

A framework for

**Building On-line Trust for  
Business to Business E Commerce**  
*Issues & Challenges*

By

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# **A framework for Building On-line Trust for Business to Business E Commerce**

## *Issues & Challenges*

### **Abstract**

*Despite the unprecedented growth of Internet based E Commerce in recent years, the rate of penetration in developing countries such as India is lower. Among several factors responsible for this, the poor state of infrastructure and low levels of online trust stand out significantly. Infrastructure issues have caught the attention of the business and policy makers but not the trust issues. This is largely due to lack of understanding of the notion of online trust and the challenges in fostering it.*

*This paper addresses this issue in some detail. We discuss specific issues that a Business-to Business market place will confront when fostering Online Trust using a few Indian case studies. We develop a framework for building online trust and discuss the manner in which online marketplace fosters trust. We discuss how CredibilityFirst, a new venture of CRISIL proposes to foster online trust in B2B markets. Finally we show that the notion and exact requirement of trust vary depending on the nature of players and the type of market structure.*

### **Introduction**

E Commerce refers to enabling inter-company trade using a variety of electronic means such as WWW, EDI and EFT. Practically every aspect of the trade could be conducted electronically. In a Business-to-Business (B2B) environment, these include locating buyers/suppliers, qualifying buyers/suppliers, selecting vendors, placing and matching RFQs, order placement, escrow services, payment, insurance and post sales support. Several transactions required to complete trade are done in a costless manner using electronic means. New business models such as Catalogue Aggregators, Auctions, Exchanges and E Market Places offer great potential for increasing market and product liquidity.

The growth rate of Internet based E Commerce in recent years is unprecedented in developed countries such as US. While Business-to-Consumer (B2C) models were validated by 1999, new opportunities in Business-to-Business (B2B) market place are being exploited currently. Several studies have projected that B2B markets will contribute to about 85% of the total E Commerce market. Estimates indicate that for the year 2007 the size of Internet based E Commerce market is expected to be about \$2.3 trillion. E Commerce market penetration in developing countries such as India shows a somewhat slower growth. This is attributed to several aspects. Prominent among them include the poor state of infrastructure and low levels of trust among users of such E Commerce market places. While infrastructure issues in developed

countries get addressed fast, the issue of trust continues to be an important dimension in such countries too.

## **Importance of Online Trust**

Traditionally, the issue of trust was addressed in a few ways. Personal face-to-face meetings, exchange of information, obtaining references and reputations of various parties from customers and partners and negotiation of contracts have helped the transacting parties to develop some instincts on the relative trustworthiness of the parties. Moreover, legislative framework also helped in developing an agreeable level of risk. The transaction is completed often by the simple act of handshaking, which signals trust. However, the characteristics of E Commerce transactions differ vastly.

Fairly simple to use and open technology of the Internet has brought together an unusually large number of buyers and sellers, hitherto unknown, to a common virtual market<sup>1</sup> place. Online markets promote buying and selling of goods and services worth several million dollars in an anonymous fashion. In such an open and unknown market place assurance and trust are difficult yet important. A 1998 Business week survey showed that privacy is the number one consumer issue facing the Internet<sup>2</sup>. According to the survey, 78% of online users would use Internet more and 61% of non-users will begin using the Internet if privacy practices were disclosed. In the case of Business-to-Consumer online transactions, online consumers often perceive a lack of control over the access others have to their personal information during the online navigation process. Absence of robust mechanisms for addressing online trust increases the risk of trade and creates more friction in the market.

Consider for example, the following. More than 75% of the auctions conducted in a well known B2C auction site in India are unsuccessful as there are no bidders for the items listed. Recently, well known E Commerce sites such as Bloomberg, AOL, ESPN and WTO have been the targets for “site spoofing”, a form of theft of site content and misrepresentation. In several of these cases, several of the pages of the sites are copied, modified and fraudulently redirected to another site where visitors are misled with wrong information<sup>3</sup>. Columbus, Ohio-based security group Interhack recently reported that TRUSTe, a well known non-profit privacy watch dog organization violated its own privacy rules<sup>4</sup>. Understandably, in order to conduct business transactions comfortably, fostering trust among the transacting parties is essential.

We address the issue of trust in this paper and identify various factors that facilitate building online trust<sup>5</sup>. We present a framework for building online trust and discuss its applicability to various market mechanisms operating in Internet based E Commerce. We identify the patterns in which E Commerce organisations could build trust. We also identify the role of technology, Government and other business organisations in fostering trust.

## **Dimensions of online trust**

Engaging in online transactions raises several questions. How do the participating parties know whom are they transacting with? Is there a guarantee that the host of vital business and commercial information transported over the public switching

network is not intercepted and altered? What if one of the parties denies the occurrence of transactions? What are the credentials of the market maker? What are the credentials of the participating buyers and sellers of products and services in an online market place? What about privacy? Is there an equivalent of physical hand shaking? How reliable is the information provided in web sites? What is the guarantee for the performance of products/services offered by sellers in an online market and guarantee for buyers credit worthiness? Is it safe and legal to engage in such online transactions? Is there any legal backing if there is a breach of commitment? Unless these questions are addressed conducting online transactions become difficult.

