

Regular Paper

A Study of “Information security” in Internet Society: The Value Formation of Information Technology and Social Trust

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The purpose of the paper is to elucidate the formation of “trust” in Internet society in the context of the relationship between the real social system and “trust” and between Internet space and “trust”. Although it is based on the dualities of real-world “system trust” and Internet “technological trust” and real-world “human trust” and Internet “personality trust” in this paper, in order for trust in the Internet space not to be limited to a personal issue of name and anonymity before trust for the space system, we intend to discuss trust in the Internet space as “communications trust” (duality of system and personality reliabilities). This study suggests that trust in the Internet space lies in the joint composition of technology (civilization) and society (culture) and clearly exists as complex of security (info-tech) and humanity (info-arts). Based on the above idea the final purpose of this study is to show a path towards forming new human trust (internal controls) in the “information security” fabricated from the viewpoint of human mind controls (laws, morality, ethics, and custom) and information engineering. This course signifies the “security arts” (the study of trust) that incorporate information arts and info-tech in the Internet space.

1. Introduction

“Trust” in the Internet society is tinged with duality in the interaction of “trust” in a real social system, and “trust” in the Internet society. It is based on the dualities of real-world “system reliability” and Internet “technological trust”, and real-world “human trust” and Internet “personality trust”. In the main discussion, so that trust in the Internet space may not be confused with personal issues as an problem of anonymity and real names before trusting in the space system, we stand on the position that trust in Internet space “communication trust” (a duality of system and personal trust). This position advocates that

trust in Internet space should be a joint arrangement of technology (civilization) and society (culture), and be actualized as a complex of security (info-tech) and humanity (info-arts). This paper discusses the process by which new human trust is formed (internal controls) within the “information security” fabricated via our internal controls (laws, morality, ethics, and custom). New human trust signifies the “security arts” (the study of trust) that incorporate information arts and information technology¹⁾.

2. What is Technology? The Original Meaning and Purpose of Technology

As a prerequisite to understanding information technology, we have to first understand some technical definitions. Technology plays a role in connecting objects to humans and technology itself cannot exist on its own. Moreover, technology objectifies human capabilities, enabling us to utilize them by bringing external nature to us and internalizing it. Such a definition points to technology (art) connected with social values, including the diversity of means by which humans achieve their goals through technology. This definition of technology has something to do with what Max Weber called “substantial rationality” and the sense of value which Plato called “*eidos* of the good,” and by which he also tried to bring the “design” of its beauty to the real world. However, such technology (art) has an aspect of technique (*techne*). *Techne* implies the objectivity of art, subjectivity for diversity, arbitrariness, and the specialization of art via value neutrality and an industrial increase in efficiency especially in a post-industrialized society. This is the same as what Max Weber called “formal rationality” and what Max Horkheimer called “instrumental reason.” It is well known that Heidegger expressed his apprehension, citing the “unique service of rule” and giving warnings to “technological society” lest such *techne* determine a society’s quality. This apprehension was rooted in the fact that in order for technology to retain a capitalist system which includes bureaucracy and marketability, technology has to incorporate *techne* within itself. So if the balance between technology and technique is then lost, then technology will itself deviate from social norms²⁾.

Thus, although technology has the two sides of technology (art) and technique (*techne*), this duality demonstrates that technology is located and exists in the

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midst of science (theory) and engineering (applied theory). That is, the relationship between the statements “science is useful to technology as long as it is used for design” and “application (engineering) has a diversity which is not returned to theory (science)” means that as long as science and engineering share a mutually critical relationship, technology would in and of itself include the means (*techne*) and the purpose (value), and have the ability to select from among many different means (*techne*) corresponding to the purposes (values)³⁾.

