Realized ends evaluated by means are abstract social categories like utility or profit. These are structural social properties. Effectiveness of production is possible to measure when abstract social properties of concept 'working time' are developed.

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<sup>3</sup> This demarcation has important implications in costs of service solutions. Information processing and security solutions based on technology and formal process components are considerably cheaper than on interaction based components.

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In global relations, where structural means-ends probability match exist not, this type of maintenance determination is not possible. Maintenance processes have social content by results based on continuing processes determining contingent objects where global components, as means of maintenance, are connected. These are determined by knowledge mediated in social processes and their relationships on foundation of information security.

Meaningful knowledge on knowledge relation specifying meaningful social action is in case of information society services based on process results. Social rationality in information society services constitutes on knowledge relation by information security mediation. Action is purposive, based on risk and probability relationships and probable rationality types. Predictable, rational network services are based on continuity determining principles at the network level, in service itself. In instrumental case rational action in network should be determined only as co-operation between instrumental units. It is possible but probable mostly between known participants; otherwise highly improbable.

Change of meaningful action is operationalized in information security. At economic rationality is developed society type of integrity and on nation based constitutional and welfare state; society is an economic formation (Mäkinen, 2011/Tr4, Mäkinen, 2012/10). Information security relations are problematic mainly on protection of information assets as external presentations of conceptual information typical to this rationality form. Such structures presuppose social and knowledge relations where social interaction is limited in ways that make possible determination of 'extensive' dimensions of social in relation to human experience. In information society services this is genuinely global and may be determined by information delivered in network.

Instead of social structures creating information security, there are several security solutions for each information society service. They may be defined as information security profiles delivered in network and accepted by rational social evaluation processes according to actual service requirements. Organizational form is dynamic, based on varying logical networks, processes and information security solutions for them.

Knowledge relation is developing in global, concurrent evaluation of probability. This may be scientific knowledge – it requires specific knowledge obtaining, testing and criteria for truth accepting - but not necessarily although follows same type of knowledge development principles. There exist social processes that determine knowledge creation on conditions of contingent objects determined by risk and probability relationships (Mäkinen, 2012/10). Social relations require objectivity of knowledge based on global evaluation and continual assessment of obtained data. Knowledge is probable, not based on belief or instrumental rationality determining achieving certain ends. Welfare maintenance consists of several products, services, or even values.

Information security determination or evaluation in welfare maintenance is not possible by any single factor or their combination. It may be fulfilled in several ways and consist of several globally delivered profiles. This means further several determinations of social. Social may develop in different forms, where one is traditional society, other social division of labour, organization and 'society' in nation state form and one information society services and global network, Globalnet.

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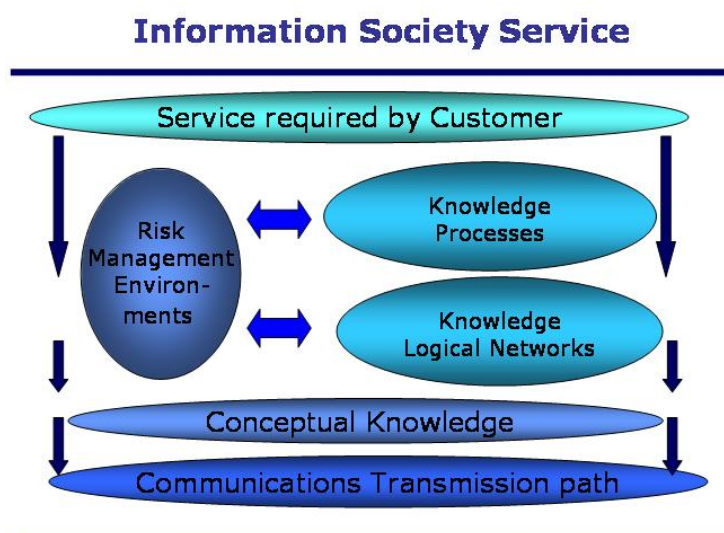
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### 5. Development and Constitution of Information Society Services

Welfare maintenance on basis of network constitutes information society services. They consists of distribution of commodities and services in genuinely global social relations, welfare market networks. Producing units are services, rationality and integrity are based on networks determined by global risk-probability dimensions in service continuity. This may constitute several forms of social, social action properties as common units.