We propose that building online trust would involve developing strategies to handle these questions. Moreover, a framework for online trust should address three dimensions of trust adequately: technology, market place, and market participant.

One of the key facilitating mechanism for online commerce as well as trust building is the legal framework. When online transactions, digital signatures and evidences produced using computer databases are not valid in the court of law, online market places will be a non-starter. The absence of a legal framework will raise the level of risk among transacting parties dramatically. This will result in poor patronage of online markets. The three dimensions of online trust needs to be embedded in an overall umbrella of a robust legal framework (Figure 1).

### **On line Trust - Technology Dimension**

Developing trust must happen in several stages. To begin with, the market participants should be assured that some of the common problems hampering trust (see Table 1) are addressed. Normally, Internet users don't monitor or interfere with the network traffic that continuously passes through their machines. However, many sensitive personal and business communications over the net require precautions that address the threats listed above. Use of technology to counter these is one of the major dimensions in fostering online trust. In order to ensure that these security hazards are avoided, E Commerce sites need to address some aspects of security. Since transactions take place in a virtual (and non-personal) environment, they must be assured of the right identity of the transacting parties (authentication) and non-denial of the transaction (non-repudiation).

The purpose of non-repudiation is to provide verifiable proof or evidence recording of data (based on cryptographic check values generated by cryptographic techniques). Non-repudiation controls ensure that transacting parties cannot disown the transaction by exploiting non-personal nature of electronic transactions. In traditional legal sense, the onus of proof in a case involving a forged paper-based signature lies with the party wishing to rely upon the signature. The relying party in relation to an alleged forged signature is required to establish in a civil action, on the balance of probabilities, and in a criminal action, beyond reasonable doubt, that the signature is not a forgery.

In the electronic commerce environment, the technical meaning of the term "non-repudiation" either shifts the onus of proof from the recipient to the alleged signatory

or entirely denies the signatory the right to repudiate a digital signature. In online transactions, it is achieved in a variety of ways. Table 2 contains a detailed explanation of the nature of proof provided by non-repudiation aspects in online transactions.

Authentication refers to validating the identity of an entity requiring access to a computer system or network. In a distributed computing environment and public networks such as the Internet, authentication plays a key role. Basically, there must be a process that verifies whether an organization or an individual exists, has a name, and is entitled to use that name. This process may also establish other identification attributes: for example, organisational affiliation ("Joe Smith works for MS"); industry segment ("Citicorp is in the financial industry"); or occupational certification ("John is a board-certified doctor in Chennai").

Once this aspect is established, they further need confidentiality of the transaction, integrity (no alteration of data/information pertaining to the transaction in different web sites and while it travels over the net), access control (thereby ensuring only authorized usage of the services), legitimate use and availability (protection from breakdown).

All these constitute *the technology dimension* of trust. They provide the needed security to the market participants to operate in a virtual market place.

## **On line Trust – Market Place Dimension**

A second set of concern relates to the credibility of the online market place. An online market is nothing but a few mouse clicks for the potential consumer. Can an impressive home page design with screens tastefully decorated, and good navigation facilities provide enough confidence to the consumer? Akin to the physical world, business practices, the richness and depth of offerings, reputation, brand equity and corporate governance mechanisms of market participants contribute to the *market place dimension* of trust in an online market. We discuss these in detail.

### **Corporate Governance Mechanism**

B2B on line markets have evolved in the corporate governance mechanisms adopted. Initially B2B segment witnessed neutral online market makers. These market makers used various market-making mechanisms to mediate transactions among businesses focused on specific industry verticals. Neutral B2B start-ups such as Ventro and Vertical Net gained prominence as reflected in their market valuations. However, recently, B2B industry-sponsored consortia are creating new online market places. For instance, GM, Ford, and Daimler Chrysler announced in February 2000 creation of a business-to-business exchange, Covisint for procurement of automotive parts, supplies, and services for automotive industry worldwide. This set the stage for formation of consortia based market places in industries ranging from airlines to utilities.

In addition to reducing procurement costs consortia will allow industrial firms to spread the costs of building e-commerce infrastructure across multiple participants

B2B consortia will allow them to connect directly with their customers and suppliers, instead of letting intermediaries control the flow of information in the supply chain. The emergence of the independent and industry consortia exchanges has raised several issues of governance.

An industry sponsored consortia is likely to be controlled by the sponsors and can create doubts in the minds of participants and regulators. The industry consortia exchanges face the challenge of establishing their neutrality. Since commercial considerations of founding companies could significantly influence operations, the background of sponsors of consortia exchanges is an important trust issue. The governance trust issues in an industry sponsored consortia need to address the composition of the governance team, the ownership and operations adequately. Table 3 has more details on these issues.

### **Richness and depth of service offerings**

Most of the exchanges claim to offer various value-added service which involves fulfilling one or more of the following:

- ◆ Flow of information
- ◆ Flow of Goods/services
- ◆ Flow of money

The services include payment gateways, logistics support, and escrow services. Since B2B applications are mission critical the ability of these market places to fulfil the promises is a trust issue. Failure could have a cascading effect on several other companies. In the Indian context, these issues significantly affect trust on account of other factors such as non-availability of broadband technology, legal systems, and role of regulators.

