Trust Management in Emerging countries:
International cooperation research challenges for Horizon 2020

James Clarke[1], Marijke Coetzee[2], Manmohan Chaturvedi[3], Abhishek Sharma[3]

Karima Boudaoud [4], Mounib Mekhilef[5], Jan Eloff[6] , Donovan Isherwood[2,6]

[1] **Waterford Institue of Technology, Waterford, Ireland. jclarke@tssg.org**

[2] **University of Johannesburg, South Africa. marijkec@uj.ac.za**

[3] **Beyond Evolution Tech Solutions Pvt. Ltd., India, {mmchat@sify.com and abhishek.sharma@beyondevolution.in}**

[4] **I3S Laboratory - University of Nice Sophia Antipolis/CNRS, France, karima@polytech.unice.fr**

[5] **Ability Europe Ltd, United Kingdom, mounib.mekhilef@abilityeurope.com**

[6] **SAP Meraka UTD, CSIR, Pretoria, South Africa; Department of Computer Science, University of Pretoria, Pretoria, South Africa, jan.eloff@sap.com**

Abstract. An international cooperation approach to trust management that considers cultural differences appears necessary if we would like to design multi-cultural trust models that can be understood and used by different cultures. The cultivation of trust is critical for the success of both the Internet economy and m-commerce. In this context, consumer trust is generally defined in a uniform manner, as if all participants behave in the same way. Current research indicates that culture has a major effect on the formation of consumer trust and the risks that consumers are willing to take. To ensure the successful uptake of m-commerce in emerging economies such as Brazil, India and South Africa, it is imperative to investigate culturally adapted trust requirements, properties and models. Countries in the EU, consisting of many different cultures, can also significantly benefit from this research. To this end, the BIC project has brought together researchers from different countries and cultures to collaborate on topics related to culture and trust. The common denominators and differences found amongst cultures can provide deep insights than can be applied to the design of useful security and privacy applications. This paper reports on the project development, provides some of the research perspectives of participants, and invites collaboration from interested parties for future collaborations. A combination of bilateral and multilateral approach may emerge as we traverse the research path.

Key Words: Trust models for online Transactions, International Cooperation, Cloud Computing, Privacy and Security.

1 Introduction

During the BIC workshop in June 2012, one of the Working group sessions (WG1 – Human Oriented approaches to Trust and security) held discussions on various trust aspects and how research between the EU and the emerging countries could enlighten more on potential solutions for trust management [1]. Trust models implemented in currently available technology are developed based on the principles of trust as a social phenomenon within the context of the western world. Indeed, the majority of the research on these topics has come from westernized or individualistic cultures, where consumer trust is facilitated through trust mechanisms such as institutional guarantees, laws and policies, information security

mechanisms, and social controls. Examples of such trust formation are manifested by the number of positive experiences and recommendations between entities in a trust community such as eBay. As stated by Jill Slay and Gerald Quirchmayr from the University of South Australia [2]: "It is therefore important to establish explicit conditions whereby the potential user can easily be assured that an application is trustworthy. A specification for and management of Trust is, therefore, necessary in the development of Internet-based services. Trust is specified by formal mathematical models and coded into software applications but current theoretical work has not led to the development of widely accepted tools and techniques for analysing trust [3]. Some authors have run surveys to capture trust challenges by the analysis of existing applications [26]. This gave a very IT oriented understanding of the real nature of trust-building in large networks. Others such as Abdul-Raiman, A. & al in [22] studied the way to establish trust in virtual communities; Butler J.K in [22] who considered from the management perspective the way to measure trust as a tool to build confidence from the end-users perspective. Dafoulas & al [25],Hofstede [26] and Hofstede [28] raised the issue about cultural differences for trust and the way to design software to tackle this challenge.

With the proliferation of mobile technology within emerging countries and the impetus it has already given to the formation of innovative business models, such as virtual co-operative buying ecosystems, there is already an acute need for technology that will instill trust within the user community. For example, the user community in Africa is characterized by small to very small enterprises conducting their whole business from a mobile phone [4] [5]. These enterprises run profit ecosystems rather than business units that interact with other ecosystems in a culturally involved manner to ensure that the ecosystem will survive in the face of adversity. Social capital and social ties support these ecosystems and communities in large parts of Africa where members of communities pool resources together in an attempt to meet economic and social needs for both individual members and the general community. The international research results to be delivered by this initiative should, therefore, aim in conceptualizing trust mechanisms that operate seamlessly in a mobile-cloud infrastructure supporting such ecosystem.