3. Technical Sociality: Technical and Social Determinism

Technology brought about the discovery of the natural, intrinsic capabilities of humans as well as our latent capabilities and has played a role in advancing social civilization. In post-industrial commercial society, technology was embodied in the habituation of technical guidance in the manufacturing industry’s commercialization process, merging with the institutionalized safety of technical design. However, since humans, fraught with uncertainty, cannot perform perfect technical development and management, the level of technology has in the long run been dependent on the relationship (bureaucracy) between a government’s technical control (political value) and civil society’s technical administration (cultural values), or by the relationship (marketability) between the autotelism (public value) of private enterprises carrying the burden of commodity production and the self-fulfillment (private person value) of general consumers. In reality, the internal contradiction of the two technical facets of technology (art) and technique (*techne*) is incorporated in civil values and national objectives, the relationship between customers and businesses, the creation process of technology itself, and the executive process as can be seen in many nuclear accidents and corporate scandals.

Such conflict is inherent in a process which consistently results in technology (size of capital funds, patents, technical knowledge, planning), a manufacturing process, manufacturing control, an employment process, management, a consumer’s use process, and a restoration process. This contradiction will amplify both optimistic and pessimistic views towards the aforementioned technology whenever an out-of-the-ordinary incident or accident occurs. For example, the tool theory deems technology to be merely a means for achieving a goal and is

rooted in optimistic view that makes light of the risk of technology losing sight of social considerations, while the independent existence theory takes the pessimistic view that technology may leave human hands, becoming independent and beyond our control before taking its revenge on society. As these two values are both deeply rooted in positive and negative values, so too is the conflict. What is really important is not to treat technology as a tool, but to use it to enrich humanity’s internal nature, putting it to use in our society by preserving the external environment, as well as activating intrinsic human life with a helping hand (universal design) that enhances our life-world⁴⁾.

Now, from a sociological point of view the values in the tool theory and the independent existence theory are respectively equivalent to social determinism and technical determinism. The former is based on the idea that the invention and introduction of new technology and the control of technology are determined socially in advance, and the latter is based on the idea that the rationality of technology has a critical impact on the quality and progress of all social domains, deactivating social efforts for introducing and developing new technology as a result. Both the tool theory and social determinism are optimistic, as the former affirms the tool-using human’s overconfidence towards technology and the latter explains that society can control technical creation and the speed of progress. Moreover, the independent existence theory and technical determinism are pessimistic, as the former states that social control and overdrive are impossible and the latter puts forth that social development is determined by technological advance and that technological creativity determines what society should be.

The conflict between the two theories will produce a directionality that creates cultural values allowing technique to be suitable for human society, in order for technology to finally produce values that are not contrary to human values (truth, good, beauty, and virtue) or social values (freedom, equality, and trust). This also means that technology cannot take root in society in the long term without attaining human and social values as well as convenience and efficiency, and that it must function in compliance with human internal controls (law, morality, ethics, and custom). Furthermore, this means that the value neutrality of technology is viewed optimistically, and for social determinism (optimism) which places trust in technology-using humans, that both humans and society will find human and

social values in the inconsistency between national objectives (bureaucracy) and civil objectives (marketability). Social determinism may hold that human society values the process which has controlled technology (civilization), but it is based on a certain trust in the system that both technology (civilization) and humans (society) have produced. Here we see a process moving towards social constructivism (a complex determination viewpoint through technical, social, cultural, and historical relationships affecting process decisions) that includes social determinism (optimism) and the “pessimism” of technical determinism.

4. The Meaning of Information Technology and Information Systems: From Machinery Systems to Information Machinery Systems

The previous section discussed the relationship between technology and society, paying special attention to “technical sociality”. So where do these statements about technology and society stand in the context of information technology and information society? In this section, we will examine the ladder leading from science, technology, and society to culture via information technology (IT) pertaining to the interpersonal information process⁵⁾.

Technology first glues science (theory) to technical skills (means), putting into motion a machinery system that works on its subjects. One could say it plays a role in increasing labor productivity as objectified technological strength. IT regulates and controls this machinery system; controls the cooperative systems between machines, between humans, and between machines and humans; and with the increasing reliability and immediacy of information encoding (digitization), raising the production efficiency of machinery systems, increases consumer goods productivity, and ultimately raises profit margins. Profits can now be extrapolated solely from the process of the cooperative system between machines and between machines and humans. That is not the only achievement of IT, which also made centralized, publicized administration possible by dividing the labor process, enabling human beings to become independent (autonomic) and share information.