Moreover, better business practices and adherence to committed policies and principles could contribute substantially to fostering online trust. A June 1998 Federal Trade Commission report to US Congress on privacy online mentioned that while 92% of web sites collect personal information, only 14% displayed information disclosure practices on their web site. The study further showed that the 14% mainly consisted of popular sites that also gave choices to the consumers to exercise how their personal information could be used<sup>6</sup>. An unambiguous product return policy, meticulous details on how the order will be handled until receipt by the customer, efforts to guarantee product quality and adherence to policy guidelines will all add significantly to fostering online trust. For instance, Verisign was one of the first certification authorities to provide up to \$ 100,000 for protection against economic loss, with others following suit<sup>7</sup>.

### **Brand Equity Issues**

In the conventional business, brands served as trust enablers. For instance, in the case of portals, the credibility of the information provider significantly affects trust in transactions. Financial information and analysis of NASDAQ provided by The Wall Street Journal site is likely to be more trusted than another provided by an unknown web site. Similar trust concerns exist in B2B markets as well. The acceptability of

online markets set up by well known firms in the brick & mortar economy point to the fact that brick & mortar brand equity and reputation has a greater potential to foster online trust. Barnes & Nobles' online bookstores, Sotheby's online auction site and Compaq's online computer superstore are some successful examples.

Similarly, a website offering automobile buy and sell services by bringing together buyers and sellers of new and used cars promoted by a well known player in the field has a greater acceptability to online customers. Domain expertise tends to foster trust easily. One of the critical success factors for B2B markets is the domain expertise. One needs to understand the problems of an industry and complexity of relationships amongst participants to be successful. The fulfilment services required in B2B segment is complex and it varies from industry to industry. The emergence of Internet has led to a proliferation of number of start-ups. Often entrepreneurs who have very little experience in the industry promote these start-ups. The issue of online trust in such cases is crucial.

### **On line Trust – Market Participant Dimension**

The third dimension to online trust relates to the credibility of market participants. B2B transactions involve huge monetary transactions, complex operations and close co-ordination. They are also mission critical. Consequently in such transactions, several questions arise in the minds of the buyers:

- ◆ Is the seller who it claims to be?
- ◆ Does he have sound business fundamentals?
- ◆ Would he be able to service my transaction in terms of on-time delivery, product quality or after sales service?

Similarly, sellers raise several questions about the buyers:

- ◆ Is the buyer who it claims to be?
- ◆ Should I grant credit to the buyer? What credit terms shall I negotiate with the buyer?
- ◆ Should I engage in this transaction?

Finally, the sellers and buyers would like to ensure that the host of the online market has the required business fundamentals to enable and sustain their trade. The ability to check the credentials and genuineness of transacting parties will foster greater online trust and will be an important driver of e-commerce. The speed of adoption of business-to-business e-commerce depends upon bridging the remotely connected and unknown transacting parties. Some of these issues (such as non-repudiation) are addressed using technology solutions. Without adequately addressing these issues online transaction suffers on account of poor trust. These contribute to the *market participant dimension* of trust.

### **Online Trust – A Framework**

We propose a framework that illustrates how online market places develop trust among the market participants. The proposed framework seeks to address the three dimensions of trust. Figure 2 is an illustration of the framework. We argue that security, privacy, market place & participant issues, dot com brand equity and legal

environment primarily an online market place to foster trust among the participants. The interplay of these factors provides the online market participants a certain degree of trust and promotes friction free market mechanism. However, we show that a set of secondary factors significantly influence these main factors. The secondary factors include technology, credibility assessments and brick & mortar brand equity. We also list a few indicators for the degree of online trust developed by a firm. A larger value of these indicators point to a greater degree to which a firm had fostered trust in the online market place.

Technology choices provide varying degrees of satisfying security and privacy issues. Credibility assessments made by reputed and neutral organisations on various aspects of the online market such as the status of security, privacy, market place issues, and brand equity can substantially improve the confidence of the online consumers. Finally a reputed firm in the brick and mortar world will be in a better position to foster trust in their online operations. We believe that by a choice of these secondary factors, e-market players can develop strategies to build online trust.

### **Technology choices for fostering online trust**

There are a variety of technological solutions available to address many of these concerns. Most of them employ data encryption technologies, digital certificates and digital watermarks to address these issues. Established firms (such as Verisign and GTE) offer these trust services through a hierarchy of services such as providing public key infrastructure, certification agencies and authenticating digital certificates. Technologies such as s-HTTP, and s/mime play a crucial role in net messaging. Recent initiatives by VISA, Master card, Netscape, IBM, Cybercash and Microsoft in several combinations have resulted in developing new technology-based solutions such as Secure Electronic Payment protocol (SEPP), Secure Transaction Technology (STT) and Secure Electronic Transaction (SET)<sup>8</sup>. These new technologies ensure securing online financial transactions and thereby improving online trust.

