

17

The Role of ICT in Creation and Sustenance of Trust in SME Clusters and Inter-organizational Systems

*Agnes Mindila, Dorothy McCormick,
Anthony Rodrigues and Ronald Waweru Mwangi*

Research has shown that it is through clustering and interorganizational relationships that SMEs can be innovative, therefore creating development opportunities. Literature stresses that the success of these clusters and inter-organizational systems can be traced to the system of social and economic relationships based on trust among other factors. It is therefore a great concern for researchers to define processes that would enhance and contribute to trust. On the other hand research has shown that ICT and networked computing provide geographical clusters and interorganizational systems with new development opportunities, drawing new possible trajectories of evolution. One specific area where ICT provides new development opportunities is by reinforcing intra-cluster and inter-organizational relationships. Many social scientists have been skeptical about the contribution of ICT towards trust arguing that trust is only built where people have face-face communication, have demographic similarity, have prior history of relationship and are co-located. However it has been noted that Inter-organizational systems exist that are enabled by ICT, they are located at different physical locations and have no prior relationships. These in itself creates a gap for researchers to be able to explain the existence of such relationships. By considering different dimensions of trust this paper posits that ICT contributes to creation and sustenance of trust, which is a key component for the success of inter-organizational systems. The paper seeks to provide a framework upon which ICT is analytically evaluated for its contribution towards creation and sustenance of trust.

1. Introduction

Economic development literature identifies innovation systems as a key vehicle that brings about development. This is through its contribution to economic growth by technological change and by contributing to institutional change by way of providing new institutional frameworks and practices. Innovation no longer depends on how firms perform on individual basis but on how they work in unison, hence the emergence of SME clusters and the concepts of inter-organizational relationships (IOR) and inter-organizational systems (IOS). Literature stresses that the success of these clusters, IOR and IOS can be traced to the system of social and economic relationships based on trust.

On the other hand, research has shown that ICT and networked computing provide geographical clusters, IOS and IOR with new development opportunities

drawing new possible trajectories of evolution (Carbonara, 2005). Besides it reinforces intra-cluster and inter-organizational relationships. This then means that establishment of inter-organizational level trust is a big concern for researchers in ICT and IOS alike. A stream of research on trust goes on in social science and on the other hand a stream of research on trust goes on in ICT. They seem to be parallel and not synergizing. This paper attempts to synergize these two streams of research and provide a common ground. It's important to investigate the contribution of ICT towards trust, which is key in the success of these inter-organizational systems. The rest of the paper is organized as follows:

Section 2 of the paper introduces the concept of SME clusters and IOS. Section 3 introduces trust and its dimensions. Section 4 suggests a conceptual framework with which ICT can be analyzed for its role in contributing towards trust creation and sustenance. Lastly section 5 makes conclusions and recommendations on future developments and research.

2. SME Clusters and IOS

Emerging evidence suggests that use of collaborative inter-organizational relationships is an important source of innovation (Marshall, 2004). SMEs can afford to continually be innovative, not because they have resources to invest in research and development but because of collaborations and inter-firm networks. Innovativeness in this context is looked at in two ways, one, innovativeness that enables SMEs to come up with new products and processes hence increasing productivity and contributing to economic growth. Secondly innovativeness that enables institutional entrepreneurs to be strategically positioned and engage in bricolage, which eventually results in institutional change (Campbell, 2004). It is then the unique combination of economic growth and institutional change that brings about economic development.

Both kinds of innovativeness are key towards economic development and are all dependent on clusters and inter-organizational systems for the case of the SMEs. Marshall, 2004 emphasizes that more enduring relations entail obligation and trust and that economic action is embedded in a rich structure of ongoing networks of relationships. Networks, partnerships and consortiums succeed in part through the social glue that holds them together, the glue entails norms of trust and appropriate behavior (Reich and Kaarst-Brown, 2003). Literature on IOS has emphasized trust to be an important factor in the development and success of IOS (Ibrahim and Ribbers, 2006).