Second, IT promoted flexibility, networking, and intelligence in the labor and study processes through the development of software skills in tandem with com-

puters. This technology not only allows production and inventory control of the production line and the products themselves, but also personnel management, teaching management, and knowledge management to improve intellectual productivity in human relations. IT has restructured information-processing behavior and intellectual work in the labor process, and combined information-processing activities and intellectually productive activities in the learning process. It also makes it possible to check workflow and to engage in e-learning through information network management (management system as paradox).

Third, IT brought about environmental changes in the power, transfer, and control facilities of work system apparatus and human relations. It made possible automatic controls (feedback) for machine operations and controls in the hands of humans. It makes it possible to automatically detect the causes of malfunction in the cooperative system between human and machine, such as forgotten data, mistaken memory, and operator error (on the human end), or misread data, false reports, malfunction, and incorrect records (on the machine end). The appearance of this automatic control function means that a self-correction process is included in the machinery system through the interaction of the computer’s data-processing, detection, and search functions. Thus, IT, by providing an additional feedback rule to IT systems, succeeded in making information flow (time) responsive and compressing data space (space) by connecting information stock (contents) to the information network (space).

Thereby, institutional computerization and networking were promoted more and data organization enhanced. If mechanization and machine systematization (Taylor/Ford) in the first half of the 20th century were processes that included humans in the mechanical system, then IT and information systems in the second half of the 20th century and beyond deal not only in creating, transferring, and accepting information but also in creating information control and control functions, thereby changing the real world into an information environment (information socialization). In that sense, human culture cannot help being more and more of an “information culture” in information society⁶⁾.

5. Network Organization and Internetworking

The aforementioned optimism of the tool theory and social determinism and

the pessimism of the independence existence theory and technical determinism can naturally be applied to the two rough categories of the computer and its networking—in other words, computer utility⁷⁾. Optimism is represented by Pierre Lévy bringing out new issues of a reality revolution into virtualizing via computers and the Internet. Pessimism is represented by Hubert Lederer Dreyfus bringing to mind “the nightmare of remote control” via Internet functionality. We can see that both show support for and caution against the act of the human mind trying to secede from the body.

Both theories for the Internet have developed as a social phenomenon into something of a confrontation between “citizenhood” and “popular appeal” (intelligence and stupidity) in Internet space and the realms of information disclosure and privacy (real name and anonymity), and marketability, citizenhood, and national regulation (information control rights and information regulation). This conflict corresponds to code (servers), routers and protocols (TCP/IP), and security functions in the technical, information machinery system aspect of the Internet, namely, Internet e-mail (the process of creating, saving, sending, transmitting, receiving, and storing information) and Web functions (the process of creating, publicizing, communicating, and storing information). The Internet space has also given a structure to our characters and social functions which are contradictory to each other. Therefore, there is a great possibility that the rights and wrongs of real-life social functions may be further amplified within the communication functions and Internet space as complex spaces of media functionality. Information authenticity and the reliability thereof, require confirmation of the information’s source and processes. Since information in an information society proliferates due to the appearance of the Internet, some types of information can cause diversification, just as in the mass media function (media hoax) of real-life society; so it is difficult enough to confirm, much less refute (huge links, broken links)⁸⁾.

Seen in this way, not all of the Internet’s information value is directly linked to social values within the information space. This means the Internet space is also replete with full of false information and holds the risk of inducing crime just like real-life society. At this point, the relationship between Internet technology and the sociability of people using the Internet should be treated as a

problem, along with the spatial characteristics of the Internet that networks this relationship. Doing so will lead to the possibility of composing social values for the path to conservation from technical safety in Internet space, through the path to trust from social security inside Internet space, and through an exchange process with the external environment. Next we’ll focus on the human network through the Internet, form ideas to determine the meaning of the double-sided function (open = convenience; controlled = safety) and consider processes to confirm whether people can connect human value to the Internet’s technical values to create social values.

