

I-Trust 2003 Position Paper  
**Context-Awareness in Trust Management for Business Applications**

Philip Robinson  
Telecooperation Office (TecO), Karlsruhe Germany & SAP AG Corporate Research  
Philip@teco.com (or Philip.Robinson@sap.com)

Context awareness has emerged as a major theme on the research agenda of pervasive and ubiquitous computing. Advances in sensor technology, mobility and hence location sensitivity of computing devices and applications, as well as visions of enhancing the human-computer interaction experience through a unification of real-world and virtual tasks continue to be key research motivators [1]. Our research currently invests most of our resources in the development of small, wireless hardware components that manage and exploit the availability of distributed sensor information [2], hence providing a platform for the generation and communication of context information. Nevertheless, our partnerships with industry urge us to envision transferal of our results into business environments and applications [3]. These include Supply Chain Management (SCM), Customer Resource Management (CRM), Logistics and Financial applications, which all currently include workflow and delegation functionality. These business processes are associated with frequent changes in the operation environment, such that they share the functional requirements of monitoring, notification and support of effective decision-making (resource planning, execution and coordination). One of the fundamental questions that we are constantly faced with from our industrial counterparts is, "how do we manage trust when this technology is deployed?" They simply will not accept or support further research or integration of such mechanisms into their office environments or enterprise applications if this question cannot be decisively addressed. They go on to ask: who or what do we need to trust? Do we need to reengineer our existing trust management systems? Is there some advantage that we can receive from this technology that will assist us in managing the elements of trust? As our research core is context awareness, we naturally use this as our foundation for investigating these questions [4].

Developments in e-Commerce Trust Management systems have been based on the premise that while human-to-human trust is attributable to the availability of social and physical cues, these are not possible attributes in human-to-computer transactions [5, 6]. For example, before a consumer submits their credit card details to an online store, there are certain characteristics, historical facts, or references that either persuade or dissuade their belief that carrying out the transaction does not pose any significant risk of unwarranted financial loss or disclosure of personal information. Bailey provides a taxonomy of trust production sources for computer-mediated transactions, namely, Attraction, Dynamism, Expertness, Intentions, Faith, Localness, and Reliability [6]. These inclusively take into account cognitive, sociological, financial, and technological factors. It is still argued, however, that the absence of physical cues leads trust management to lay emphasis on the virtual matter, which consequently distracts users from the primary application. Ubiquitous Computing is on the other hand concerned with minimising such interactive distractions.

Our position is that bringing the facets of ubiquitous computing and context-awareness into trust management can enrich the provision of trust attributes, and restore the contribution of physical and social cues into trust attribution frameworks. Blaze et al define trust management as a means of codifying, analyzing and managing trust decisions [5]. We see context information as an additional input and means of augmenting these processes. Various researchers complement this vision by exploiting context information in authentication [7, 8], authorization [9, 10] and access control mechanisms [11]. The SECURE project presents an architectural model that supports a pluggable, recommendation-based means of applying computational trust in collaborative scenarios [12]. Our approach combines trust functions, policies and operators as the elements that define how a target resource, or its owner, makes decisions regarding the trust of entities seeking access.

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