Currently experts disagree about whether face-face interaction is the only means for formation of trust and collaboration. Social science, policy and public management research is silent on the question of what would happen if potential network actors could be digitally linked (Fountain, 2001), not just with networks but with information systems that carry out duties of control, monitoring and enforcement. Technology researchers celebrate the ability of ICT to make distance and time constraints virtually meaningless. They also argue that easier

communication, enforcement, control and co-ordination lead to enhanced trust hence enhanced inter-organizational relationships. Speaking on technology, Bellussi, 2004 states “if ICT adoption and implementation are aimed at reinforcing intra-cluster and inter-organizational relationships then they contribute towards integration of the economic actors operating along global supply chains”. This integration is only possible if there is trust. How to measure the contribution of ICT on networks and social capital of which trust is part, has been the greatest challenge for researchers (Hurriagotia, 2004).

It’s the importance of trust in these SME clusters and IOS that leads to section 3, which aims at examining trust and its different dimensions with the aim of finding the role of ICT in any of the dimensions available.

3. Trust and Its Dimensions

Gefen D, 2002 argues that trust itself is a multidimensional construct. Each of these dimensions is important in the achievement of the desired behavior. Many researchers, (Gefen D., 2002, Areniurs and Antro, 2002, Erden and Ozen, 2003) have classified trust into two major categories each with its dimensions.

- (i) Institutional trust: Situational Normality, Structural assurances and facilitating conditions.
- (ii) Inter-organizational trust: perceived ability, perceived integrity and perceived benevolence.

Institutional trust was suggested by Zucker, 1986 when he suggested that institutional trust is the most important mode by which trust is created in an impersonal economic environment where the sense of a community with common values is lacking. This is a perspective that has been widely adopted by information systems researchers perhaps because ICT brings together organizations with no familiarity and similarity.

Institutional trust has been defined by various researchers (Mcknight et al, 2002) as “the organizations belief that favorable conditions are in place that are beneficial to outcome success”.

Institutional trust is defined to have three dimensions, which are structural assurances, situational normality and facilitating conditions. Structural assurances are beliefs that favorable outcomes are likely because of contextual structures such as contracts, regulations and guarantees whereas situational normality beliefs that success is anticipated because the situation is normal (Pavlou P.A., Tan Y.H., and Gefen D., 2003). Whereas facilitating conditions refer to common beliefs, goals and standards.

Interorganizational trust on the other hand has been defined as “one organizations belief that the other party in the exchange relationship will behave in accordance with the trustors confident expectations” (Pavlou P.A., Tan Y.H., and Gefen D., 2003). Four dimensions of interorganizational trust have been identified namely:

- Competence
- Credibility

- Benevolence
- Openness

Competence refers to the capacity to fulfill promises and contracts. Credibility refers to predictability, reliability and honesty towards fulfilling contractual obligations. Benevolence refers to the expectation that a party will act fairly and will not take unfair advantage of the trustor, even given chance (Ridings C.M., Gefen D., and Arinze B., 2002, Stoutland S.E., 2001). Openness refers to the perception of honesty of communications and completeness of information (Ibrahim M. and Ribbers P., 2006).

It is important at this point to note that while trust plays a major role in the inter-organizational systems supported by networked computing and ICT environment, it seldom complies with the traditional view of dyadic trust that the academic literature in social sciences focuses on but rather the institutional trust.

Many researchers like Pavlou P.A., 2002 and (Pavlou P.A., Tan Y.H., and Gefen D., 2003) have shown that institution based trust positively influences inter-organizational trust which positively influences inter-organizational relationship continuity whether in a digital environment or not.

This paper posits that even though ICT may have less or may not have a direct role in creating and sustaining Inter-organizational trust per se, it surely has a direct influence on institutional trust which positively influences inter-organizational trust. This then leads to section 4, which conceptualizes the 'how' of this hypothesis.