6. The Social Function of the Internet and Value Formation through Internet Use

Basic computer’s role of an operational function and recording management and the advent of personal computers added social-related functions (such as data processing and information transmission) to technical ones via the Internet evolved through a series of processes ones (such as keyboard/mouse operations, input, conversion, detection, transmission, playback, and storage). An Internet function takes on social value by assisting humans, and being used by them. Circumstances have brought about the same mechanism in humans. Given automatic processing via a computer’s operation functions, receiving prediction assistance, producing information from intellectual speculation based on rules of thumb, and collecting intellect based on speculation, the working of the human intellect supports a route to knowledge from theoretical understanding⁹⁾.

This means that people are helped by computers and the Internet at the level of preparing data, information, and knowledge, reproducing human values (truth, good, beauty, and virtue) via a process of forming information and knowledge; by so doing, the functional worth of a computer/the Internet is stipulated by the needs and values of people and human society. On the other hand, human desires easily reproduce negative human values on the Internet. In this context, the technical function of the Internet cannot help having the duality of both promoting and controlling free action by responding to our social values (freedom, equality, and trust). The Internet in the words incorporates safety functions to preserve its architecture, along with security functions to deter criminals and

preserve system and human reliability, thus building peace of mind. The also means that the Internet at the same time controls the human worth of Internet functions and creates and controls human social values.

In other words, though the computer and Internet function may have human-like functions they do not necessarily satisfy human values. The safety functions (preservation) and security features (monitoring) of Internet technology, in line with the improvement of security techniques that serve as the outside point of internal control over human desires, create a copy of the “freedom” so crucial in human and social value and dub it “convenience,” thus surrendering “trust” to “peace of mind”. In order to secure both safety and peace of mind in the Internet space from the outset, one must first establish trust in the system. Nevertheless, information disclosure (real name) is often recommended in the Internet space. This shows a tendency to treat the “hazard” of information protection (anonymity) without discussing the validity of trust in the system. In order to maintain freedom in the Internet space, it is necessary to reconsider issues about human internal regulations in the context of systematic reliance and social reliance of the Internet. Issues about the “preservation” of optimal architecture (long-term) and the “well-being” of social ethics corresponding to the “safety” of security technology (short-term) and the “peace of mind” of human psychology will soon become issues about creating trust in Internet space itself and about the formation of high-level Internet societies.

7. Forming Social Trust and Forming “Trust” in Internet Space

According to Niklas Luhmann, trust (*Vertrauen*) is counting on one’s expectations of others or of society, and is a fundamental fact of social life. Moreover without the prerequisite of trust, the social materialization of distrust is also impossible. The power of trust is the capability to cope with the complexity of the real world and to soften distrust, it is an ability of a human being leading human identity within others’ complex experiences and the social system toward mental system equilibrium. It points to new mental and social mechanisms for reducing complexity, thus preventing increased distrust born of differences in systems and (human) environment. In other words, humans reduce to a common experience the unexpected complexity brought about by others on a daily basis, unless we

can shrink the social system that exists objectively and out of our hands, we will dig away at the foundation of trust when faced with increasing complexity. Trust includes the power to create social norms based on human and social trust as an accumulation of (already reduced) past events, turn them toward the future, and sustain them. It is invoked when people working from a shared familiarity (*Vertrautheit*) in the real world (using real names) take the risk in social systems of reproducing trust-based human relations (with anonymity) in an attempt to reduce the complexity of a massive, growing world¹⁰⁾.

In a complicated society, humans must constantly aim for “reduction of complexity” (*Reduktion von Komplexität*) in both social and communication systems. The foundation of trust must be ready for the uncertainty which damages its interests, and must connect it to trust in the behaviors (actions) of others.

Now, we have reviewed Niklas Luhmann’s fundamental statement about trust, but how does one consider trust between the real world and mutual system environment in the context of the diffuse cyberspace of the Internet?

First of all, when considering that Luhmann’s trust comes from reducing the differences between system and environment (i.e., complexity), a real-world system (computer networks) gives rise to virtual space; here it becomes important that we understand how the conflict between real space and the virtual world is an internal contradiction of the real world derived from an artificial system generating virtual spaces. Although Internet society representing real-world and modern cyberspace seems to coexist apparently on a social space level, when understood as a time sequence, the former includes the latter (legal) and the latter depends on reciprocity within a relationship (ethical) that shakes the former’s foundation. Luhmann’s trust requires an attempt to read this “mutual provision” nature in a contemporary context, integrating the legal entity, normative ethics, legal effects, and ethical norms of virtual space into the social system, all while realigning the character system via communication processes (the process of identification based on inter-independence).