Within the BIC project, one of the objectives is to find trust and security topics of mutual interest and benefit to collaborate on. Trust management in emerging countries is of significant interest not only to those in the African context, but to any environment where different types of cultures exist, including the EU, and where an understanding of the influence of culture on trust is limited. Considerable amounts of research still has to be done on identifying the unique properties/requirements related to trust used by people in collectivist cultures and how this can be captured by mobile technologies in order to support and grow business ecosystems.

To move the topic forward from the June workshop, the BIC project organized an open workshop on 27th November 2012 [6] where the concentration was on this research topic to put us in a better position to form consortia that can work on research/development/implementation/ stages for this work. There were a number of participants showing particular interest in this area, especially from Africa, India and the EU and are already discussing the potential for setting up a consortium on the topic. This paper further elaborates on this topic from the perspective of the EU, India and South Africa and how these countries can help each other in carrying out the required research elements associated with the topic in the future as we move towards Horizon 2020.

2 Trust Management – Why do we need International Cooperation (INCO)?

The basic premise for studying the need of INCO for Trust Management is driven by the fact that individuals, communities, and groups, from practically every country across the globe, are heavily dependent upon electronic transparent solutions and services, originating from any part of the globe. Not only is the commonly known e-money or e-commerce used, but practically entire gamut of human needs such as e-health, e-learning e-government serviced through electronic means. Even social interactions between people and communities across the world, unknown or unconnected to each other through applications like Facebook are a common practice.

However the need of the people, their perception about and *acceptability* of these solutions, services or social interactions are not uniform across different countries, communities and cultures; and depend heavily on the "Trust Perception" of those people or that community. In all of these, the cultures of a country, community or group of people play a major role in the acceptability and Trust. Typically, vast countries like India, which has many culturally unique and independent communities within the country, also face a similar situation. Hence the simple question – can the same solution, service, literature, art, commerce, ideas or views be equally acceptable and useful across different communities with their different cultures? The answer to this simple but important question is obvious. There are bound to be significant variations, gaps and absence of uniformity in Trust perceptions. However the need is to moderate these variations, bridge the gaps and create a system that is aimed at providing maximum possible uniformity. This critical challenge of achieving a reasonable degree of uniformity in Trust perceptions could be made possible by exploring common factors that affect consumer trust in online transactions across the cultural diversity. In many cases, the base may be same common function e.g. e-money transfer, the way it needs to be pitched to the people to interact or utilize – the User Interface (UI) may need to be different to suit different "Trust Perceptions" of different cultures. This basic necessity, in our globalised world, to develop a "Trust model", factoring cultural variations suggests utility of international cooperation in "Trust Management" research.

Considering the question - "Why do we need INCO for Trust" - further, the first obvious response is that when talking about trust, we need to understand how trust develops and how the culture of a society or a nation impacts the trust-building process. This concept has not the same meaning in Europe or America and in Asia and South Africa due to the fact that in Europe and the United States, the predominate culture is of individualistic nature, whereas in Asia, India and South Africa, it is a more collectivist [4]. In addition to the fact that culture has a major influence on trust, culture is not the only criteria to consider when talking about trust, but societal values, language differences have also an impact on trust. Thus, trust needs can be and are different from a culture or a country to another one. One can refer to the work done by Hofstede's on cultural dimensions. Hofstede [7] defines culture as "the collective programming of the mind that distinguishes the members of one group or category of people from another". A trustor decides whether and who to trust based on the culture of the group he/she belongs to. He identifies the dimensions of power-distance (the level to which a society accepts the equality or inequality distribution of power), collectivism vs. individualism (relationship between the individual and the group), femininity vs. masculinity, uncertainty avoidance (how societies accept high levels of uncertainty and ambiguity) and long-term vs.

short-term orientation. One of the greatest impacts of culture is therefore on how information is used to make trust decisions. Developing an integrated model of trust to address this issue is particularly difficult, given the vagueness and peculiarities in defining trust across multiple cultures.

The next question raised is how to understand and manage trust for emerging countries. There is a need to develop trust models using a multi-lateral and multi-cultural approach that first involves the end-users and listens to their trust needs; and then translates these trust needs into parameters that makes sense to these end-users.