Development of information society services constitutes on service requirements of customers based on contingent object determination on foundation of probability, continuity. It presupposes development of conceptual and active knowledge used, processes for their application and networks environments, where knowledge and processes are present, and information security for all components. Starting point is knowledge forms, where special forms of continuity and transference are determined by risk management environments (Mäkinen, 2011/Tr4).

Information society services constitute as follows.



Contingent social relations require that networks, processes, knowledge and their security are at information society services defined in ways social continuity requires. Knowledge is built on limiting processes for probability building which determine information security. Networks and processes are specified by knowledge and bindings determining service security. They consist of global and interactive components constituting systems according to service requirements in probable conditions. Service may be built on ad hoc systems. Service happening in generalized 'network Inter networks', following generalized instrumental rationality in an organization and using general knowledge, does nothing in social continuity requirements.

Global connections are based on directories in different levels. On these are constituted network addresses, organizations, services, network constitutions, process components, information security profiles and knowledge components which have meaning on conditions of global relations continuity. The formation of social systems is actually based on directories where are presented components on

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which social relations are constituted<sup>4</sup>, and the continuity in social action, actual interaction. Social constitutions are sets of social definitions of global social dimensions and their historical realizations managed in directories. These are based on concurrent risk definitions and corresponding social dimensions.

Information society services have following properties (Mäkinen, 2011/Tr4):

- Foundation for services is knowledge relation and its probable forms (network information, conceptual and active knowledge). These forms are included in all services.
- Social processes, which produce the actual services. There is specified interaction mediated by knowledge forms.
- Communications environments where processes are realized. They are transferability environments for knowledge and processes, specified according to the requirements of service.
- Social welfare maintenance as general results of service determined by content.
- Network organization for production on foundation of service.
- Information security of components, including specifications of risks encountered at services and trust they require.

Information security solutions are realized on information security management systems in organization, processes, co-operation of several organizations, services and networks (Mäkinen, 2012/10).

Network constructions either are or not constituted of relatively permanent components. They are based on information security constructions which are the most important management functions on information society services.

### 6. Risk Society and Information Society Services

The change of industrial society, or modernity, has been characterized by several concepts, as Information Society, Network Society, Risk Society, and changing forms of social (Mäkinen, 2008/13, Mäkinen, 2009/Tr1, Mäkinen, 2011/Tr4). Concept 'Risk Society' (Beck, 1986, Mäkinen, 2008/3) is based on 'new modernity', or 'second modernity', following 'modern society'. In risk society are performing Grand Risks which are not possible to specify according to probability and whose consequences are not possible to predict. Presuppositions for risk management do not exist. Risks are a feature of modern society, unmanageable risks a feature of risk society. In concept of social based on managed risks this means that genuine social is in risk society not developed.

Social interaction on foundation of communications network creates risk network and risk social. Rather than as unmanageable risk environments they should be considered as boundary values of social. Social is not a relation either existing or not; it has degrees.

Risk network has its foundations in network technologies, as IP (Internet Protocol, network level protocol) routing communications packets dynamically according to universal address on whatever route is available. But risk network is created when and if these technological relations are connected with social rationality which has no network foundation but is based on instrumental rationality (Mäkinen, 2008/3, Mäkinen, 2008/13, Mäkinen, 2011/Tr4).

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<sup>4</sup> Directories are probably based on X.500-standards and their developments (Mäkinen, 2009/7, Mäkinen, 2011/Tr4).

