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# Information Assurance in B2C e-Commerce Transactions: A Process-Oriented Framework and Empirical Analysis of Websites using Semantic Networks

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## Abstract

*What aspects of information assurance can be identified in Business-to-Consumer (B-to-C) online transactions? The purpose of this research is to build a theoretical framework for studying information assurance based on a detailed analysis of academic literature for online exchanges in B-to-C electronic commerce. Further, a semantic network content analysis is conducted to analyze the representations of information assurance in B-to-C electronic commerce in the real online market place (transaction Web sites of selected Fortune 500 firms). The results show that the transaction websites focus on some perspectives and not on others. For example, we see an emphasis on the importance of technological and consumer behavioral elements of information assurance such as issues of online security and privacy. Further corporate practitioners place most emphasis on transaction-related information assurance issues. Interestingly, the product and institutional dimension of information assurance in online transaction websites are only minimally present.*

## Key words

Multi-dimensional information assurance framework, online exchange, Business-to-Consumer E-commerce, semantic network analysis

## Introduction

Consumer fraud on the Internet is slowly mounting, resulting in appreciable monetary losses, and growing distrust of e-commerce websites. This is primarily because of weaknesses of security, privacy, and business integrity (for instance) in online commerce, which could have a considerable detrimental impact on e-commerce (Kim et al. 2004). Several unfavorable effects have been documented by a Yankelovich information assurance study carried out along with the American Institute of

Certified Public Accountants (AICPA). Key findings of that study were that consumers were worried about online security; they were not sure if there was a genuine business behind the Web site they were interacting with; they didn't know "if and when" they would receive the merchandise or services they ordered; they didn't like the traceability of transactions on the Internet (many want a high degree of privacy related to their personal information and transactions); and they were worried that they might become victims of electronic fraud.

Consumer WebWatch took a look at the credibility of information and e-commerce sites. The report<sup>1</sup> revealed that only 29 percent (of 1500 respondents) say they trust Web sites that sell products and services, a far lower figure than for traditional, offline institutions; and 95 percent say that it is very important that sites disclose how they protect consumer information (e.g., credit card number). The recent report<sup>2</sup> found that concern about identity theft is substantial, and is changing consumer behavior in major ways. Eighty percent of Web users in the United States of age 18 and over are at least somewhat concerned someone could steal their identity from personal information stored or transmitted on the Internet.

This lack of trust is worrisome since trust is the key to online e-commerce (Ba et al. 1999; Beatty et al. 1996; Chang et al. 2005; Cheung et al. 2006; Hoffman et al. 1999; Jarvenpaa et al. 2000; Kim et al. 2006; Kim et al. 2005; Lim et al. 2006; Pavlou et al. 2004). The institutional view of trust has been widely studied by e-commerce researchers (Kim et al. 2004; McKnight et al. 2002; Pavlou 2002; Pennington et al. 2003; Tan et al. 2001). As one of the institutional efforts to alleviate consumer concerns, a variety of information assurance services on websites (e.g., trust-assuring arguments, trusted third party seals, etc) have entered the online commerce arena to help consumers judge the trustworthiness of an online vendor.

Information Assurance (IA) issues fall into three distinct categories of issues: Security, Privacy, and Business Integrity (Kim et al. 2004; Sivasailam et al. 2002). Information Security on the Internet pertains to the safeguarding of proprietary/personal data from unauthorized/inadvertent access/disclosure. Though there are various advancements in security technologies, the specter of Websites being compromised because of lax security procedures is very common. Companies need to employ encryption during data transmission, and need consumer data to be stored in secure environments, which are free from external/internal tampering. In the online arena, the core principles of privacy include: disclosure of information collection, and dissemination practices; providing the consumer with a choice with respect to how his or her information may be used; measures to protect the integrity of personal information and preclude their unauthorized disclosure, and protecting children – compliance with governmental laws such as Children's Online Privacy and Protection Act (COPPA). Businesses are expected to disclose their information privacy practices prominently on their sites including the specific types of data that are collected both actively and passively; how that information may be used; possible third-party dissemination; how individuals may restrict the usage of their information and correct any factual errors in the same; usage of cookies or other electronic technologies that could either identify them personally or otherwise; contact information to resolve questions/concerns about the privacy policies; how grievances may be redressed, and possible third-party roles. Physical, electronic, and managerial measures should be instituted to guard against inadvertent disclosures, and guard the integrity and confidentiality of consumer data. Assurance programs that attest the business integrity of firms often follow the below-mentioned guidelines as a minimum: Upfront disclosure and forthrightness about various business policies, such as refunds, returns, exchanges, etc. and information about the business and its products and services; adoption of practices which aim to preserve the integrity of customer data, provide the customer with choices concerning how the data may or may not be used, and prevent the data from falling in to the wrong hands by way of physical, electronic, and managerial measures; customer satisfaction - the merchant should aim to be prompt with resolving queries; redressal of grievances in a timely and responsible manner.