4. Conceptual Framework of the Role of ICT in Contributing to Trust in Inter-organizational Systems.

Several researchers have contributed to the work on institutional trust and how it relates to inter-organizational trust. This section will examine some of these works and draw important resolutions.

Hung Y.C et al, 2004 posit that individuals have three possible routes by which to form trust namely peripheral route, central route or habitual route. That the peripheral route is used due to reasons such as limited personal knowledge, time constraints or lack of traditional social cues. In such a situation individuals are not able to engage deliberate cognitive information processing and have to rely on peripheral cues available in context. The peripheral cues that form initial trust include dispositional trust, third party as conduits of trust, category based trust, role based trust and rule based trust.

The central route is achieved through interactions and accumulated personal knowledge. Personal attributes are deliberately assessed. The accumulated knowledge becomes a basis for initially calibrating and then upgrading trust related expectations.

Habitual route is where the accumulated personal knowledge based on prior successful trust transactions contribute to a habitual trust attitude.

Pavlou, 2002, states that institutional trust positively contributes to interorganizational trust. Where he defines institutional trust as obtained through Structural assurances, Situational normality and facilitating conditions.

The commonness in the research done on institutional trust is the fact that it can be achieved through third party or bilateral relationships between various firms. This is done through three major ways namely:

- Structural assurances
- Situational normality
- Facilitating conditions.

Another way mentioned by Hung et al is category based.

This section sheds light on how ICT can be used in inter-organization systems to foster structural assurances, situational normality, facilitating conditions and category based trust.

4.1 Situational Normality

Situational normality is where it is believed that success is anticipated because the situation is normal. It is suggested that this situation is achieved when the following factors are guaranteed.

- Authorization
- Integrity
- Non-repudiation
- Confidentiality.

The factors above can be achieved by way of various technologies and information systems. By employing technologies such as encryption where special mathematical algorithms are used to transform digital data into a scrambled code before they are transmitted and decode the data when received and firewalls authorization and confidentiality can be achieved in IOS.

Development of Information systems controls will ensure integrity in IOS by way of ensuring proper data entry, processing techniques, storage methods and information output. Input controls would include encryption, validation procedures, error signals and error corrections among others. Processing controls will include programmed edit checks and controlled totals. Storage controls include logs and time stamps, secured databases, disaster recovery capabilities, backup files, security codes and proper database management procedures. Output controls would include control totals, report distribution lists, encryption, control totals and end user feed back. This information system controls will ensure integrity in IOS.

Information system audit trails would contribute greatly to non-repudiation in IOS. These trails provide a way of documenting all transactions done from the first step to the very last step. They help auditors check for errors or fraud.

Cyber forensic, sniffer software and investigative services also provide integrity within IOS.

By use of the above information technologies and systems IOS can achieve situational normality in the sense that authorization, integrity, non-repudiation and confidentiality is attained.

4.2. Structural Assurances.

Structural assurances are beliefs that favorable outcomes are likely because of contextual structures such as contracts, regulations and guarantees. This is especially when looking at IOS as sources of technological change, which is one aspect that brings about economic development. This paper would want to take the other perspective of economic development occasioned by institutional change. This then implies that learning of new ideas becomes a key issue or what we call brocolage. The structural assurances required for this kind of set up are those that intentionally foster knowledge transfer between organizations. The structures put in place should be such that the ability to extract knowledge from individuals within the organization and to structure the knowledge foe use by partners is made easier. It also means assurance that the actual transfer of the knowledge will occur and that the partners will be able to absorb the knowledge provided by other organizations. Two key issues become very important when addressing structural assurances that will achieve the above description. These are:

- Transparency-level of openness of a firm to its partner and the opportunity it provides to its partner to learn
- Receptivity-the capacity or ability of the collaborating partners to absorb the knowledge provided by another. (Davidson M. and Olfman L., 2004)

This implies that collaborating organizations should have high levels of transparency and receptivity. In order to achieve this organizations have to make a deliberate effort to set up structures that will help them achieve these two important factors. This implies creating structural assurances that help them achieve transparency and receptivity.