The role of technology in improving security of online transactions is well understood. However, technology choices exist for addressing online privacy also. Online privacy issues need to be addressed using a combination of self-regulatory practices on the part of online market makers, regulatory framework provided by the government and utilising internet-based technology tools<sup>9</sup>. Technology-based services for guarding online privacy are provided by several leading firms in the IT sector. These tools either anonymise the user during online transactions or create pseudonyms for the user. For instance, research at AT&T led to the development of a concept called crowds<sup>10</sup>. Lucent developed “Lucent Personal Web Assistant” that generates secure, consistent and pseudonymous aliases for web users<sup>11</sup>. Secured Socket Layer (SSL) technology provides the needed security for B2B players to exchange sensitive business information and financial data safely in a web site.

Online market makers could make use of these technology choices in varying degrees to build trust. However, self-regulatory practices such as privacy policies and information disclosure practices play a crucial role in fostering online trust.

## **Credibility Assessments for fostering online trust**

The problem of trust in online transactions gets even more complicated due to the ubiquitous nature of web. Online markets allow large number of buyers and sellers from various parts of the globe without any prior familiarity to each other to engage in business. Many problems related to this could be addressed by putting in place a robust mechanism that will provide some information on the credibility of the market participants through an assessment scheme. The credibility assessments could come from two major sources: neutral third party sources and online customers themselves.

### **Credibility Assessments by neutral third party organisations**

A neutral third party might be in a position to assess the credibility of an online market from several angles. A firm specialising in technology solutions will be able to provide an assessment of the web site, the network and the security architecture, the robustness of security employed for data storage, transport over the net and handling of financial and other transactions.

Similarly, firms specialising on privacy issues could rate the online market for degree of privacy protection and perhaps award a privacy seal. These firms could examine the technology and self-regulatory options exercised by the site in addressing privacy and provide a rating. For instance, the platform for privacy preferences (P3P) project of the world-wide-web consortium (W3C) has developed a harmonised vocabulary that firms could use to enumerate the data elements the site proposes to collect and to explain how each will be used. The vocabulary also allows the site to specify with whom the data will be shared, and whether data will be used in an identifiable manner. An organisation resorting to such self-regulatory practices by adhering to the P3P vocabulary has greater chances of fostering trust and obtaining a better assessment of this aspect of trust.

Non-profit organisations and industry consortiums can provide a privacy seal program on the basis of examining these aspects. For instance, TRUSTe provides a trust seal if the sites adhere to the following requirements:

- Notifying the practices adopted in collecting and using personal information
- Providing a choice to the customers to opt out of the information use options
- Degree of protection offered for information
- Mechanism for correcting inaccuracies of information about consumers
- Periodic review and compliance reviews

### **Word of Mouse**

A crucial aspect in building trust is the role played by customers. In the online book market, the experience of Barnes & Nobles and Amazon seems to suggest that while established firms in the brick & mortar economy could rely on their existing brand equity to migrate customers to their online markets, pure Internet start-ups need other means for building dot com brand equity. Technology options and credibility assessments by neutral third parties could induce the first few customers. However,

building trust eventually depends heavily on the credibility assessments of the early customers.

Online customers transact business on the basis of the commitments and policies laid down by online markets in their web sites. A firm fulfilling these commitments and obligations to the delight of the customers repeatedly is likely to have a positive assessment from these customers. Online customer assessments often travel by word of mouse (or more appropriately by click of mouse) similar to the word of mouth in the brick & mortar economy. Pure Internet start-up companies will have to rely on this credibility assessment in order to improve its brand equity and trust among online customers.

### **Enhancing online trust for B2B - The case of Credibility First**

CRISIL has been in the business of providing rating for financial performance and credit worthiness of firms for several years. Such ratings have to a large extent helped foster trust between transacting parties in the brick & mortar economy. In response to the greater need for such services in the Internet economy, CRISIL propose to launch a host of services (CredibilityFirst.com) that provide credibility assessments for B2B online markets. Being a neutral third party with a brand equity and rich domain expertise Credibility First (CF) promises to play a significant role in fostering online trust in B2B markets.

The proposed services seek to address the trust issues at two levels: E Commerce Opinion Services and E Commerce Ratings. These use a combination of Credit and Performance factors. The proposed methodology uses parameters covering business demographics, operational, financial, business and management. The CF information collection infrastructure backed with proprietary evaluation and rating models and technology infrastructure will deliver timely and quality information.

The opinion services allow firms to establish the business credentials of online market places through a host of pre- qualification services and a Business D Rating? (BDR). BDR would be provided on the basis of the information collected by CF that it considers reliable, on various business and financial aspects of the participant. The ratings would be assigned on a scale of 1 to 6 (BDR1 to BDR6)<sup>12</sup>. On the other hand, CF E-commerce ratings will reflect the ability of the participants to honour business transactions. This would entail measuring the twin issues of "Performance Capability" and "Credit Worthiness" of the participants. The ratings would be assigned on a scale of 1 to 6 (E to E6).

By assessing the worthiness of transacting parties in an online market, CF is likely to increase the confidence of potential buyers and sellers through CF services. This will give the suppliers a quality access to customers across the world. It will also boost the business potential and help leverage the power of Internet. E-commerce ratings will help SSIs and SMEs in generating new business revenues by reaching out to large and qualified buyers and will help them availing better trade terms. This rating could be adopted as de-facto industry standards and will help a company in automating certain aspects of purchasing decisions.