2.1 How to build trust models for emerging countries?

Several powerful trust models [8][9][10][11][12][13] have been proposed to model trust in different contexts (wireless networks, sensors networks, etc.). These models use mathematical models that can be enough for this kind of context. However, if we use them in other contexts that involve the Human, such as social networks, they are of no use, as they do not take into account cultural factors. A very good example is a study that has been conducted for online shopping and e-commerce where it has been proven that the trust model used by e-Bay does not suit Asian users' expectations [14][15].

In order to determine the effect of culture on trust, we need to understand how trust generally develops. Previous research [16] indicates that trust is initially formed by "hard" mechanisms such as certificates and algorithms, seen at the bottom of the Table 1, but as time passes and positive experiences are recorded, "soft" mechanisms such as human judgement increase trust levels. Initially, competence trust is formed on the basis of identity, implemented security mechanisms and best practice of partners as shown by information layers 1 and 2 at the bottom of the table. References and recommendations, shown in information layers 3 and 4, will further increase competence trust. Next, predictability trust is the result of established experience, as shown in information layer 5. Finally, after time, goodwill trust is formed, as is shown in information layer 6.

Table 1: Information layers and sources of trust formation

	Information Layer	Source of information
soft	6. Goodwill	Human judgment
	5. Experience	Volume of transactions, history, behavior, social network position
	4. Recommendations	Situation-specific values
	3. References	Certificates, assurances, licenses
	2. Technology	Security mechanisms, best practice
hard	1. Identity	Digital certificate, password, Kerberos ticket

A specific research question to be answered is how each of these layers are influenced by culture? One may assume that information layer 1, where "hard" mechanisms such certificates are used to establish trust, may not be much affected by the influence of culture. On the other hand it may be possible that layer 6, where human judgment resides, may culturally discount the impact of identity trust. Layers 4 – 6 are directly influenced by human behaviour, and will thus influence trust management in emerging economies.

A further research question to address is how the perspectives from e.g. Africa, India and Europe view this issue, what do they see as important to their environment? To date, trust models and mechanisms have been developed by researchers from cultures such as the USA, UK, Germany and others with a predominately individualistic approach. These models focus on environments with *low power distance* where citizens have equal rights, *individualistic* societies where citizens are self-reliant, more *masculine* societies where the winner takes all, where citizens are more *accepting of uncertainty* and more easily take risks and a *short-term oriented* culture that is very driven to achieve tangible and direct results. In contrast to this, trust mechanisms and models have to adapt to emerging economies by incorporating *high power distance* where hierarchy between people is important, *collectivist* society where citizens are strongly bound to a group that provides protection, more *feminine* societies that avoid conflicts and are more easy-going, *less accepting of uncertainty* by having many rules in place to ensure structure and security and have a *long-term oriented* culture with more tolerance for different truths.

In e.g. Africa, Asia, India and South America, structures embedded in the society are thus much more relevant. The principle of similarity from a societal point of view can be considered as one of potentially many different and important parameters in building trust models that are also of relevance to the developing world. A study [17] on acceptance of security solutions for the end-users and analysed through the well-known Schwartz circumplex (10 dimensions of values) puts into perspective values that matters to different cultures. Once their existence is by nature universal, the importance that we give depends on local perceptions. Hofstede in [29] run also a similar study to spot the cultural differences in values.
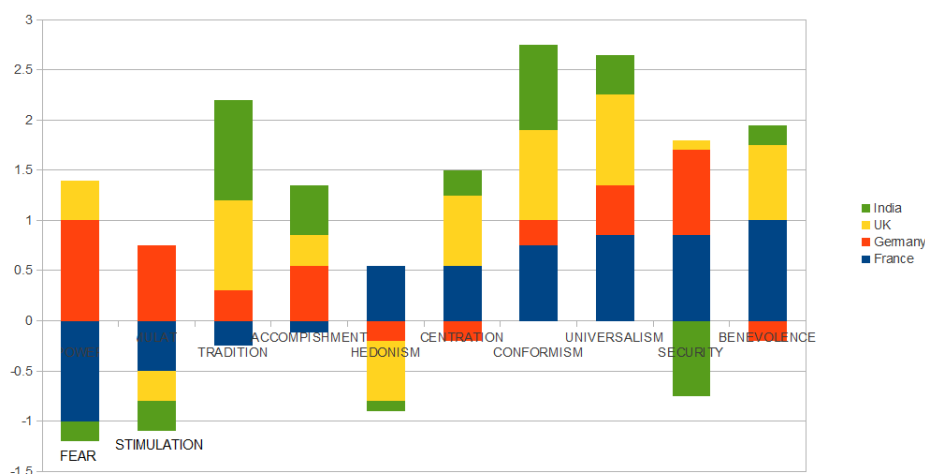

Figure 1. Differences in term of hierarchisation of values between some countries.