ICT provides a fertile ground for easily achieving this two factors. By employing knowledge management systems that embeds techniques, technologies and reward systems for getting individuals share what they know and to make use of the accumulated IOS knowledge. By providing accessibility to people, documentation and organization partners through groupware software, e-mail, telephone, shared databases, instant messaging organizations increase their level of transparency.

By providing help desk systems and web portals firms are provided with the opportunity to learn by their partners. An organization that deliberately puts the above technologies and information systems in place provides structural assurances which is assurance that actual transfer of knowledge will occur.

4.3. Facilitating Conditions

This refers to shared standards, common beliefs about behavior and goals, and relationship values. We focus on shared standards. Organizations can achieve shared standards by considering adopting similar standards in terms of data

management. Organizations can also ensure shared standards by supporting interoperable Information technology platforms.

4.4. Category Based Membership

Membership in a certain social or organizational category is said to contribute to institutional trust. With the invention of social software like blogs, individuals across partnering firms can be able to share information in their area of interest.

The framework in Figure 1 summarizes the contribution of ICT to institutional trust.

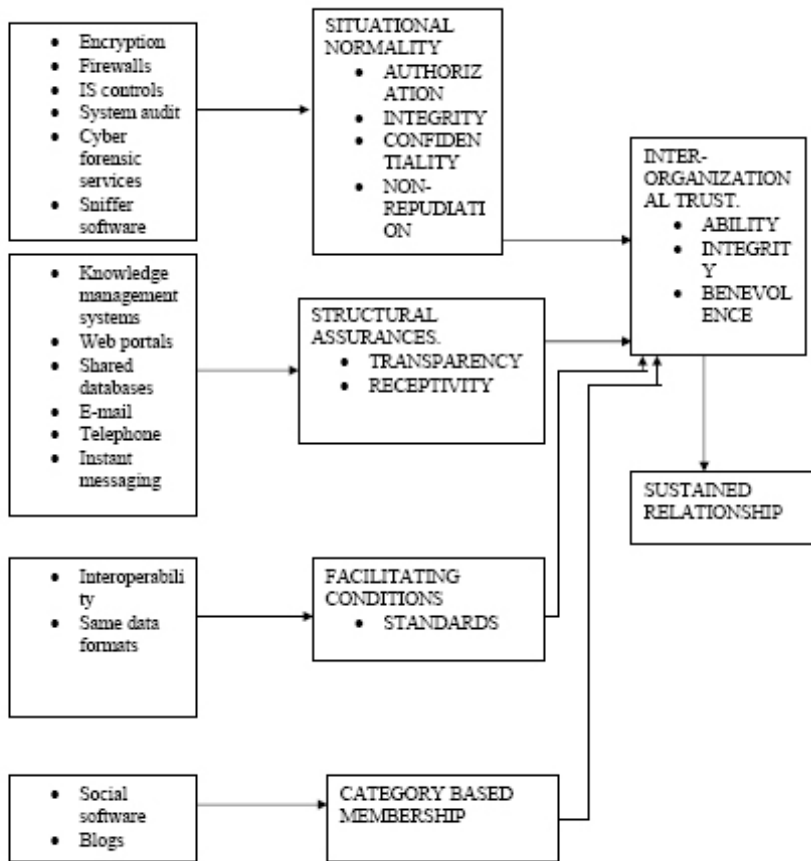
5.0. Conclusion and Further Research

Trust affects performance and it is critical in organization co-operation, coordination and control. As Information system researchers we are faced with the challenge of developing new models for creation and maintenance of trust better suited to the dispensation of new ICTS'. This paper has focused on creation of trust for the sake of causing brocolage to occur. This brocolage is what brings about institutional change that is a key ingredient to economic development in SMES'.