This poses the question – what are the critical aspects of information assurance implementation in the e-commerce environment and which of those are implemented in on-line transaction websites for consumer use? The answers to the question can then form the basis for evaluation of e-commerce websites for the presence of assurance services. The overall objectives of this study are (a) to identify a multi-dimensional framework with which we can understand the complex and dynamic phenomena of information assurance in online exchange, (b) to apply semantic network analysis to online transactions through a study of Fortune 500 web-sites and evaluate the results in light of the framework developed in a).

## Background

In order to study the phenomenon of information assurance in the Internet environment, we develop a theoretical framework based on several concepts discussed in the academic literature. One of the critical aspects of such a framework is the

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<sup>1</sup> <http://www.consumerwebwatch.org/dynamic/press-release-trust-in-ecom.cfm>

<sup>2</sup> <http://www.consumerwebwatch.org/dynamic/press-release-princeton.cfm>

technology dimension, namely the *technology layer* of B-to-C services and applications. Another critical aspect would include the *process stages* that represent the essential steps that a consumer goes through to complete an online transaction.

The *technology layer* (Shaw 1999) captures and portrays the IT infrastructure of e-commerce in a layered architecture, namely 1) the e-commerce technology infrastructure (implemented in both hardware and software), 2) the e-commerce services, and 3) the e-commerce business applications. The *process stages* of our framework essentially capture the three generic stages of information assurance-formulation models in on-line exchanges (Urban et al. 2000). The *web site/information* stage is concerned with the information content of a specific website. In this stage, a customer is concerned especially with such properties of websites as accuracy, up-to-datedness, completeness, unbiasedness, competitiveness, and credibility. A customer is assured of the authenticity of a web site when the information conveyed on the site presents such qualities. The *product* stage relates to specific aspects regarding the product/service that a customer intends to purchase. In this stage, a customer is concerned about the properties of the particular product/service portrayed in the web site. The properties include durability, reliability, brand equity, transience, competitiveness, and availability. The third stage, *transaction* stage, is concerned about how the delivery will be fulfilled and how the after-sales services will be provided. This stage is involved with factors such as pricing and payment options, financial planning (complexity), sales-related service (refund policy, after-sales, etc.), promotions, and delivery fulfillment. These three stages form a linear process that a customer must go through to complete a transaction.

Besides the process stages and technology layer, there are two more aspects that affect overall transaction process. The first is the *consumer-behavioral* aspect, which deals with buyer involvement in the information assurance assessment process. This includes such elements as buyers' demographic factors, experience, technology familiarity, importance of privacy, risk tendency, and subjective assessment of trustworthiness of the website based on personality and past transaction history. The second is the *institutional* aspect. This deals with (i) legal environments of on-line exchanges which forms an assurance environment independent of the subjective level of customer trust, (ii) guarantors (i.e., banks, credit companies, financial institutions) which guarantees the completion of the transaction in financial terms, and (iii) advisors and trust brokers (credit bureau and industry specific advisors such as TruckTown.com) which accredits, authenticates, and approves a particular website. In this research, we are not concerned with legal environment as it is rather dependent on specific types of on-line exchanges.

The combination of the two scales – the technology layers and the process stages – along with two independent aspects, consumer- behavioral and institutional aspects, provide a powerful way of thinking of the information assurance building mechanism, which involves the complex nature of on-line exchanges. From this perspective, we view information assurance building as a process composed of several aspects, each of which must be taken into account to complete a transaction successfully.