As an example, it is shown that a value such as Fear is not considered equally important by different cultures. When designing for trustworthiness there are major challenges to be considered using these values such as the adaptation and parameterization of user interfaces, the nature of the services and the manner in which they need to be delivered. Solutions will not be optimal and efficient if they are suggested by a unique culture. While this could appear as a very constrained problem, we know also that innovations do not manifest in a non-constrained system. An innovative approach to capture this diversity and suggest approaches in "Trust Management" ,that thrive rather than get constrained by this phenomenon, could be an objective of proposed research.

This research now proposes a definition of trust management for emerging countries to guide its development, adapted from Grandison [18] "*The activity of collecting, encoding, analysing and presenting evidence relating to competence, honesty, security or dependability, with the purpose of making assessments and decisions regarding trust relationships, while at the same time considering the influence of culture and beliefs*."

As a consequence, to build trust models and mechanisms for emerging economies, we need to extend existing trust management models by cultural aspects.

A provisional set of trust management research challenges and criteria are now defined to guide this research project holistically as follows:

- Gain an understanding of existing cultural frameworks to determine the most suitable framework to use to extract cultural behaviors and beliefs.

- Determine how individualist cultures have influenced the development of trust management to date.

- Determine the manner in which current trust management systems not meet the needs of collectivist cultures at each of the identified layers of the trust development framework.

- Identify specific trust mechanisms that can be adapted for collectivist cultures to better suit their needs.

- Define and develop culturally specific trust mechanisms and models to address the needs of a cultural group.

Having observed and analysed the above described information layers which are influenced by cultures and hierarchy of values at different countries and societies, there is another aspect of the cultures and societies that is apparently left untouched by the researchers is the existence of "Culture Revolutionaries (CR)". In every culture and society, there are invariably a small section of people who think and act differently than the thinking and behaviour of the rest of the society and its culture. The attributes of these people can be briefly described as:

a Logical and Bold.

b Logical but Timid.

c Logical but Indifferent.

Keeping in mind the primary objective of the INCO in "Trust & Management" is to bridge the gaps in the thinking and behaviour between cultures. Is it possible to bring about a certain degree of uniformity in their thinking and behaviour towards "Trust Aspects", particularly in the fields of Technology utilization such as e-commerce and others. Areas where the acceptability of any useful technology gets adversely affected due to cultural influences on the aspects of Trust on Technologies can be examined to develop an organic approach across the different cultures. It is this context that we need to look at these "Culture Revolutionaries" who can work as "Change Agents". It is these CRs who, being part of the same cultural background but of different thinking and beliefs could be the most effective and can bring about significant change in the desired direction.

Out of the three categories of the CRs described above, the common element is the "Logical Thinking". The first one "Logical & Bold" are of immediate and maximum relevance, however those in the second and third categories can also be motivated and transformed to various degrees to make some contribution to the objective.

In view of this additional angle of the analysis of people belonging to a culture, the aim of finding ways and mechanisms for initiating the organic of transformation and later possibly achieving a wave of change, one more element in the above set of trust management and research challenges may be listed as follows:

- Make special effort to locate and identify such "Culture Revolutionaries" within a target culture/ society and
- Create a motivating environment for such CRs to become the Change Agents (CA) and prime drivers for bridging the culture gaps and bringing about the necessary uniformity.

2.2 How INCO can help and how to best move forward?

From an international point of view, different actions are required [19].

Collaboration is needed with international security experts that have a user-centric approach regarding trust, privacy and security (Brazil, India, South Africa, Canada, USA, France, etc.), international experts from different disciplines to take into account the differences in terms of culture, laws, etc and collaboration with international standardization organisations such as W3C, ETSI, IETF, etc. These collaborations can start through the creation of multidisciplinary working groups in each targeted country (right experts from each discipline). This is already started in the BIC project WG1 and more participants are most welcome to participate.