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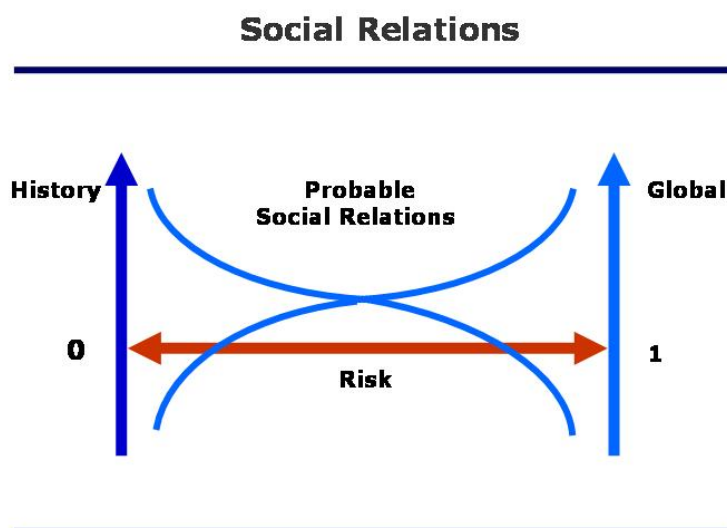
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Network rationality presupposes knowledge relations based on probable conditions for knowledge building. Its production and administration structures are information society services. Probable knowledge building creates risk based conceptual form of knowledge, not conceptual managed as information assets and by accepted trust in social structures, rules or laws, ideological doctrines; not even scientific truths on presuppositions of non-contingent knowledge building processes. Information society services presuppose global conceptual relations, where information is managed by network procedures determined by information security.

Conceptual information in social relations for generalized knowledge relations at relative certainty in action, create social structures and networks. These relations mean dissolution of society type of integrity, but are not genuinely global. When network is build on concept 'network Inter networks' on these properties, it does not work with rationality developed on genuine global networks, where any historically determined probable relationships do not dominate. Then is created risk network, a limiting value of social.

In ubiquitous network distance or space in the geographical sense do not mean anything. Also time does not mean anything; ubiquitous transmission path is possible to deliver concurrently into several processes included in different social relations. Definition of social dimensions is based on concepts 'Risk' and 'Probability' or 'Global' and 'History'.

Social risk management processes are created on components that create contingent dimensions of social. These constitute social formations whether they build social integrity in traditional, structural or network form.



Global dimension of risk management is non-contingent when risk has probability equal to one. Absolute risk regulation, presupposition for non-contingent social objects, is possible only on that condition. In probable, unique processes, are developed social relations. In the limiting case they are approaching certainty, however it never reaching: social relations are always mediated by knowledge, conceptual.

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Components of social processes for risk management constitute connections of objects on social continuity formations, are they based on tradition, social structures and institutions, or probabilistic systems of network information and social profiles.

Global means networks not having information security and history networks having information security. Social relations are relations of these components. The realizing social formations are based on probability of risk assessments and probability of singular action going on according to probable knowledge developed in risk assessment.

Risk society, Network society, Information society, Postmodern sociality are new forms of modernity. They have common basis: global phenomena based on information and networks. Social based on networking is by default risk social; conceptual knowledge is.

If information society services are eServices, society remains risk society. eServices, boundary values of information society services, can serve as widely applicable but short term social services. Global network without specified risk management environment – as plain Internet - can be basis for eServices – if requirements which services state are assessed to be fulfilled in probability enough and this probability is accepted by users of services. Those requirements must be determined and they shall be quite low.

In human action proximity and applicability in wide connections seem to be exclusive (Lash, 2002, 75). With the ubiquity of network this phenomenon loses its geographical dimensions. This can mean breakdown of proximity of social relations. If information society services are developed only as eServices this is more than probable. There is developing an 'every-day risk society' with global risks. Its characteristics are technical risk management of separated eServices, but not functioning society.

Information security in global network can be reached by development of knowledge and social. Operationally this requires development for information security of information society services, managed through all aspects of knowledge and networking.

### 7. Economy and Information Society Services

Social continuing formations are approximations of sets of incidents in global-history continuum. In action they are based on relative certainty that is not questioned but is however probable course of social action. Action has to follow social relations only on probability to be social. Moral judgments (Mäkinen, 2010/15) on which social organized forms are based on, are build on relative certainty and also probable. Social approximations for social life are organized by high probability on regulations, as organizational principles or legislation. Then is usually presupposed their following almost necessarily at the conditions defined for social action.

Organized and regulated forms are based on rationality and integrity types. Organizations, in economy context enterprises, are based on rationality where is possible to determine a probability match for means and ends, network on rationality form where existence of probability match is itself probable, also may have several forms. This is based on differences in knowledge probability formation, risk and probability relations definitions. At network rationality or integrity may be

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at organizations or even societies but integrity does not build on that foundation, also on structures but on probable knowledge properties.