## Semantic Network Content Analysis

Since the level of assurance itself can be very difficult to observe and measure (Gulati 1995; Jarvenpaa et al. 1997), it is not an easy task empirically to identify the multiple-aspects of information assurance in B-to-C online exchange. Therefore, we utilize semantic network content analysis within a set of texts determine the presence of different aspects that describe or represent assurance in B-to-C electronic commerce.

A semantic network is a network of interconnected concepts (Sowa 1984; Sowa 1991). Similar to network analysis, semantic network analysis is a research method measuring the importance of both terms and their associations (Doerfel et al. 1999). Semantic network analysis focuses on the structure of a system based on shared meaning rather than on links. In other words, two nodes are connected in a semantic network to the extent that their use of concepts overlap (Doerfel et al. 1999).

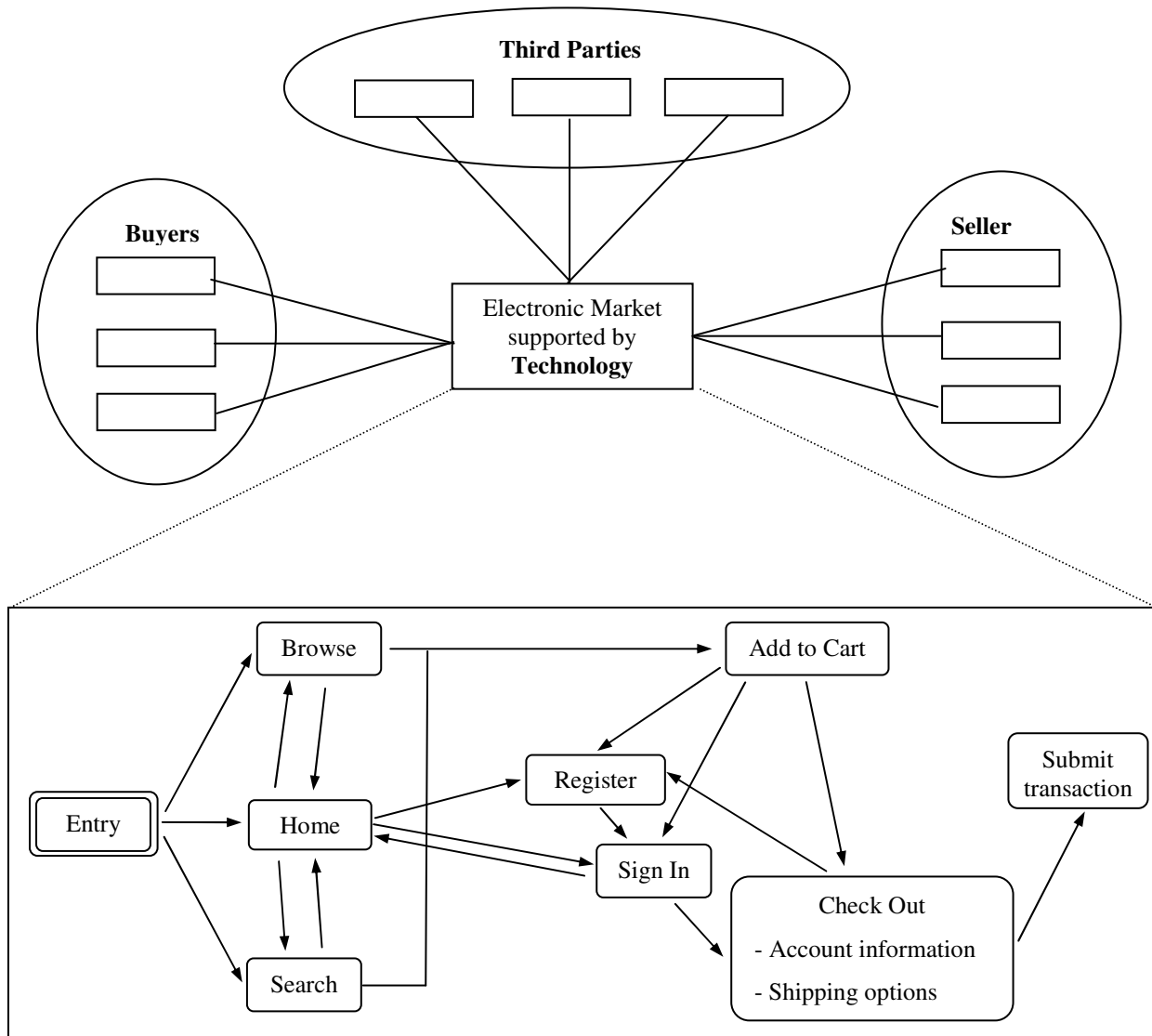
The first step in semantic network analysis requires a content analysis of textual data to determine the most frequently used symbols or words. In this study, CATPAC, a computer-based content analysis software, is employed for the analysis of text. CATPAC is a self-organizing artificial neural network computer program that has been optimized for analyzing text such as open-ended survey responses, news stories, speeches and contents of papers (Computing 1994). This program is able to identify the most frequently occurring words (assume that they are the most important words) in a text and determines the patterns of similarity based on their co-occurrence (Woelfel 1990). The program reads through the text, identifies when specific words occur together, and performs a clustering of words based on the degree of sharing attributes which occur in the cases. Thus, there is no need for preconceived categories and tests of intercoder reliability (Doerfel et al. 1999).