So, trust in Internet space is more complicated. It will be necessary to classify two viewpoints before taking this into consideration. One is *system trust* of Internet society based on the architecture itself, and another is *communication trust* in the information existing in Internet space. The former must be recognized

as the interaction of trust in Internet space based on the duality of IT (security and liberty) and the information ethics (society and democracy) of the real world. The latter must be understood as trust in the structures (architecture) and trust in the quality of information which completes the ad hoc communication process between human beings.

This indicates that the reduction of complexity must be doubled in the interaction between trust in real-life social systems and trust in Internet society. As for distrust of the quality of information on the Internet, since it is impossible to determine fundamentally whether or not anyone can be trustworthy in virtual spaces (especially in the case of anonymity), trust on the Internet can instead become a question of whether to trust that person before trusting the Internet system itself. The challenge of trust in the system is hidden in the subconscious, and the issue of personal trust on the Internet (i.e., that of anonymity versus using one’s real name) must be examined more closely. In order for issues of system trust not to be categorized only as personal issues, we must consider the relationship of system trust and personal trust as “communications trust.”

8. The Formation of Personal Trust in Internet Space

“Trust” in the Internet space first relies on people’s trust in the Internet trust. The Internet is becoming widespread and well-used despite various problems, and will therefore soon be discussed as a challenge in the realms of communication trust (connecting system trust to personal trust), information trust, market trust, and public trust. According to Toshio Yamagishi’s definition, “Trust has meaning only when social uncertainties exist. In other words, in situations where there is no possibility of coming to harm by being deceived by others, a trust relationship is not necessary”¹¹⁾. Yamagishi also states that because safety can exist even without trust and that trust makes you consider as dependable someone’s character, we feel a sense of reassurance. peace of mind is maintained under a collective order of successfully procured life resources under mutual communal monitoring, and trust is the key to deciphering American society, premised as it is on the possibility of being deceived by others—as opposed to the typical group psychology of Japanese society.

On that basis, Yamagishi insists that Japan should also move towards besoming

a “trust society”. This is not a “peace-of-mind society” that combines selfish and altruistic interests, but rather a society that possesses the internal capability to amplify trust relationships¹²⁾.

This allows us to easily imagine how hard it is to continuously form relationships of trust in Internet space in Japan where there is no trust society as of yet. Internet trust may be classified into two rough categories: system trust formation and character trust formation. However, personal trust tends to be judged by words and deeds based on individual personality (i.e., the result of acting on one’s words and deeds) and on the evidence thereof, sometimes without understanding the communication process as a whole. Although personal trust on the Internet is based on the duality of communication functions and reliance functions, the foundation is built on trust (communication function) and credit (transactional functions) in economic relations. On the Internet, the former comes from language experience and behavior accumulated in the home environment and in school, influenced by information transmission and simulated experience, including social experience, mass media, social authority, and social symbols. Individual personal trust begins to be determined by information disclosure on the Internet and information exchange irrespective of anonymity or use of one’s real name. As for the latter, we seek personal credibility due to the movement of money in buying and selling. While personality is related to social status and social behavior, it is evaluated in correspondence with the person’s ability to pay and financial track record in the context of commercial transactions.

Personal trust on the Internet will make reliability (transactional functions) in an economical relationship the minimum requirement of trust, and will thrive on the congruence of systematic judgment and trust judgment. However, the relationship of trust (communication function) of a human in real-life society, formed through the congruence of speech and conduct, consistency of speech and conduct, permission of others’ speech and conduct, sympathy toward others’ speech and conduct, antipathy toward others’ speech and conduct, and the guarantee of others’ counterarguments, differs from the trust judgments rendered in financial transactions. On the Internet, this drifts in a state between the authority (dignified nature) that the general public has inherited, tradition (legitimacy), a system (validity), organization (expertise), and mass media information that has

lost its value judgment axis and is therefore unable to form public opinions; It is therefore prone to be influenced by the appearance of coincidental and sudden moments (events)¹³⁾. Moreover, the symbolization of information, also called simplification in Internet space, has a tendency to abstract the process of building personal trust between online users and raise formal personal trust. What we must not forget is that this sense of trust is little more than a single dot on a huge network that exists locally—and sporadically at that. Then how does it become possible to establish stable and continuous (not sporadic) trust relationships network-wide, and not just locally? The key is in the role of community in Internet space.