Enterprises and networks as forms of rationality and integrity are social approximations of probable courses of action. Their results, products are also constituted on foundation of differences of means-ends probability match; on certain resources use or having individual properties only in relation to action. These rationality properties are based on historical knowledge relations having meaning based on relations of risk and probability which may be defined in social structures or at information security.

Economy has not always existed; maintaining presuppositions for social life or even production do not constitute economy (Sahlins, 1972/1981, especially 1 – 39). Economy may neither always exist – information society services mean its dissolution. Economy is only instrumental and presupposes social structures, definite social space, and definite social time, possibility to measure effectiveness in social working time<sup>5</sup>. Utility, profit seeking, social organizations aiming at profit and functioning on basis of property all presuppose instrumental rationality and constant relationship of global and history. 'Economic' is a specific form of 'social', its existence is contingent in knowledge relation. On the other hand it is foundation for society type of social integrity; both presuppose same probability match conditions for means and ends (Mäkinen, 2011/Tr4, Mäkinen, 2012/10).

Argumentation of economy as a natural system, only producing things people need, is equivalent to supposition that society is non-contingent system where regulative mechanisms, risk management, can affect unlimited in extension and time; 'in the long run' system should always recover its disorder and return to the 'natural' laws. This holds only in the sense that "in the long run we are all dead" (Keynes, 1923/1971, 65). Otherwise in the long run there exist only undefined risks (Mäkinen, 2009/14). Social is contingent system, determined by knowledge meaning based on risk management. Global dimension of risk management may be interpreted non-contingent when risk has probability equal to one. Then it however does not build social relationships. Idea of 'long run' regulative effects corresponds to this global concept. There is impossible to affirm equilibrium.

Instrumental rationality has nothing to do with human nature or best of all worlds but only with historical knowledge relations. It is not only ideological to argue that greed is foundations for economy or that utilitarian strive for everyone's own utility leads at least into the most efficient - if not best - results regarding society as a whole. When social relations are based on instrumental rationality so it is; provided that rational government ensures the predictability and reliability of social action outside the relations at commodity exchange. Both economy and society must exist as social systems determining means-ends probability match.

Purely ideological is, if this is supposed to be founded on properties of human, or his action - human nature - or that thus is created a natural social order, or at least the most efficient – if not best – economy. Then is created the only economy and only social order based on structure type of integrity; they are twins<sup>6</sup>.

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<sup>5</sup> Between years 1300 – 1650 in Western-Europe happened a change in the concept 'time' (Thompson, 1982, 299 – 304). This made possible 'working time' as an economic issue. Before this concept 'economy' is only descriptive.

<sup>6</sup> The dominant role of economy in social development in Marx's social theory (Marx, 1859/1970, also Mäkinen, 2011/Tr4, Mäkinen, 2012/10) is possible to interpret on foundation that society type of social integrity is based on existence of economy.

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Selfishness and egoism may be subjective relations at knowledge relations. If they should determine production or economy regulation of these social relations should be individual. Means and ends are however social categories based either on mediation of generalization or transferability of knowledge at interaction. Their probability match is determined at generalizations and presupposes existence of social structure; individual action may follow these by probability. If these social properties and relations should be determined by individual qualities it should presuppose non-contingent regulation. But 'in the long run' is defined only on relative certainty.

Selfishness and egoism are relative certainty at knowledge relations developed in empirical probability building processes. They may have a life of their own for a while, for example a couple thousands of years - or something, approximately. But if they have relations into purposive action they must have connections into social relations which are management of risk and probability connections. In that sense these subjective relations are coincidental variations in probability building processes. Purposive action is a social relation that is based on relationship of means and ends, at instrumental form in social structures. Relations, that are purely subjective, are coincidental and do not build social<sup>7</sup>.

This is not only important in connection with the regulative mechanisms of market economy. Primary question is, that instrumental rationality is a historical rationality form, based on social continuity in relationships where set of means are selected to reach a certain end, in social relations where their probability match is defined. It is developed in a process of rational selections, appearing coincidental in global dimensions, but creating reasons for historical rational action.

Organisations and networks are social formations where social connections are continuing in frames of certain social processes. On foundation of information security they are defined by Bindings, connections, and their continuity on foundation of defined and applied profiles. They have differences on foundation of duration and form of empirical continuity. Duration is possible to determine if the dimension of continuity is empirically specified. It presupposes relative certainty where history and society are defined as limiting values of global-history connections. On these relations it is possible to determine the existence of knowledge, in last instance in constant global-history connections at global networks going on at indefinite time.