To empirically identify the dimensions of information assurance in electronic commerce, a semantic network content analysis was conducted for its representations in the real online market place (B-to-C internet web sites). This represents the practical

view in the implementations regarding issues of assurance with respect to how practitioners perceive it and what elements they value.

In order to identify the formation of assurance in B-to-C online exchanges it is necessary to understand B-to-C electronic commerce market structure, its' entities and actual buyers' behavior process for online transaction in retail web sites. Based on Shaw's electronic market structure (Shaw 1999) and the discussion in Section 2, we can simplify the online exchange process as an interaction of four different entities; buyers, sellers, third parties, and technology. As shown in Figure 1, buyers, sellers, and third parties can connect through electronic markets supported by information technology. In this structure, sellers could be online retailers, intermediaries or suppliers. Third parties are impartial organizations delivering business confidence, through commercial and technical security features, to an electronic transaction (Lekkas et al. 1999).

The online transactions for electronic commerce includes services provided by many trusted third parties such as banks, credit card authorization organizations, consumer online privacy institutions, and consumer confidence program groups. One of the examples of third parties involved in the trust of online transactions is TRUSTe, a non-profit, privacy seal program. The TRUSTe trustmark on web sites informs buyers that they've openly agreed to disclose their information gathering and dissemination practices, and that their disclosure is backed by credible third-party assurance (Benassi 1999).



**Figure 1: B-to-C E-Market Structure and buyer's process model in online transactions**

In this model we assume that buyers go through seven functions: they enter the online store at either of three states: *Home*, *Browse*, and *Search*. After entering site, buyers browse product information by following links to, for example, 'today's special' or 'promotions of the week'. Or they search products they looking for using various search criteria including

keywords, title, and product descriptions. After finding and selecting product items, buyers can add the items into the virtual cart by clicking *Add to Cart* button. Then the sites ask consumers to *sign in* if they have an account. If they don't have, they can *register* as a new customer of the store. At the registration stage, customers provide a user name and password including personal information such as name, mailing address, e-mail address, date of birth, and so on. In the process of checking out, they enter and review their account information including shipping address, shipping options and payment options. Finally, customers click the submit button on the final stage of *check out*, they can get a confirmation message or confirmatory e-mail regarding this transaction from the online store.

We also posit, as explained above, that information assurance is enhanced through the interaction of the four different entities in online transactions: buyers, sellers, third parties and technology. The B-to-C online web stores implemented by sellers provide buyers at least three types of information, including site related, product related, and transaction related information, among which assurance is embedded in particular in the transaction related information.

## Data Collection

For the collection of real representations of information assurance for online exchange transaction, we gathered website contents of transaction related information from corporate web sites following the buyer's process model in Figure 1. We went through all seven functions and services of the consumer behavior model and collected such transaction related content from firm web sites. We assumed that the information was related to B2C IA issues because these were the web pages that were seen by consumers that moved beyond the eye-balling stage to actually placing the transaction and paying for it; we further assumed that unless consumers had some level of assurance regarding the sites to some degree they would not carry out the transaction. On analyzing the contents collected, it was seen that they included explicit descriptions of privacy, security, trusted partners, guarantee, customer protection plan, return policy, secure shopping statements, forms of payment, legal notices, credit options, frequently asked questions, and so on. For the data collection, 101 firms out of Fortune 500 corporations were initially selected. The selected firms represent five categories, including apparel, computers office equipment, general merchandisers, retail and specialty retailers. These firms were chosen because they are considered to be more related to B-to-C commerce than most other categories in the Fortune 500 list. After we eliminated 35 corporations that did **not** provide online sales functions or were not relevant to B-to-C e-business, the final data set contained 66 firms. Table 1 summarizes these firms.