Organization of international multidisciplinary workshops in targeted countries (involving wider public) is needed. As far as we know, a World Wide trust model does not exist and this is mainly due to the complexity of the problem as it implies Human and cultural factors which can only be investigated comprehensively by involving people and researchers from different cultures.

This kind of model requires the coverage of various regions in the World (India, China, South America, South Africa, etc.) to suit different cultural regions and languages. The only way to be able to do it is to create and strengthen collaboration between trust experts from different cultures. This can be done through international cooperation and more specifically, international workshops and working groups.

We believe that using an international cooperation approach for a trust taking into account cultural differences is mandatory if we would like to design a multi-cultural trust model that can be understood and used by different cultures.

3 Cultural perspectives on trust research

At the BIC workshop in November 2012, a number of perspectives documenting the ongoing research being carried out (or needs for) on this topic were presented for two of the BIC countries – South Africa and India. Those efforts are summarized here.

3.1 South Africa

3.1.1 Introduction – the need for INCO

A research topic identified for international cooperation is the development of trust requirements, properties, models and mechanisms to support business ecosystems in rural Africa that are supported by mobile and cloud technology [4][5]. For these systems, it is important that trust management takes into account the culture of the target group, namely the collectivist rural African culture.

3.1.2 Research challenges

The research challenges needed to address trust models for collectivist rural African cultures are defined to address the research challenges of this project:

- A study of the work of Hofstede on culture to extract cultural behaviors and beliefs that are applicable to the rural African consumer;

- A study of state-of-the-art peer-to-peer trust models to identify properties and mechanisms that can be used by mobile and cloud-based applications supporting business ecosystems in collectivist rural Africa;

- The identification of new trust requirements, properties and models to support cultural behaviours and beliefs of collectivist African communities;

- The implementation and evaluation of a prototype system to determine if a culturally adapted trust model can successfully be used in collectivists rural African communities.

3.1.3 Objectives

The main focus of this research on trust focuses on layers 4-6 of Table 1. The focus is on identifying how rural collectivist African consumers understand and use trust information such as recommendations and assurances, and to build into trust evaluation the social position of consumers, retailers and suppliers. This research is not so much focused on technology

trust, but rather on how culturally specific behaviour influences the development of trust to ensure the growth of a business ecosystem. These research objectives are of interest not only to the African context, but to any environment where different types of cultures exist, and where an understanding of the influence of culture on trust is limited. It is therefore a topic that is ideal for collaboration between parties found in different countries in Europe, Africa, India and Brazil. The long-term expected outcome of this work would be a more generic framework that supports the ability to adapt trust models to culture, in a very generic manner, thereby complementing other research conducted in the trust research community.

3.1.4 Stakeholders

Within South Africa, there is significant work being carried out in this area by the University of Johannesburg and SAP research Pretoria, South Africa. Within the BIC workshops, a number of future collaborators have been identified already from India and the EU, but more are welcomed to mobilise in a bid for funding of a joint project within Horizon 2020 or elsewhere of relevance to investigate the manner in which each partner country can benefit from this research.

3.1.5 Benefits and success metrics, and need for INCO

A project of this nature will bring significantly more understanding to the role of culture on the different layers of consumer trust. A success metric for this work would include a working prototype, evaluated in a real life context in one or more of the countries. There would need to be INCO funding available to carry out investigations on cultural behaviours and norms, and consumer trust in different contexts. It would also enable the setting up and evaluation of the prototype in a real community such as India and South Africa.

3.1.6 Approach

Parallel approaches are needed – both bilateral (country to country) and multilateral (multiple countries) – because different countries have different perspectives on this problem, which needs to be understood individually and then brought together into an interoperable framework.

3.1.7 Timeline

An initial estimate of a timeline for this work would be:

- Completion of basic model developed in South Africa - by end of 2014;

- Evaluation of prototype - start of 2014 – 2016;

- Continuous adaptation of trust model based on prototype evaluation - 2014 – 2016;

- Investigation of culture on consumer trust – on-going till 2016;

- This timeline fits quite well with the onset of Horizon 2020.