9. Forming Social Trust: Social Trust and Trust in Internet Society

The features of “atomized individuals” are often pointed to as characteristics of modern society. However, even if that tendency is indeed becoming stronger, people are human and will have some kind of partnership with one another, meaning the kind of community that acts in collaboration cannot disappear. Compared with previous societies, the local community in modern society has the features of an excessively huge amount of information, the fluctuation of connections, the miniaturization of exclusivity, and an increased “twin-engine nature,” and these features tend to be even more obvious on the Internet. Interpersonal relationships within the community online are not necessarily divided, though they are individualized. In this community, although the individual is socialized as in corporate society and community, that socialization is a networked existence that transcends the same space¹⁴⁾. However, an Internet community with individualistic principles has the duality of a reassurance society and a post-reassurance society, where homogeneous people tend to gather. On the other hand, there is still no trust society where different types of people take the risk of forming mutual trust. This will require a process to move away from a security society and towards a trust society. Moreover, it will call for an intermediate process leading from a society of contracts (reliability) and towards one of approval (fiduciary).

There, we will look for a situation where a trust relationship is established in a given society, i.e., a situation where mutual acts are considered preferable among human beings or certain types of preferable norms are abundant in society. It

signifies a state predicated on the power that maintains a social order that is minimally restricting on the subject, while enacting the maximum effect of authority in order to keep that power going. However, Internet society has a role in transcending the same spatiality presupposed by modern law (region, occupational ability, national law, treaty) as well as social common sense for maintaining an identity, and national education which deals with the same language and ethnicity. Although modern law is premised on the formation of a modern subject with a modern, rational mind, due to its spatial characteristics this new society makes it difficult to attain the “modern norm” that is a modern rational subject.

Higuchi Norio, with a view toward such a “stalemate” in modern society, considers the perspective of modern society to be a process by which the relationship of “post-contract/conversion fiduciary” can be introduced into a relationship of “post-status/contract acceptance.” According to Higuchi, the “contract society” which attained freedom from a feudal caste makes it difficult to resolve facets of subject matter that have spilled over into a more complicated social system. Although it includes a chance to lead a new society to be established from contract to confidence, Higuchi tries to pluralize human relationships (equal relation between individuals) managed evenly through contractual relationships by reproducing fiduciary relationships (a renewed awareness of the unequal relationship between individuals)¹⁵⁾.

In order to sweep away the remnants of a feudal society in which a certain kind of security society had formed, human relationships in Japanese society are considered contractual relationships based on accountability, limited duty, reparations as relief, and formless property, with the still-immature concept of fiduciary relationships giving its approval to dependency, extensive duty, diverse means of relief, and property having form¹⁶⁾. Generally, although it is a characteristic of contractual relationships that intervention by public authorities is limited by our adjustments based on the principle of private autonomy, this means that both contracting party and trustee have a fiduciary relationship in a mutual dependency, and the tie between the stronger and weaker parties in both relationships may have third-party protection via a public organization. A fiduciary relationship in a trust system considers the properties of beneficiaries to be trust properties, while at the same time isolating property from trustor,

trustee, and beneficiary. That means that a creditor cannot seize property as the personal property of the trustee, and there is no inherited property even at the time of the trustee's death. It also means that a trustee takes on obligations to be faithful, such as the duty of divided management, the duty to protect privileged information, and the duty to provide information¹⁷⁾.