**Table 1: Company List from Fortune 500**

Industry	Company Name	Web URL
Apparel	Liz Claiborne Nike Phillips-Van Heusen Polo Ralph Lauren Jones Apparel Group Russell Corporation	www.lizclaiborne.com www.nike.com www.pvh.com www.polo.com www.jny.com www.russellcorp.com
Computers, Office Equipment	Dell Computer Gateway Hewlett-Packard Western Digital Apple Computer Intl. Business Machines Sun Microsystems Compaq Computer Xerox	www.dell.com www.gateway.com www.hp.com www.westerndigital.com www.apple.com www.ibm.com www.sun.com www.compaq.com www.xerox.com
General Merchandisers	Dillard's Nordstrom Belk Saks	www.dillards.com www.store.nordstrom.com www.belk.com www.saksfifthavenue.com
Retail	Costco Wholesale Federated Department Stores Kmart Marks & Spencer May Department Stores	www.costco.com www.federated-fds.com www.bluelight.com www.marksandspencer.com www.maycompany.com

	Home Depot J.C. Penney Target Wal-Mart Stores Sears Roebuck	www.homedepot.com www.jcpenny.com www.target.com www.walmart.com www.sears.com
Specialty Retailers	CSK Auto Footstar Gap Jo Ann Stores Lands' End Linens'n Things Men's Wearhouse Michaels Stores Office Depot OfficeMax Pier 1 Imports Radio Shack Trans World Entertainment Venator AnnTaylor Stores PC Connection AutoZone Best Buy Lowe's Payless Shoesource PetsMart Service Merchandise Sports Authority Staples Systemax The Neiman Marcus Group Tiffany & Co Toys 'R' Us Williams-Sonoma Zale Circuit City Stores, Inc. Abercrombie & Fitch Amazon.Com Barnes & Noble Bed Bath & Beyond Borders Group Burlington Coat Factory	www.cskauto.com www.footstar.com www.gap.com www.joann.com www.landsend.com www.lnthings.com www.menswearhouse.com www.michaels.com www.officedepot.com www.officemax.com www.pier1.com www.radioshack.com www.twec.com www.footlocker.com www.anntaylor.com www.pcconnection.com www.autozone.com www.bestbuy.com www.lowes.com www.payless.com www.petsmart.com www.servicemerchandise.com www.thesportsauthority.com www.staples.com www.systemax.com www.neimanmarcus.com www.tiffany.com help.toysrus.com www.williams-sonoma.com www.zales.com www.circuitcity.com www.abercrombie.com www.amazon.com www.barnesnoble.com www.bedbathandbeyond.com www.bordersgroupinc.com www.burlingtoncoat.com

Out of the data sample, thirty web sites displayed at least one third-party trustmark such as TRUSTe, Verisign, BizRate, or BBBOnline on their web sites to inform visitors of the security practices conducted at the site. The average number of steps (procedure) required to complete a transaction is 4.18 steps. We counted each page before clicking the 'continue' button as one step; we considered all the pages after 'Add to Cart' function in the buyer process model. About half (32) of the corporation web sites asked buyers to register when they placed an online order. The average number of items of private information required, when registration is compulsory, is 6.29. The common fields required to fill out include name, addresses, day and night phone numbers, e-mail addresses.

## Results and Discussion

Table 2 presents the results of CATPAC, performed on transaction-related website contents for 66 Fortune 500 firms. It shows that this analysis contained a total of 65,097 words and lists 100 most frequently mentioned words in the contents. The

most frequently appeared word was *information* which occurred 5,039 times or in 7.7% of 100 top-listed words appeared in the website contents.