Two dimensions of trust have been identified i.e. institutional trust and inter-organizational trust. The paper dwelt on institutional trust and illustrated how ICTS' can be used to contribute to structural assurances, situational normality, facilitating conditions and membership category, which are key ingredients that make up institutional trust.

Other researchers have done work on how institutional trust leads to inter-organizational trust. Further research on this work will endeavor to look at how ICTS' directly contributes to inter-organizational trust. This will be a leap forward in trying to inform managers of information systems on how strategically ICTS' can be utilized to foster trust in IOS.

Fig. 1: Framework: contribution of ICT to institutional trust



References

- ARENIURS P. AND ANTRO E. (2002) *International Social capital and its effects on resource acquisition in born global firms*. Working paper series. 91-wp-2002-004.
- BELLUSSI F., (2002) *Industrial districts: networks without technologies?* Proceedings of the DRUD summer conference “Industrial Dynamics of the new and old economy-who is embracing whom?”
- CAMPELL J.K. (2004) *Institutional change and globalization* . Princeton: Princeton University Press.
- CARBONARA N., (2005) *Information and Communication Technology and Geographical clusters: Opportunities and Spread*. Technovation 25 pp 213-222
- DAVIDSON M. AND OLFMAN L. (2004) *The Impact of Information Technology use on interorganizational Learning in an IT Outsourcing Collaboration*. Proceedings of the 37th Hawaii International Conference on System sciences
- ERDEN F. AND OZEN J. (2003) *Cognitive and affective dimensions of trust in developing team performance*. Team Performance Management Vol 9 Number 5-6. pp131-135.

- FOUNTAIN J.E., (2001). *Building the virtual state Information Technology and Institutional Change*. Brookings Institution press. Washington D.C
- GEFEN D. (2002) *Reflections on the dimensions of trust and trustworthiness among online consumers*. ACM vol 33 issue 3. pp38-53.
- HUNG Y.C., DENNIS A.R AND ROBERT L. (2004) *Trust in Virtual Teams:Towards an Intergrative Model of Trust Formation*. Proceedings of the 37th Hawaii International Conference on System sciences
- HURRIAGAGOITIA J.M.Z., (2004) *Analysis and measurement of interactions in European innovation systems. A sectoral approach*. Economics of Technological and institutional change. Doctoral training program ETIC 2004. Maastricht, October 11th-24th 2004.
- IBRAHIM M. AND RIBBERS P. (2006) *Trust, Dependence And Global Interorganizational Systems*. Proceedings of the 37th Hawaii International Conference on System sciences
- MARSHALL C., (2004). *The dynamic nature of innovation partnering: a longitudinal study of collaborative interorganizational relationships*. European Journal of innovation Management. Vol 7 No.2 pp128-140
- MCKNIGHT ET AL. (2002) *Developing and Validating trust measures foe e-commerce: An integrative typology*. Information Systems Research. 13 (3) pp 334-359
- O'BRIEN J. (6th ed) (2004)*Management Information Systems. Managing Technology in the Business Enterprise*. New york: McGraw Hill
- PAVLOU P.A. (2002) *Institution based trust in interorganizational exchange relationship. The role of online B2B market places on trust formation*. Journal of strategic information systems 11. pp215-243
- PAVLOU P.A., TAN Y.H AND GEFEN D. (2003) *The transitional Role of Institutional Trust in Online Interorganizational Relationships*. Proceedings of the 37th Hawaii International Conference on System sciences
- RIDINGS C.M., GEFEN D. AND ARINZE B., (2002) *Some antecedents and effects of trust in virtual communities*. Journal of strategic Information systems 11. pp271-295.
- STOUTLAND S.E., (2001) *The multiple Dimensions of Trust in resident/Police relations in Boston*. Journal of Research in Crime and Delinquency vol 38. No.3 pp 226-256.