How can the process toward a fiduciary relationship function be established in Internet space? In order to build a safe and secure space, Internet space integrates and forms the basis of distributed system engineering (an algorithm and a communications protocol), security engineering (encoding and authentication technology), software engineering (object-oriented design and analysis), and dependability engineering (reliability evaluation) to reorganize the system's tenacity and autonomy. Spatial trust in the Internet society is generated from an engineering standpoint as the base, playing a conservative role as the contractual relationship that clarifies income and the possession of rights. Dependability engineering (reliability evaluation) has moved from a system-focused stage to one that is creating a reliability evaluation system in which humans participate online. Although an engineered system does serve as a requirement in forming "trust space" on the Internet, a humanistic system is likewise needed if it is to function in a way true to its name. This is an issue in connection with the human-led formation of new communities. Although the reliability evaluation system that complements the contractual relationship includes revaluation of said relationship (human relationships) through engineering methods, it also serves as the first step of simultaneous "approval by osmosis" in Internet space.

Fiduciary trust, which functions implicitly in the societies of the United Kingdom and the United States is part of the contractual relationship in Japan, and is carried out restrictively in society in general as a part of contract functionality. However can a social function not yet established in the real world succeed in truly permeating Internet society? In order to know the answer to this question, the key issue of trust in Internet space must first be divided into countless pieces, and we must keep in mind that the actions of the 'Net community are believed to cancel out social credibility on the whole.

10. Credibility and Community as the Keys to Internet Space Reliability

The present Internet community is an extremely late addition to the history of community formation in human society. Yet its functions have implemented interactions which increasingly condense the nature of information, relationships, synchrony, and the "twin-engine nature" between human beings. Naturally, however, a process by which a community becomes more dense will produce exclusivity and reciprocity, thus involving another process by which the community is subdivided. Still, given the high-level development of the Internet media going from news sites to blogs, from blogs to social networking and shopping sites, then onward to YouTube, Twitter, Ustream, and their associated sites, the community has become saturated with exclusivity and reciprocity not to mention the new phenomenon of various world views existing all at once. In this context, the directionality of credibility in the Internet community is premised on the assumption that specific relationships, including real-world credibility relationships, i.e., property commission to the trustee by a trustor, receivership (trust) for the trustor by a trustee or a third party (beneficiary), advice to a trustee's trustor, and the use of professional expertise and technology, have an impact on Internet interpersonal relationships. Considered concretely, the relationships of information (things) and goods (products) between trustor (exhibitor, provider) and/or trustee (organizer, administrator) and/or beneficiary (purchaser, third party) in the context of online shopping, online auctions, and the Internet community can be considered a phenomenon of human relationships (people).

Even if it seems to be only a community of repeated statements in casual language, it becomes naturally clear over time how to distinguish specialization from non-specialization and reliability from non-reliability, in what is stated concerning a given topic. Information asymmetry will always occur on the Internet; guarantees of quality information on shopping sites via product information and vicarious knowledge are carried out as between a trustor (exhibitor, donor), a trustee (organizer, administrator), and a beneficiary (purchaser, third party). Although these three parties have an equal relationship given their contractual ties of money exchange, it is unequal given the asymmetry of information. This

shows that one must first create a place of mutual reliability between all parties in order to produce relationships of trust. For that reason, as information asymmetry grows smaller, information and product gain the same value, thus requiring the assumption that they are exchanged equally. This shows that individuals atomized on the Internet, having experienced online features such as information explosion, the risk of relationships, the island universe of exclusivity and synchrony, and the twin-engine nature of intellect and stupidity, definitely consider themselves as unequal individuals in a realistic situation rather ideal equals, and as entering a stage where a process is generated that leads to information symmetry, risk-hedging in relationships, a balance of exclusivity and synchrony, and twin-engine intellect as a complement to stupidity¹⁸⁾.

For that purpose, the trustee (organizer, administrator) in the field has to professionally perform the obligations of loyalty, caution, self-enforcement, and separate controls. It is impossible for a large number of people exchanging information on the Internet to perform these duties right away. Therefore, in order for places of confidence to spread throughout the Internet, it first becomes important from a system engineering and ergonomics standpoint to reconsider “Internet society.” The practical research of Toshio Yamagishi has pioneered this topic. It is a system experiment concerning a process whereby a beneficiary (purchaser) and a client (exhibitor) form mutual evaluations (reliability), while the relationship of information (things) and goods (products) is involved with confidence-building between (people) a trustee (sponsor), a trustor (exhibitor), and a beneficiary (purchaser)¹⁹⁾.