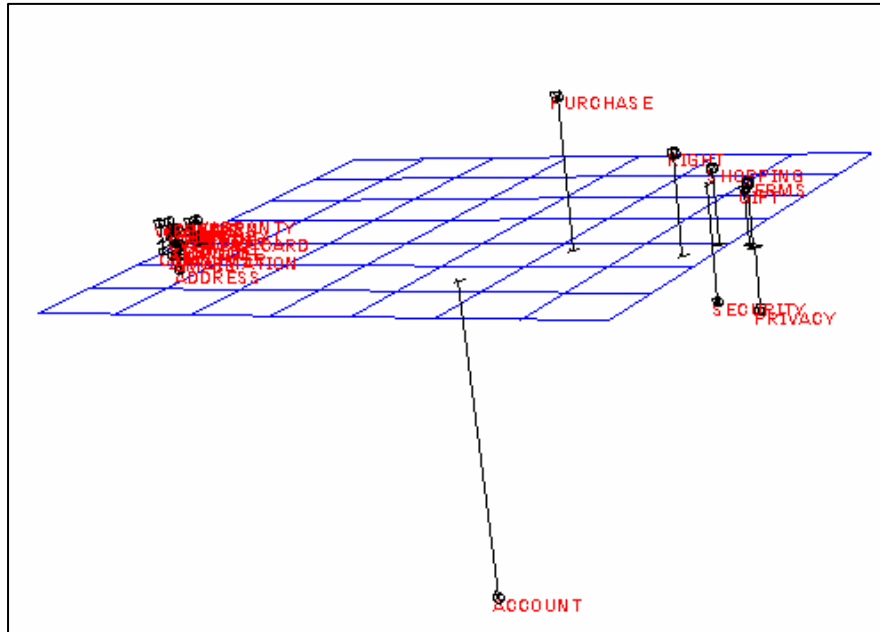
**Table 2: Frequency of Words in the Dataset from 66 Corporations Websites**