In network knowledge relationships are constituted on contingent relations of social objects and their contingent processes for relations and knowledge development. These objects and events constitute unlimited sets, based on unlimited transferability of knowledge. On these sets knowledge has meaning determined by information security managing relations and processes. Historical continuity may include several probable global connections and global connections may exist in several continuity processes. Probability is the only content for duration and experience. Global connections are defined by knowledge transferability where events and objects have social properties by probability, instead that they are defined as generalizations – according to relative certainty – which are fulfilled at events and objects by probability match.

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<sup>7</sup> Purposive action is a property of social action and only its. From this point of view should be interpreted also: "Nur ein vernünftiges Wesen hat das Vermögen, nach der Vorstellung der Gesetze, d.i. nach Prinzipien, zu handeln, oder einen Willen" (Kant, 1785/1974, 41)

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Continuity of social relations at structures is based on history of conceptual knowledge mediation in social interaction determining for example social means or human standings at social relations. In traditional society economy did not develop social relations based on conceptual knowledge generalizing social relations; it was part of the continual living of community. Modernity began to develop when social relations as generalizations of human standings in historically determined relations became dominant. Global social relations imply dissolution of social structures in general and economic structures in particular.

Information society services are global. Permanent historical standings do not dominate social life. This is based on transformation of knowledge mediated in social interaction. Permanence of social relations has a relatively weak importance, and decisive is actual action. Historically determined production of things or services does not build economic relations but relations between individuals.

'Economy' is a period of transition in social history of humankind. Only on it is defined continuity of constant relations of risk and probability, otherwise either dimension dominates. Inception of economy is a social and historical problem, but does not explain 'social' in any way - on the contrary. There is no principal reason for development of economy or instrumental rationality; they are historical, contingent questions depending on incidents based on empirical knowledge probability building<sup>8</sup>.

All social formations are contingent, exist in continuum of global and history. The 'general law' of social is its creation by individuals' conscious management of global contingency and on that based rational social relations. Social has no properties to be generalized into 'all social relations' but there are several 'socials'. Their development probably just begins when there are created global social relations. Compared with biological evolution, lasted several hundreds of million years, social rationality is just beginning.

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<sup>8</sup> Examples about historicity of economy are: Exchange can have form where it is based on reciprocity, Gift (Mauss, 1923/1990). - Economic presuppositions of capitalism were present in several forms of living, but only in western societies were such forms of rationality which made possible its creation (Weber, 1904-05/1963). Real is history and its development as conscious management of global risk. - The presupposition of economic 'in the long run' regulation is a possibility to widen the economic scope (Polanyi, 1944/1957, 68 - 76).

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## History of Modifications

<b>Date</b>	<b>Version</b>	<b>Writer</b>	<b>Modification</b>
26.2.2007	1.0	Heikki Mäkinen	1. accepted version
30.1.2009	2.0	Heikki Mäkinen	Modifications according to 'Yhteiskunnan Tiedon Turvallisuus', Version 2.0 Definition of Information Society Service in Global Network
28.3.2012	3.0	Heikki Mäkinen	Modifications according to Knowledge of Society Training Papers 1 - 4

# Social Foundations of Information Society Services

Knowledge of Society White Papers 11

## The Knowledge of Society White Papers Series

15. **The Moral Judgement**
14. **Knowledge Relation and Social Rationality**
13. **Global, History and Social**
12. **Information Society Services and the Change of Social Rationality**
11. **The Social Foundations of Information Society Services**
10. **The Social Foundations of Information Security**
9. **The Social Foundations of Knowledge Management**
8. **Space, Time, Sociality** (Obsolete, Superseded by No. 13)
7. **Globalnet as Directories of Information Security Profiles**
6. **Knowledge Society or Information Society**
5. **Globalization: Information, Knowledge and Networks** (Obsolete)
4. **For Development of ISMS Standards** (Obsolete, Superseded by No. 10)
3. **Risk Society and Risk Network**
2. **Globalnet and Knowledge of Society** (Obsolete)
1. **Risk, Trust and Security** (Obsolete, Superseded by No. 13)