## **Legal environment for E Commerce**

E Commerce market space has raised several complex legal issues related to conducting business. The copy right issue raised in the case of the musical site Nabster has exposed the inadequacy of existing laws in effectively governing E Commerce. Traditionally, legal frameworks are country specific. However, a typical E Commerce transaction can involve business entities cutting across several countries. For instance, consider a firm registered in Edinburgh, Scotland that operates a site on a German server offering mobile telephones to customers in mainland Europe at a discount. What are the legal implications of offering price discount?

A recent study shows that while such discounts are outlawed in Germany, the Scots Law allows such practices. Moreover, as per the existing legal framework, the company will be bound only by Scot Laws<sup>13</sup>. Several experts in the field concur that countries and International bodies such as United Nation's Committee on International Trade and Law (UNCITRAL) and the European Union (EU) have tried to fit cyberspace into four corners of traditional and familiar domestic jurisprudence. Ironically, the EU directive on privacy is markedly different from that of the American position.

These issues underscore the importance of a legal framework in fostering trust. Conflicting views and approaches to solve problems arising out of cross-country trade will create not only confusion in the minds of potential users but also more friction in online markets. However, a sound legal framework contributes more than sorting out such issues. If web sites do not support fair information practices and enforcement mechanisms when addressing users' privacy and other concerns, the legal framework could play a vital role in regulating the industry and restoring confidence in the mind of customers. Such initiatives from the government play a useful role in fostering online trust.

## **Varying requirements of online trust**

The proposed framework for online trust clearly brings out another aspect of online trust. The requirements of online trust vary widely on account of several factors. We particularly identify two dimensions on which these variations take place. The first dimension is the nature of the players in online markets. The other dimension is nature of role played by these.

### **Nature of players in online markets**

Based on our earlier discussions on the market place dimension, we identify three generic markets on the basis of nature of players. These are players with brand equity, industry consortium and independent players. The trust issues vary significantly among the three players. Online markets hosted by existing players with high brand equity present fewer concerns for the participants. At the other extreme, independent markets promoted by a firm that has less than adequate domain expertise and poor brand equity will require considerable efforts to foster online trust. Industry based consortium fall in between the two. A properly designed ownership and governance mechanism will help foster trust.

## **Role in the online market**

Online trust requirements also vary with the online market structure. Three emerging market structures exist in online markets<sup>14</sup>. Some markets primarily cater to information requirements of buyers and sellers of products/services. These are often referred to as portals or infomediaries. Some others perform a variety of market making activities such as aggregating catalogues, mounting exchanges, facilitating auctions, organising business communities and procurement. These market makers could perform a limited role of enabling transactions by bringing together a large number of buyers or sellers or both to a virtual market place. On the other hand, these market makers could also offer a host of other services towards order fulfilment. These market makers are referred to as Metamediaries<sup>15</sup>.

Meta-mediaries could involve several groups of entities. These could for instance include logistic partners, escrow services, and insurance. In the limited market makers, the situation is less complex and so are the trust concerns. In contrast, infomediaries is less complex. The buyers of services need to evaluate the portal for trustworthiness. However, since the nature of the product/service offered is informational, trust issues may heavily hinge on the reputation of the portal<sup>16</sup>.

Trust requirements expectedly vary on these two dimensions. Figure 3 portrays the situation when both the dimensions are superimposed. Simple market structures such as infomediaries promoted by market places that have brand backup have fewer requirements of trust. However, as one travel either horizontally or vertically across the matrix, trust concerns become severe (shown by arrows in the figure). This is further substantiated by a few examples shown in the figure.

## **Conclusions**

Online trust will be a significant driver in the growth of B2B E-commerce. Although this is well known, what is not clear is the notion of online trust. Online trust has three major dimensions and fostering online trust requires a host of services. Our framework of online trust has clearly brought out these aspects. The varying requirement of trust and the criticality of online trust is likely to open up several opportunities for existing businesses in the area of credibility rating to cater to this requirement. The recent initiatives of CRISIL and the decision to play an important role in this process through Credibility First is definitely an indication of a bright future to B2B E-commerce in India.

**Table 1. Issues hampering online trust**

| <b>Issue</b>  | <b>Trust aspects in online markets</b>  |
|---|---|
| <i>Eavesdropping</i>  | Information remains intact, but its privacy is compromised. For example, someone could get to know your credit card number, intercept classified information or record a sensitive conversation.  |
| <i>Tampering</i>  | Information in transit is altered/replaced and then sent to the recipient. For example, someone could alter an order for goods or change a person's resume.   |
| <i>Impersonation</i><br><br><i>Spoofing</i><br><br><i>Misrepresentation</i> | Information passes to a person who poses as the intended recipient. Impersonation can take two forms:<br><br>Pretending to be someone else. For example, a person can pretend to have the email address jdoe@raja.com, or a web site can identify itself as www.raja.com when it is not.<br><br>A person/organization can misrepresent itself. For example, a site www.raja.com can pretend to be a camera store when it is a site that takes credit-card payments but never sends any goods. |

