Trust in E–Technologies

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INTRODUCTION

When reflecting the term *trust*, there are two main hypotheses which can be found in most of the literature: First, trust is presented as an amorphous phenomenon, which is difficult to measure empirically (Endress, 2002). Second, the characteristic of trust is rather fragile. Trust as a mediator of social interactions cannot be quantified precisely, it has to be generated and recreated at any time varying with its social context. Volken summarizes this particular connection between trust and the context in which it is created: "Trust is a complex construct with multiple dimensions, and their relative effects on innovative actions may be highly dependent on their respective social context" (Volken, 2002).

In the age of globalization trust is particularly important when one operates in the areas of e-commerce, e-government, and mobile commerce, or develops IT-systems which are touching the interface between technical innovation and its application by users. The latter live and work in a certain social context in which trust can be established in various ways. This necessarily has consequences for IT-solutions and IT-security which this article tries to explore. Giddens (1990) pointed out that "mechanised technologies of communication have dramatically influenced all aspects of globalization since the first introduction of mechanical printing into Europe [Johannes Gutenberg, 16th century]" (p.77).

Without Johannes Gutenberg, there would have been no Reformation, without information technology, there would have been no global information age. Both historical developments, as different as they may be, took place in a certain social context, of which technical innovation became a part. At the same time every society depends on the key ingredient, which is a requirement for social interaction: Trust.

As a reader of the Gutenberg *Bible* trusted that his book is complete and correct, any user of information technology trusts that the applied system functions properly and is reliable. The following questions arise: How does trust which basically is part of most social interactions fits within information technology using "0" and "1" to enable any sort of interaction? How is trust created,

maintained and developed in the information age? Which forms of trust exist and are necessary to operate in an interconnected world?

The article will explore these questions by describing current definitions and concepts of trust outside and inside a context of information technology. After exploring the link to concepts of trust in social science and culture a new concept of trust in e-technologies such as e-commerce, e-government, and mobile commerce will be developed. Important trust-building factors such as transparency or participation will be analyzed in order to conceptionally deal with the increasing importance of trust in a virtual world.

BACKGROUND

As a background, an overview is presented about trust from the social science perspective. While trust is defined in various ways, this article concentrates on the most relevant definitions influencing e-technologies.

Trust in Social Science

Trust as a concept of social science was firstly written down by Georg Simmel, who differentiates three trust phenomena in the context of the "Philosophy of Money" (Simmel, 1989):

a. Microlevel ("natural trust" in direct, intuitive social relationships)
b. Mesolevel ("rational trust" in professionals and the role of a person)
c. Macrolevel ("systemic trust" in interactions which are mediated through symbolic tokens such as social subsystems, e.g., money)

Trust, its creation, presence and its maintenance extends through all three levels. By focussing on the meso- and macrolevel, this can be outlined as the first impact on the view of trust as a concept for e-technologies. Discussing trust regarding e-technologies means to clarify the relation of trust and virtual systems of information tech-

nology (IT systems). Thus, the circle of trusted dependencies is enhanced concerning e-technologies, and this creates sustaining trust of a wider scope considering more subsystems within the macrolevel, such as contracts, system hardware and several types of system software.

Further in this context, Simmel (1992) developed a second distinction of the term *trust* and positioned three hypotheses:

1. **Trust as a general confidence and as a "weak inductive knowledge":** Trust is the confidence in certain, constant elements in the human life or as a type of unspecific expectations, or alternatively, general hopes. But it has to be distinguish that "trust presupposes awareness of circumstances of risk, whereas confidence does not" (Giddens 1990, p. 31)

2. **Trust as a form of knowledge. Trust in somebody (or something):** Trust is the hypothesis of future behaviour, which is certain enough for establishing practical acting. Trust is the medium state between knowledge and ignorance. The one who has complete knowledge does not need to trust, and the one who does not have any knowledge cannot even develop trust. (Simmel, 1989)

3. **Trust as a feeling. Trust as a belief or faith in somebody. Trust as an inner *unreservedness* towards someone else:** Although trust is always partly determined through feeling and emotion, these aspects have no purpose in the debate about trust and IT-systems. When looking at IT-systems one proceeds from the assumption of an average participant and trust can be treated rationally compare to Giddens and Luhmann. Both are grounded in Simmel's statement of trust as a "week inductive knowledge" (Simmel, 1989).

Based on Simmel, Niklas Luhmann similarly differentiates between personal trust (trust in persons) and systemic trust (trust in social or technical systems). As professional knowledge is required to control systemic trust, it isn't for personal trust. (Luhmann, 1968) Luhmann, as a leading voice of modern sociology and father of the *system theory* (*Systemtheorie),* defines trust as a vital mediator between different systems. Therefore, trust is able to lower or bridge complexity to manage expectations and to increase space for action. (Luhmann, 1968)

The differentiation between personal and systemic trust is further supported and enhanced by Fukuyama's (1995) "radius of trust" with the goal to resume different types and contexts of trust to capture its whole concept. The greater the radius the more complex the concept of

trust gets. The systemic trust in expert or abstract systems in relation to trust in products, absent others and organizations and institutions is the focus of this article.

Giddens as an extension of Simmel provides the major impact on trust regarding e-technologies. He characterizes trust as "a distinct from confidence based on weak inductive knowledge." (Giddens, 1990, p. 54). Besides other hypotheses of Giddens, the following are considered here: (1) Trust is related to absence in time and space. (2) Trust is not the same as faith in the reliability of a person or in a system; it is what derives from that face. (3) Trust may be defined as confidence in the reliability of a person or system, regarding a given set of outcomes or events, where that confidence expresses a faith in the probity or love of another, or in the correctness of abstract principles (technical knowledge). (4) Danger and risk: What risk presumes is precisely danger. The "acceptable" risk—the minimizing of danger—varies in different contexts, but is usually central in sustaining trust. (5) Risk is not just a matter of individual action. In his last point he indicates the relation of trust and security which will be referred to later.

James S. Coleman's logic of trust as a rational decision making model also fits the statement of this article and can be summarized as follows in four structured patterns (Coleman, 1990): (1) Placement of trust allows actions that otherwise are not possible. (2) If the trusted person (trustee) is trustworthy, the trusting person (trustor) improves his or her position; otherwise, he or she worsens it. (3) Trust is an action that involves the voluntary placement of resources (physical, financial, intellectual, or temporal) at the disposal of the trustee with no real commitment from the trustee. (4) A temporal delay exists between the extension of trust and the result of the trusting behaviour. These four patterns can be applied to trust in relation to e-technologies as it is later described in chapter three. According to Coleman's outlined relation between trust and rationality, the decision on trust is related to the trusting person's state of knowledge about possible surplus and loss. Following this, individuals as rational actors give trust in a rational way if the expected advantage (proof) is higher than the expected possible disadvantage (disappointment). Individuals rationally calculate and evaluate the win and loss based on the available information (Coleman, 1990). Coleman's second pattern is affirmed by Sztompka who says: "If the grounds for trust come down to a certain knowledge acquired by the trustor about the trustee, then it would make sense to accumulate such knowledge to arise the probability of wellplaced trust" (Sztompka, 1999, p. 70). In addition to the rational attribute of trust, the reflexiveness of trust needs to be outlined. "Reflexiveness" is defined as people acting on beliefs, knowledge, memory and interpretation

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