TOTAL WORDS	65097	THRESHOLD	0.000
TOTAL UNIQUE WORDS	100	RESTORING FORCE	0.100
TOTAL EPISODES	65091	CYCLES	1
TOTAL LINES	82080	FUNCTION	Sigmoid (-1 - +1)
		CLAMPING	Yes
DESCENDING FREQUENCY LIST			
		ALPHABETICALLY SORTED LIST	
		CASE CASE	CASE CASE
WORD	FREQ PCNT	FREQ PCNT	WORD FREQ PCNT FREQ PCNT
-----	-----	-----	-----
INFORMATION	5039 7.7	22797 35.0	PAYMENT 391 0.6 2208 3.4
WEBSITE	3676 5.6	17391 26.7	EXPRESS 385 0.6 2461 3.8
SERVICE	2482 3.8	12947 19.9	COLLECT 381 0.6 2411 3.7
SHIPPING	2231 3.4	10359 15.9	PHONE 381 0.6 2349 3.6
PRODUCT	1958 3.0	9914 15.2	COPYRIGHT 375 0.6 2186 3.4
CONSUMER	1748 2.7	9795 15.0	SYSTEM 373 0.6 1881 2.9
ITEM	1551 2.4	7563 11.6	LIMITED 371 0.6 2285 3.5
STORE	1421 2.2	7419 11.4	SELECT 368 0.6 2102 3.2
EMAIL	1262 1.9	6983 10.7	SUBJECT 363 0.6 2372 3.6
RETURN	1248 1.9	5894 9.1	PASSWORD 358 0.5 1645 2.5
ADDRESS	1205 1.9	6565 10.1	CART 355 0.5 1955 3.0
ONLINE	1130 1.7	7015 10.8	BROWSER 344 0.5 1908 2.9
SECURITY	1118 1.7	6031 9.3	CHARGES 343 0.5 2137 3.3
CREDIT-CARD	1082 1.7	6000 9.2	REQUEST 337 0.5 2137 3.3
TERMS	989 1.5	5261 8.1	SALES 334 0.5 1979 3.0
PERSONAL	988 1.5	5891 9.1	MATERIALS 329 0.5 1894 2.9
WEB	953 1.5	5547 8.5	THIRDPARTY 320 0.5 1966 3.0
WARRANTY	920 1.4	4059 6.2	STANDARD 311 0.5 1970 3.0
PRIVACY	880 1.4	5025 7.7	NOTICE 308 0.5 1930 3.0
RIGHT	833 1.3	4905 7.5	SPECIAL 307 0.5 1998 3.1
GIFT	831 1.3	3356 5.2	CHOOSE 304 0.5 1963 3.0
SHOPPING	824 1.3	4753 7.3	ACCEPT 303 0.5 1924 3.0
CONTACT	813 1.2	5226 8.0	PROCESS 300 0.5 1901 2.9
PURCHASE	736 1.1	4632 7.1	LAW 299 0.5 1829 2.8
ACCOUNT	731 1.1	4157 6.4	VISIT 296 0.5 1954 3.0
CLICK	714 1.1	4091 6.3	FREE 294 0.5 1909 2.9
INCLUDING	649 1.0	4276 6.6	COMPUTER 291 0.4 1887 2.9
ORDERS	640 1.0	3673 5.6	DAMAGES 290 0.4 1493 2.3
NAME	630 1.0	3673 5.6	PART 289 0.4 1647 2.5
BUSINESS	603 0.9	3238 5.0	STATEMENT 287 0.4 1823 2.8
CONTENT	595 0.9	2812 4.3	MAIL 278 0.4 1778 2.7
COOKIES	590 0.9	2846 4.4	LIST 277 0.4 1684 2.6
AVAILABLE	583 0.9	3737 5.7	PLACE 274 0.4 1807 2.8
INTERNET	579 0.9	3406 5.2	FORM 273 0.4 1701 2.6
DELIVERY	576 0.9	3003 4.6	TAX 273 0.4 1514 2.3
RECEIVE	553 0.8	3457 5.3	GUARANTEE 271 0.4 1528 2.3
HELP	546 0.8	3425 5.3	CHECKOUT 268 0.4 1542 2.4
PRIVACYPOLICY	546 0.8	3424 5.3	SHOP 267 0.4 1676 2.6
CONDITIONS	521 0.8	3041 4.7	ORIGINAL 266 0.4 1620 2.5
CREDIT	491 0.8	2961 4.5	CODE 265 0.4 1367 2.1
ACCESS	485 0.7	3114 4.8	LIABILITY 263 0.4 1476 2.3
USER	480 0.7	2896 4.4	SITES 263 0.4 1378 2.1
MERCHANDISE	466 0.7	2609 4.0	WWW 262 0.4 1282 2.0
QUESTIONS	459 0.7	2926 4.5	PARTIES 258 0.4 1550 2.4
PRICE	450 0.7	2433 3.7	RESPONSIBLE 250 0.4 1671 2.6
CARD	433 0.7	2084 3.2	PURCHASES 248 0.4 1603 2.5
POLICY	418 0.6	2413 3.7	REQUIRED 248 0.4 1682 2.6
SOFTWARE	409 0.6	2266 3.5	ABOVE 247 0.4 1624 2.5
AGREEMENT	406 0.6	1898 2.9	TRANSACTION 246 0.4 1488 2.3
CHECK	397 0.6	2286 3.5	REGISTER 245 0.4 1608 2.5



Other frequently occurring words include *website* (5.6%), *service* (3.8%), *shipping* (3.4%), *product* (3%), *consumer* (2.7%), *item* (2.4%), *store* (2.2%), *email* (1.9%), and *return* (1.9%). Figure 2 presents again a three-dimensional picture of the results of the multi-dimensional scaling of the co-occurrence matrix.

**Figure 2: Cognitive Map of Top 25 Most Frequent Words from the Websites**



The preliminary test results from the clustering analysis indicate that the data showed a bi-modal cognitive mapping. (i) The first cluster occurs around the words like *security*, *online*, *internet*, *service*, *product*, and *consumer*. From this list of words, we can infer that corporate practitioners link the issues of information assurance with consumer security in product and service provided through websites. These fit the consumer behavioral dimension, defined in the previous section. This dimension is also connected to a weak cluster, which include words, *return*, *contact*, *questions* and *warranty*. Thus, from this we can infer that corporate practitioners emphasize convenience and security aspects of the online transactions that they offer. (ii) The second cluster, which is by far the most extensive and exhaustive, is related to actual online transactions. Words like *terms*, *change*, *shipping*, *cookies*, *copyright*, *gifts*, and *price* are included in the list. This list is linked with again a weak cluster, which encompasses the terms like *special*, *merchandise*, *credit*, *payment*, and *standard*. These are all related to the transaction dimension of IA. Therefore, we can infer from this finding that corporate practitioners value transaction - related elements of assurance building as highly important.