3.2 India

3.2.1 Introduction – the need for INCO

The potential uptake of mobile computing in tandem with the cloud paradigm, offers possibilities that can spur a huge market in the developing Indian economy. However, the privacy and security concerns arising because of the storage and handling of data at indeterminable locations in the Cloud appears an inhibitor for both corporations and individuals [20].

In a globalised world, there is a case to undertake a research in the construct of "Online trust" models as applicable to the adoption of these emerging mobile applications in Indian context. By international cooperation between different nations on this research, the common denominators and differences amongst the researched cultures would provide deep insights while designing security and privacy applications.

3.2.2 The research challenges

The psychology of trust has deeper connotations and is influenced by the cultural backdrop of the people being investigated. For ensuring adequate uptake for the mobile cloud applications, we need to package them with due sensitivity to the trust dynamics of the target consumers. Different segments of large Indian population seem to have different perception about the security and privacy issues. The urban–rural divide is a reality of Indian ecosystems. The necessity to bridge the digital divide and achieve inclusive growth for all segments of Indian society has resulted in following three initiatives by Indian government:

a The Central Government, the State Government and public authorities are mandated to deliver all public services by electronic mode within five years of the commencement of an empowering act (The Indian Government THE ELECTRONIC DELIVERY OF SERVICES BILL 16th November 2011).

b In an endeavor to increase citizens' trust in the online environment and to enable the various government agencies to choose appropriate authentication mechanisms, the Department of Information Technology, Government of India has conceptualized the National e-Authentication Framework (NeAF) (Draft National e-Authentication Framework (NeAF) by Indian Government, 01 Sep 2011).

c The m-Governance framework of Government of India aims to utilize the massive reach of mobile phones and harness the potential of mobile applications to enable easy and round-the-clock access to public services, especially in the rural areas. The framework aims to create unique infrastructure as well as application development ecosystem for m-Governance in the country (Framework for Mobile Governance by Indian Government, Jan 2012).

The challenge is to design a trust model factoring the defining characteristics of various identifiable segments in Indian society. We would use the layered approach to trust formation as described in Table 1 to research various segments in Indian context.

3.2.3 Objectives

This research on trust proposes to focus on higher layers (4 to 6) dealing with social aspects in Table 1. The focus is on identifying how various segments of consumers within Indian context understand and use trust information such as recommendations and assurances, and to build into trust evaluation the social position of consumers, retailers and suppliers. This research is focused on how culturally specific behaviour influences the trust model. The lower layers of Table 1 dealing with technology issues would be minimized. The long-term expected outcome of this work would be a more generic framework that supports the ability to adapt trust models to culture, in a very generic manner, thereby complementing other research conducted in the trust research community.

3.2.4 Stakeholders within the evolving Indian Government Policy

The Indian government and industry would be interested to understand the dynamics of online trust models as applicable to various identifiable segments to implement e-Governance and e-Commerce projects. A proposal by the Department of Management Studies at IIT Delhi to Indian government for modelling the online trust construct is under active consideration. Under the aegis of BIC project collaboration with willing international partners would provide deep insights about this phenomenon factoring the effect of cross national cultural diversity.

3.2.5 Benefits, success metrics, and need for INCO

A project of this nature will bring significantly more understanding to the role of culture on the different layers of consumer trust as elaborated in Table 1. A success metric for this work would include a working prototype, evaluated in a real life context in rural and urban segments of India. We could also segment the consumers based on other demographic details like monthly income, age group, sex etc.

The collaboration with willing nations of BIC would facilitate sharing of the commonality and differences across the varied cultural diversity of participating nations. INCO funding would be necessary to investigate the trust dynamics of the target segments within India and to collaborate with partner nations. Indian government would also be approached for supplementary funding after the collaborative research framework is agreed upon.

3.2.6 Approach

While initial focus would be to capture the diversity inherent in various segments in Indian society as viewed through the layered framework of Table 1, a combination of bilateral and multilateral approach may emerge as we traverse the research path to facilitate insights into cultural diversity across the participating nations.

3.2.7 Timelines

The research may be undertaken in phases. The research plan and deliverables at end of each phase would need preliminary study by the collaborating agencies. A timeline of 3 years for useful deliverables is considered realistic. This fits within the scope of the Horizon 2020 programme.

3.3 European perspective

The European Union has launched several projects or initiatives to cover this area. We develop here a summary of them. Part of these works can become building blocks of an integrated and international framework that could be built.