**Table 2. Nature of proof provided by non-repudiation of online transactions**

| <b>Type of service</b> | <b>Nature of non-repudiation provided</b>  |
|------------------------|--|
| Approval               | Proof of who is responsible for approval of the content of a message   |
| Sending                | Proof of who sent a message  |
| Origin                 | Is a combination of approval and sending services  |
| Submission             | Proof that a delivery authority has accepted a message for transmission  |
| Transport              | Proof for the message originator that a delivery authority has given the message to the intended recipient                                   |
| Receipt                | Proof that the recipient indeed received a message   |
| Knowledge              | Proof that the recipient recognised the content of a received message  |
| Delivery               | Is a combination of receipt and knowledge services as it provides proof that the recipient received and recognised the content of a message. |

**Table 3. Corporate Governance trust issues in Industry based consortia**

| <b>Criterion</b>      | <b>Issues for Consideration</b>   |
|-----------------------|---|
| Governance Mechanisms | Board of Directors <ul style="list-style-type: none"> <li>• Size</li> <li>• Composition</li> <li>• Control</li> </ul> Shifting the control away from founders<br>Rules of engagement and conduct<br>Arbitration and dispute resolution mechanisms |
| Ownership Pattern     | Equity stake of founders<br>Founders transaction commitment<br>Nature of outside parties & their equity stake<br>Management's equity stake and incentives   |
| Operations            | Recruitment of neutral management team<br>Autonomy of management team<br>Participation of non-owners<br>Revenue streams<br>Pricing model<br>Technology platform<br>Scope of offering  |