The results of cluster analysis in the form of a dendrogram are summarized in Appendix A, representing the relationships between the most commonly occurring concepts. This dendrogram, estimated in Ward's method, provides a visual expression of the cognitive clustering of concepts in the website contents. The multidimensional scaling result also confirms the finding. The graph shows a very densely populated cluster, within which words *service*, *warranty*, *shopping*, *product*, *credit-card*, *return*, *online*, etc. appeared. These words represent the transaction dimension of IA in online exchange. The high density indicates that transaction aspect is very well represented in the websites. On the other hand, words like *security*, *privacy*, *shipping*, and *purchase* form a very loosely coupled group, reflecting the consumer-behavioral aspect of information assurance.

## Discussion and Conclusion

### Discussion

The perspective in the content analysis portrays the elements of practitioners' perceptions on IA in websites. First we see an emphasis on the importance of consumer-behavioral elements such as issues of online security and privacy. Corporate

practitioners are well aware of the importance of this security and privacy issues as important elements of information assurance mechanisms in online transactions. Further corporate practitioners place most emphasis on transaction-related issues. This is probably partly because of the fact that the institutional aspect is put into practice in actual web-sites in forms of icons. Heavy emphasis on the transaction aspects of information assurance is a salient feature of the web-sites. In web-sites, the transaction aspect in fact acts like an integral part of other aspects, linking and incorporating them together. Interestingly the product aspect of IA is not present in online transactions. This could be because the product dimension of trust is incorporated in websites in forms of product features and website presentation skills.

The list of top twenty five most frequently occurred words in the data sets is also instructive. The words reflecting consumer-behavioral aspect of assurance building such as *consumer*, *privacy*, *service*, etc are clearly seen. Transaction-related terms are found only in the actual websites, which include *shipping*, *store terms*, *return*, *shopping*, etc.

	Top twenty-five most frequently occurred words
Websites	1. <i>information</i> , 2. <i>website</i> , 3. <i>service</i> , 4. <i>shipping</i> , 5. <i>product</i> , 6. <i>consumer</i> , 7. <i>item</i> , 8. <i>store</i> , 9. <i>email</i> , 10. <i>return</i> , 11. <i>address</i> , 12. <i>online</i> , 13. <i>security</i> , 14. <i>credit-card</i> , 15. <i>terms</i> , 16. <i>personal</i> , 17. <i>web</i> , 18. <i>warrant</i> , 19. <i>privacy</i> , 20. <i>right</i> , 21. <i>gift</i> , 22. <i>shopping</i> , 23. <i>contact</i> , 24. <i>purchase</i> , 25. <i>account</i>

The results show that corporate practitioners more emphasize the actual transaction-related elements. Clearly enhancement of IA among B-C consumers may need to incorporate many more of the factors such as technology, institutional elements, and consumer behavioral elements to represent meaningful trust-building mechanisms in websites.

### Conclusion

This study has enhanced our understanding about IA-building mechanisms and the implementation of levels of assurance in the context of on-line transaction websites. Research on IA in online exchanges has thus far been limited and disjointed. The current research proposes a comprehensive framework in which multiple aspects of assurance building in online exchanges can be simultaneously investigated. As such, we expect the framework to help provide new insights into the dynamics of IA in online exchanges. The work reported here represents an interesting direction, using objective tools to study information assurance related aspects of real web sites. These are clearly common on real commerce sites, and cluster in intriguing ways. By using standard clustering and visualization techniques we remove some major sources of bias. Further, it was found that task-oriented aspects pervade and dominate the sites and that product-oriented aspects are quite weak. This clearly calls for practitioners to spend more effort on the product-oriented aspects of goods on websites.

To further our study, our next step for future research will be to refurbish the data and inspect the data in a more structured way. The data will be split into different sets, including, but not limited to, a B-to-C business initiatives set, and a B-to-C technology product set. This will help identifying similarities and differences in cognitive mapping about e-commerce trust from various perspectives. Through this process, our aim is, first, to identify the concepts and dimensions related to the e-commerce trust, and second, to corroborate and further enhance the proposed model in B-to-C online exchange. We will then impose the words and concepts related to each dimension to see how these dimensions are valued, related, and treated in actual B-to-C online exchange settings. It is of vital importance to investigate how the identified dimensions are inter-related in cognitive mapping of trust-building mechanism.

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