Several programs and initiatives have been launched in Europe within the frame of the European effort to generate a trustworthy environment for commerce, communication and generally speaking interactions on internet. It has also been the case for regional studies. As an example one can point the work done within the BATE project that covers the Nordic countries [21].

The authors derive a set of questions that we should consider when designing for all:

- How can we investigate into the effects of culture in understanding computer security?
- How should we define "culture" in this context? What is it, exactly, made of?
- How should we define security-related concepts, such as privacy, or trust, for multi-cultural environments?
- How can we make cultural comparisons across users from various countries? What is relevant for the study of cultural effects?
- How "weighty" are cultural considerations for the overall design of security-prone systems?
- What will the future culture of secure Internet and secure and private mobility be like?

From the international cooperation programs to the European Union, we can consider the extensive analysis of the cultural differences in term of the value perception of an offer (product or service) by different cultures. We can confirm from this study that while Trust is an universal value, it is not perceived in the same way in different cultures. Moreover, factors that influence this perception are not similar. From the disciplinary approaches we face the same situation: development are scattered. Table 2 illustrates the benefits gained from the specific programs that the European Commission funded upon which the BIC initiatives is building an integrated paradigm.

Acronym	Full Title	Objectives
Start 2011-01-01 **End** 2013-12-31	*Building International Cooperation for Trustworthy ICT*	The European Commission's CNECT H4 project BIC – Building International Cooperation in Trustworthy ICT works with the international community to solicit feedback, comments and ideas for further progress towards future international cooperation (INCO) on trust and security areas that inherently need to be addressed at the global level. The goal of the BIC project is to bring together the global research community with the aim of determining mutually beneficial and urgent topics for international collaboration on the research and development of Trustworthy ICT between the EU and emerging countries, specifically Brazil, South Africa and India.

Acronym	Full Title	Objectives
Start 2010-09-01 **End** 2013-02-28	*European Framework for Future Internet Compliance, Trust, Security and Privacy through effective clustering*	Provides a coordination service for R&D for Trust, Security, Privacy and Compliance (TSPC) in the Information Society and the Future Internet (FI) coordination of project contribution to the development of Future Internet; (1) coordination of project contribution to the development of Future Internet; (2) coordination of project activities through Project Clustering; (3) coordination and integration of the results and findings from (1) and (2), feeding them into an ongoing roadmap that contributes to the agenda for future European research, development, and practice. To date, there has been no overall co-ordination of Future Internet Assembly (FIA) work with early T&S project clustering.
ATTPS **Start** 2012-07-01 **End** 2015-06-30	Achieving The Trust Paradigm Shift	ATTPS addresses four pillars, which include business, legal, social and technical challenges. The objectives of ATTPS are: (1) Enforcement of the trust paradigm shift (2) Create awareness at industry, institutes, governments across member states (3) Contribute to interoperability and standardisation at European level on trustworthy ICT.
ETRUST **Start** 2007-04-01 **End** 2009-03-31	E-democracy technologies and the problem of public trust	The aim of e-democracy tools is to give people more choice about how they can participate and to give them the feeling that their input makes a real difference, eventually resulting in more trust in government. This project aims at answering the question "Does e-democracy increase trust in government, and under what conditions?"
REPUTATION **Start** 2003-11-01 **End** 2005-10-31	Using trust and reputation to Improve security in virtual societies	(1) Improve the reliability and security in e-Commerce environments. (2) Provide a common metrics to compare computational trust and reputation models. (3) gives a common experimental environment where to compare all computational trust and reputation models under the same conditions and allows to clearly determine the strengths and weaknesses of each model. (4) Increase people's confidence in multi-agent systems technology. Improving the reliability and security of e-Commerce environments by means of better trust and reputation models.
ITRUST		(1) Facilitate the cross-disciplinary investigation of fundamental issues underpinning computational trust models by bringing together expertise from