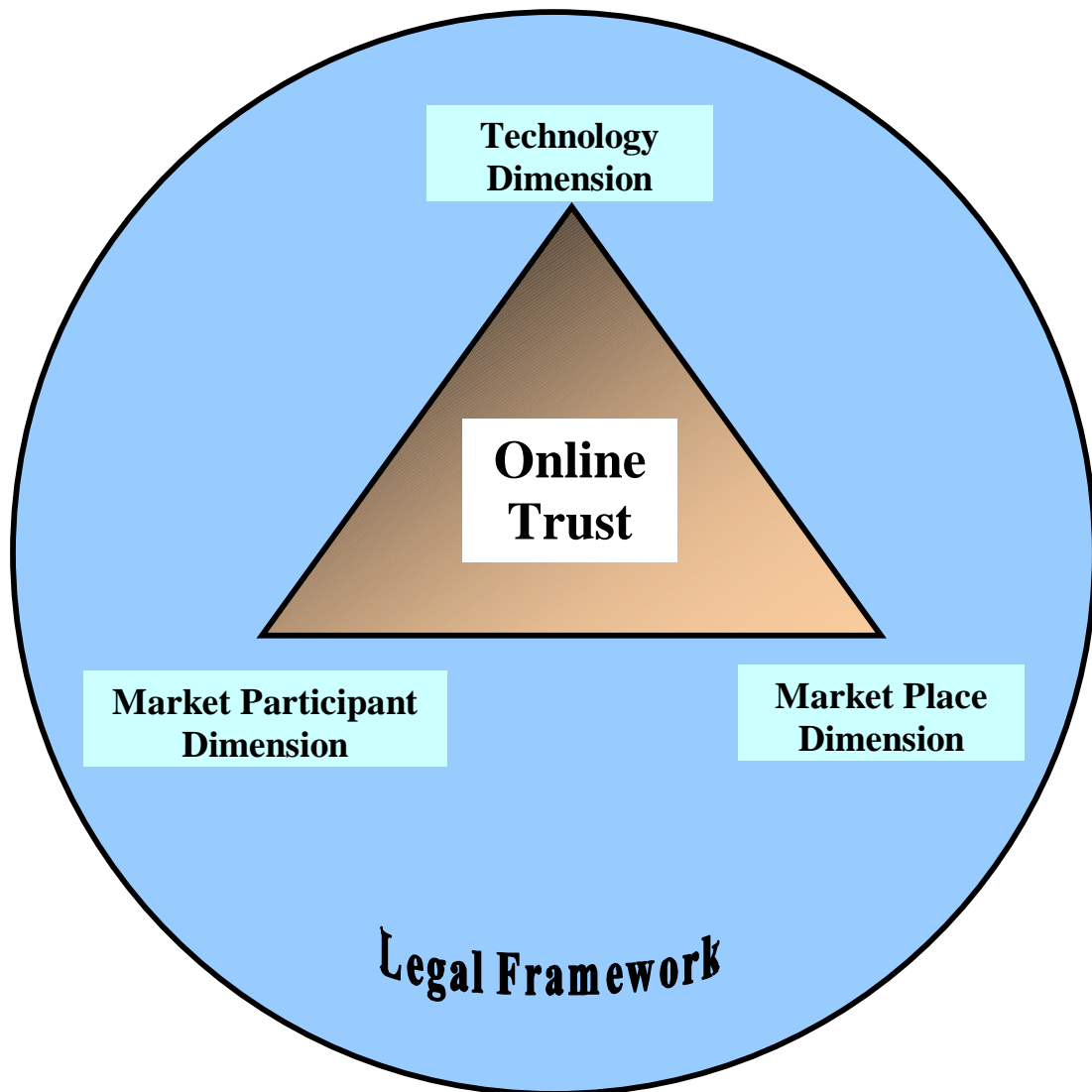
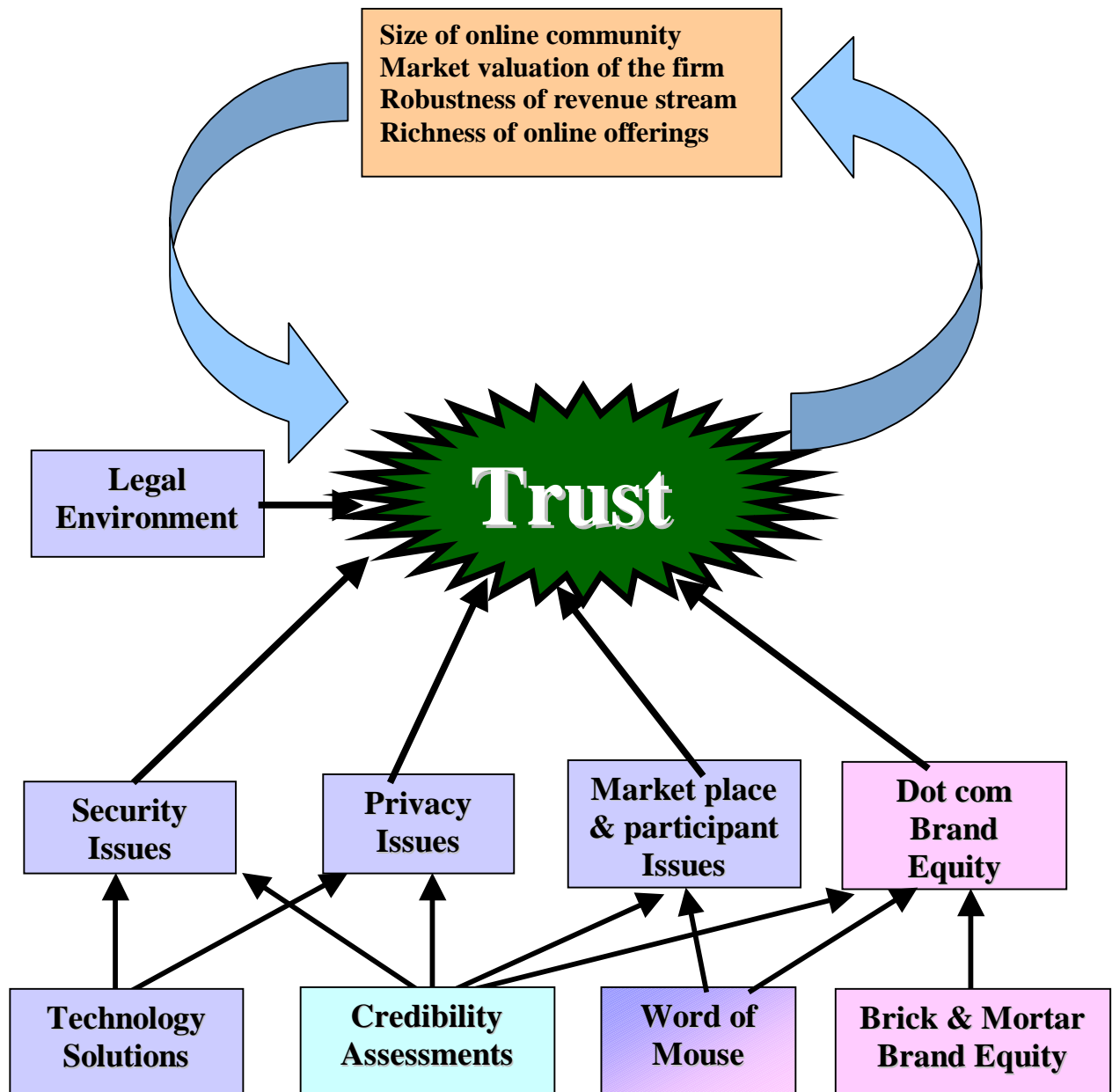
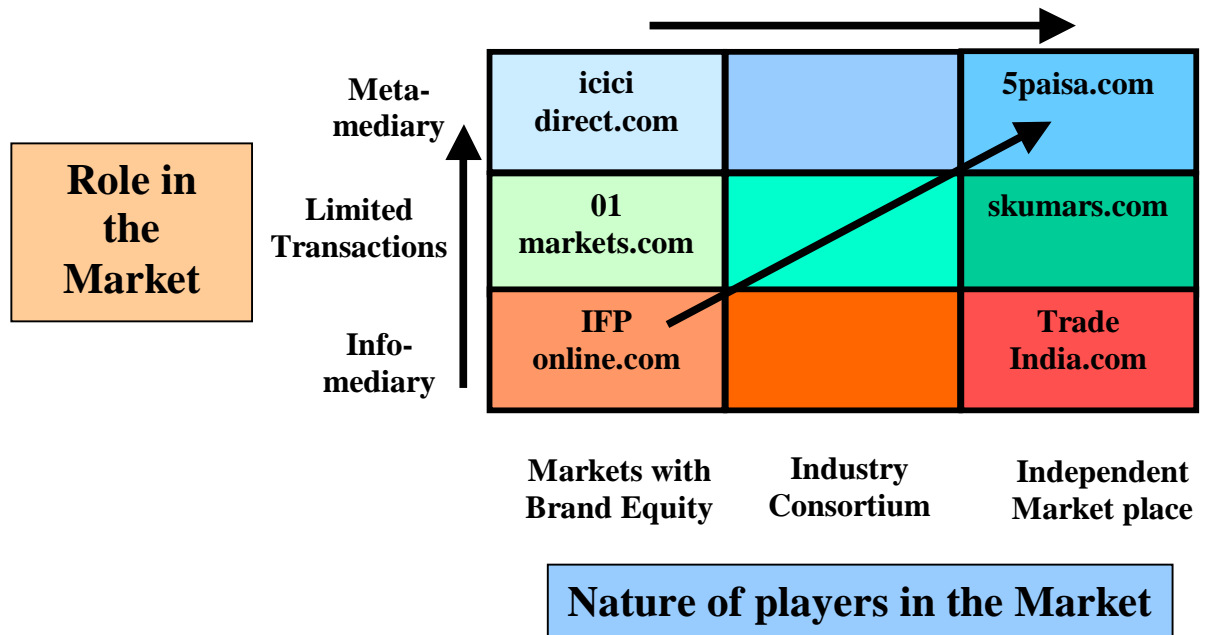