For example, Yamagishi points out that “trust” on a network is influenced by the “reputation” a Web user shares about trust formation in Internet space through Internet auctions where transaction cost exceeds opportunity cost. By introducing a “reputation” function into the gray zone (non-trusted foundation) of the anonymity problem on the Internet, Yamagishi determined that online “risk” dips below theoretical values. One can therefore expect that a great many positive reputations (amount) will induce reliance thereon (quality), and the advent of negative reputation will be able to predict some problems in advance. The result of this trust experiment is consistent with game theory that holds that cooperation is more beneficial than noncooperation. This network reputation

function is a new value judgment (similar to human engineering), unlike the system engineering of Website evaluation via Google’s link system or E-mail and Website risk assessment via security software (system). (However, we must recognize that votes can be fixed, such as in group voting, and evaluations can be evaded by changing screen names or IDs.)

But when an ethical personal trust function accompanies an engineering-style reputation review function that includes an evaluation of such financial reliability, this comprehensive assessment system rejects the concept of being clearly displayed as an online “survival evaluation” possibly even leading to a computer-age nightmare as imagined in the late 1960s. At the heart of that idea is the thought that Internet space as free space must truly *be free*—free from the freedom to evaluate, freedom not to evaluate, and freedom from being evaluated. However, in order for a system to be trusted and to foster trust among humans on the Internet, it is crucial that as reduction of complexity takes place among the three parties in this relationship, the complexity of the relationship and of the Internet system itself must also be reduced. In order for a fiduciary relationship to actualize on the Internet, it is important in a relationship with such an engineered system to deepen awareness about the system as a stage for the three parties to connect in a trust relationship, as well as foster an awareness about the relationship itself.

11. Value Formation of IT on the Internet

As industrial society became more advanced in the 20th Century, a social system strongly influenced by bureaucracy and marketability prompted the separation of technology (art) and technique (*techne*), which meant the optimism of the tool theory and social determinism and the pessimism of the independence existence theory and technical determinism came into more intensive conflict with one another. However, IT has both the technical function of increasing production efficiency and information communication efficiency as well as the personal support function of increasing intellectual creation efficiency and information control efficiency.

Human society can no longer exist without a system of technology, IT, and its assorted subsystems. In that sense, society in the real world is built on a

foundation of technical values, and it could not be built at all unless IT and its subsystems include human and social functions. This intimate relationship between machine and human naturally brought forth the social composition principle that the interaction between society and technology is reflected in our thought processes. Therefore, this kind of social situation and in particular, security in Internet society is considered interdependent with the nature of transmission and control, with the information society nature of psychology, and with ethics. The human being who feels as though changed from being an agent of modern reason to being an informational subject²⁰⁾ must create in the Internet information network and information spaces, mutual trust via the peace of mind provided by technological security (access surveillance, log management, protocol encryption, authentication systems, security patches) and social reliability (information selection, information value judgment, serious consideration of real-name access, reliance actions toward anonymity, social intelligence, and third-party certificates).

The value formation of IT in connection with the formation of such a society can uncover positive aspects (collaboration in a reliable society, the independence of an individual) among the negatives of human characteristics (interdependence in a security society, the isolation of an individual). Thereby, people can for the first time become both informational subjects (based on the social intelligence which forms Yamagishi’s reputation society) and mutual reference subjects of the “between-information” subject (based in the mutual participation sensitivity that form’s Higuchi’s fiduciary relationship). Should such a subject be created, there is the possibility of optimizing technical security and social reliability as needed throughout the information process, in the Internet space made up of an Internet system and a social system. In the future, will we be able to create an Internet environment that allows trustor awareness, trustee awareness, and beneficiary awareness based on each Web surfer’s professionalism to be linked with system reliability and personal trust? The lifeblood of security arts (the study of trust), generated from the position of the social composition principle discussed in this paper, is to form human values (truth, good, beauty, virtue) inside IT so that social values (freedom, equality, confidence) may be accumulated in the Internet space. However, this will depend on the degree to which “partial optima” have

been collectivized, the trusted portion of the process by which the stability of Internet society moves from peace of mind to confidence.

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