Acronym	Full Title	Objectives
Start 2002-08-01 **End** 2005-07-31	Working Group on Trust Management in Dynamic Open Systems	technology oriented sciences, law, philosophy and social sciences; (2) Facilitate the emergence of a widely acceptable trust management process for dynamic open systems; (3) Facilitate the development of new paradigms in the area of dynamic open systems which effectively utilise computational trust models; (4) Facilitate the harmonisation of regulatory and legislative frameworks and facilitate their evolution so as to support the fast take-up of the emerging technologies in the area of dynamic open systems; (5) Incorporate trust management elements in existing standards and prepare the ground for the standardisation of emerging technologies by submitting recommendations to the appropriate standardisation bodies.
GRIDTRUST **Start** 2006-06-01 **End** 2009-05-31	Trust and security for next generation grids	The overall objective of the GridTrust project is to develop the technology to manage trust and security for the Next Generation Grids (NGG). The project proposes to set a vertical approach tackling issues of trust, security and privacy (TSP) from the requirement level down to the application, middleware and foundation levels. The resulting tools will be of a generic nature and will be validated on innovative applications from different application sectors. The tools will not be specific to the applications considered in the GridTrust project.
SOCIALREP **From** 2006-03-01 **End** 2007-02-28	Toward the next generation of computational trust and reputation models	1. improving the state-of-the-art of current computational trust and reputation models. 2. Provide a common metrics to compare computational trust and reputation models. 3. Increase people's confidence in multi-agent systems technology.
TRUSIS **Start** 2010-06-07 **End** 2011-06-06	Trust in Social Internetworking Systems	1. To define a simple mathematical model of social internetworking and analyze factors influencing the computation of trust and reputation with a special emphasis on some typical Web 2.0 features. 2. To extend the basic model with context-awareness functionalities in order to specify trust/reputation of users in concrete domains. 3. To build an ontology capable of representing trust and reputation data in multiple social networks. 4. To carry out long-term iterative testing and validation activities on real users.

Acronym	Full Title	Objectives
TRUSTREP **Start** 2006-10-18 **End** 2008-10-17	Creation and use of trust in virtual communities through reputation Management	This project examines how reputation management schemes can be used to monitor and manage systems in a decentralized fashion. Reputation management is not a replacement of traditional security solutions and is instead a complementary strategy that works through establishing trust between members of a virtual community allowing them to collaborate so that they can provide each other with robust services and services that would otherwise not have been possible.
ACTOR **Start** 2010-06-01 **End** 2012-05-31	ACcelerate Trust in digital life Organisation and Relations	Establishing a multidisciplinary partnership Broad support to the TDL research roadmaps for longer-term research in the field of trustworthy ICT Bundling and coordinating the effort of the Partnership members to develop a promising and ambitious SRA and Work plan for TDL. Identification of a balanced portfolio with concrete project ideas for public funded research and innovation projects.
DEL **Start** 2011 **End** continuous	Digital Enlightenment Forum	http://www.digitalenlightenment.org/ The DIGITAL ENLIGHTENMENT FORUM stimulates and organises debate among representatives of science and technology, law and policy. It provides guidance on the rapid changes in digital technologies and their perceived impact on society and its governance.

Table 2. Summary of the European projects/initiatives dealing with trust management

4 Conclusions

This paper has highlighted the necessity of considering the cultural context while evolving the construct of online Trust. As online transactions in our global village go beyond the various cultural contexts, the necessity to factor the effect of cultural diversity while proposing Online Trust models appears relevant. The ongoing and proposed research on this important theme at two of BIC partner countries viz. South Africa and India have been described. The paper makes a case for evolving an Online Trust model that factors the cultural diversity as a dimension for research model.

There is definitely a revised if not new understanding of the real challenge about trust and security in our open and global society. The BIC project, through its working groups, managed to turn this general issue into tangible statements that should be considered for further development, in a way that policy makers can build upon the real-field description of the societal challenges, industrials to better design services and products, users to get a culturally-adapted awareness about trust and security. Several steps need to be considered in

our path for global trustworthiness. We believe that an urgent agenda need to be set considering the following:

- Building a framework for culture analysis within the frame of trust and security;

- Characterization and understanding of the cultural differences using this framework;

- Co-creation of culturally-adapted indicators for trust and security for a better efficiency of awareness actions;

- Construction of an International Reputation Index for trust and security that allows transparency;

- Building a methodology to transform user requirements into real industrial requirements;

- Feeding policy makers and standardisation bodies with these constraints coming from multi-disciplinary, multi-cultural and end-users needs.

This agenda needs to be adopted internationally within an EU program that, by now, is the only potentially realistic host and run by a multidisciplinary group of experts in an "open innovation" methodology way rather than in separate groups.

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