Figure 1. Dimensions of online trust



**Figure 2. Building online trust – A framework**



**Figure 3. Varying requirements of online trust**

*\* The direction of arrow indicates increasing importance of online trust*

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- <sup>1</sup> In this paper we use the terms “virtual market place”, “online market”, “E Commerce market” and “e-market” interchangeably. They all represent the same idea, i.e. buyers and sellers conducting their business transactions either fully or in part using the Internet infrastructure.
- <sup>2</sup> A little net privacy, please. Business Week, March 16, 1998.
- <sup>3</sup> For details see the white paper by GeoTrust, “Build online trust: Critical infrastructure to foster Business-to-Business confidence” at <http://www.geotrust.com>
- <sup>4</sup> Chidi, Jr., G.A. “TRUSTe admits to violating its own privacy policy”, ITWorld.com, August 2000.
- <sup>5</sup> We use the term online trust to denote various issues related to trust in transacting in an E Commerce market place. As we have discussed in the later part of the paper, the scope of this definition and its meaning will depend on the nature of the E Commerce market.
- <sup>6</sup> For more detail see, “Privacy online: a report to US Congress”, by the Federal Trade Commission. June 1998. The full report and other reports such as the study on Child online privacy protection is available on their web site at: <http://www.ftc.gov/privacy/index.html>
- <sup>7</sup> Chesher, M. and Kurua, R. (1998), “Electronic Commerce and Business Communications”, Springer.
- <sup>8</sup> For a rudimentary treatment of these issues see, Chesher, M. and Kaura, R., op. cit. Chapter 13 and Chapters 10 and 13 of Amor, D., (2000), “The E-business (R)evolution, Hewlett-Packard Professional Books. For a technical introduction to security issues in network see <http://www.interhack.net/pubs/network-security/>
- <sup>9</sup> An overall framework for addressing privacy issues in Internet is available in Cranor, L.F. (1999), “Internet Privacy”, Communications of the ACM, Vol. 42 (2), 39 – 31. The ACM issue also carries a series of articles pertaining to Internet Privacy. For a wealth of online resources and useful links related to online privacy visit <http://www.onion-router.net/>
- <sup>10</sup> The code for crowds is supported and freely available to citizens of the U.S. and Canada from <http://www.research.att.com/projects/crowds>.
- <sup>11</sup> Gabber, E., Gibbons, P.B., and Kristol, D.M. (1999), “Consistent yet anonymous web access with LPWA”, Communications of the ACM, Vol. 42 (2), 42 – 47.
- <sup>12</sup> We do not propose to elaborate on the logic and mechanism used to compute the BDR score in this writing. For more details please get in touch with the second author.
- <sup>13</sup> Murray, A.D., Vick, D.W., and Wortley, S. (1999), “Regulating E Commerce: Formal transactions in the digital age”, International review of Law, Computers & Technology, Vol. 13 (2), 127 0 145.
- <sup>14</sup> For an alternative description of the emerging market structure please see “Mahadevan (2000), Business Models for Internet based E Commerce: An anatomy, California Management Review, Vol. 42, No. 4, (Summer 2000), pp 55-69”.
- <sup>15</sup> The term Meta-mediary was introduced and elaborated by Bear Stearns, a US based consulting firm. An excellent treatment of the term meta-mediary could be found at the research report “ Ehrens, S. and Zapf, P. (1999), The Internet Business-to-Business report”, at their web site [www.bearstearns.com](http://www.bearstearns.com).
- <sup>16</sup> This requirement stems from the fact that the information is an experience good. The quality of information is not known until the information is fully revealed. For a rigorous treatment of this issue, see Rose, F. (1999), “The economics, concept, and design of information infomediaries: A theoretic approach”, Physica-Verlag.