Folksonomies, Collaborative Filtering and e-Business: is Enterprise 2.0 One Step Forward and Two Steps Back?

Kevin Johnston
Liverpool John Moores University, UK
k.m.johnston@ljmu.ac.uk

Abstract: Enterprise2.0 is the use of emergent social software tools to improve knowledge sharing and collaboration within and between firms, their customers and partners. This paper proposes that Enterprise2.0 is a double-edged sword and should be adopted cautiously. Emerging trends in e-business are specialisation and collaboration, creating a diverse population of organisations, each tightly defined by its core competences, interacting in a constant sequence of transient relationships, each motivated by a particular market opportunity. These dynamic business networks depend on the establishment of appropriate platforms and global standards to enable smooth interaction between the service components, in particular, appropriate metadata such as ontologies. The dynamism of such an interconnected yet free-wheeling economy is constrained unless risks relating to investment in a new business relationship are reduced to levels where the risk-reward ratio favours agility rather than inertia. For its advocates, Enterprise2.0 techniques promise to contribute to the evolution of dynamic, agile, collaborative e-commerce. However, its egalitarian and permissive nature creates challenges. Folksonomies allow a more customer-centric view of an organisation's value proposition but may also undermine carefully devised official ontologies. Collaborative filtering may provide a mechanism for mitigating risk but the trust created is dependent upon the perceived credibility of the reviewers. A high profile example of an initiative designed to facilitate dynamic e-commerce which failed due to unsatisfactory classification of its members and the perceived risk of interacting with unknown reputations is examined. Recent academic research and practical applications that address these conflicts are reviewed.

Keywords: Enterprise2.0, ontology, folksonomy, metadata, collaborative filtering, trust

1. Enterprise 2.0

Enterprise 2.0 is the manifestation and application of Web2.0 in the business domain. Web2.0 represents the revolution that is occurring as large numbers of previously passive consumers of content become active contributors. In Web2.0 the Web itself is merely a platform for interacting with content. Information is broken up into “microcontent” units that may be distributed across the Web. A new set of tools such as blogs, RSS (Really Simple Syndication - a mechanism that creates a "feed" of updates from specified news sites, blogs etc.) and Wikis (tools to facilitate mass collaborative authoring) are developing to publish, aggregate and remix microcontent in new and useful ways. Interfaces like these are changing the way we store, access, and share information. Evidence of the significance of this trend includes the acquisition of Myspace (www.myspace.com) and YouTube (www.youtube.com) by Yahoo (www.yahoo.com) and Google (www.google.com) respectively and the front covers of Newsweek and Time featuring the founders of the photo-sharing site Flickr (www.flickr.com) and a mirror (i.e. the reader). Advocates praise the egalitarianism, inclusivity and empowerment of Web2.0, critics bemoan its potential for dumbing down, narcissicism and pandering to the lowest-common denominator. Enterprise 2.0 describes the use of emergent social software tools to improve knowledge sharing and collaborate within and between firms, their customers and partners. An example of Enterprise2.0 is the "mashup" - a website or web application that uses content from more than one source to create a completely new service. Tapscott and Williams (2006) examine the emerging paradigm of ad-hoc, self-organised mass collaboration and peer production. They propose the term "wikinomics" to describe an economy in which firms that are proficient at managing trust-based relationships with external collaborators (including customers) enjoy competitive advantage disproportionate to their size.

2. The e-business ecosystem

The ubiquity and standardisation of the Internet has created the ability to easily and cheaply dissolve and re-establish virtual co-ordinating relationships. This in turn has enabled the development of *dynamic* network organisations (Benjamin and Wigand, 1995; Fulk and deSanctis, 1995; Cravens et al., 1996). The huge benefit of the dynamic network organisation is the reduced asset specificity (Williamson, 1983) and the resultant increase in flexibility (Boynton and Victor, 1991). The linear, static value chain (Porter, 1980) is being "blown to bits" (Evans and Wurster, 1999) and replaced with “value constellation” partners (Normann and Ramirez, 1998). Iansiti and Levien (2004) note that "rather than focusing primarily on their internal capabilities [...] they emphasize the collective properties of the business networks in which they participate". Value-adding activities are continuously being "unbundled" and "rebundled" (Hagel and Singer, 1999). The increasingingly virtual nature of organisational structures (Davidow and Malone, 1992) and reduction of the "friction" that slows the rate of change of business interaction is creating an economic paradigm known as

Reference this paper as:
Johnston, K. “Folksonomies, Collaborative Filtering and e-Business: is Enterprise 2.0 One Step Forward and Two Steps Back?” *The Electronic Journal of Knowledge Management* Volume 5 Issue 4, pp 411 - 418, available online at www.ejkm.com

the "business ecosystem" (Moore, 1996). A diverse population of "modular" organisations (Sanchez and Mahoney, 1996), each tightly defined by its core competences, exists in an "opportunity environment" (Moore, 1996), interacting in a constant sequence of transient relationships, each motivated by a particular market opportunity (Brandenburger and Nalebuff, 1996). Networks are driven and coordinated by the definition of a specific business need and the search for a business partner offering the best service at that point in time (Lorenzoni and Lipparini, 1999). The wider the "net" with which we can trawl for these services the greater the diversity we have to choose from and the greater the likelihood of there being one that does precisely what we are looking for. There is a greater likelihood of there *being one* – but what about the likelihood of finding it? Furthermore, if you did find what you were looking for could you trust them?

3. Metadata and the semantic web: Taxonomies and ontologies

Adding metadata to Web content is bringing into reality the *Semantic Web* - another vision of the Web's creator, Tim Berners-Lee (Berners-Lee *et al*., 2001). This vision is to embed meaning into the content making it self-describing allowing the development of new ways to manipulate, integrate and aggregate data across the Web. For example an online travel agency might copy a flight itinerary into an electronic diary or assemble a collage of photographs of a particular tourist destination. As metadata is readable by software the Semantic Web allows applications themselves to search for data and, critical to the vision of distributed software, to search for other *applications*. Metadata cannot exist in a semantic vacuum. We may assign the value of "Pride and Prejudice" to the metadata element "Title" but that is taking the meaning of "Title" for granted. This deeper level of definition is addressed by the creation of an ontology, a concept found in Aristotle's metaphysical study of the nature of being and existence. A taxonomy is a hierarchical classification of entities within a domain and establishes hierarchical inter-relationships (parent-child/ broader-narrower) e.g. the Dewey Decimal system or the North American Industry Classification System. An ontology does more: it has strict, formal rules (a "grammar") about those relationships and encompasses attributes of knowledge rather than data i.e. assumptions, justifications - it is a conceptualisation of a knowledge domain.

4. Risk and trust in the e-Business ecosystem

The Internet lowers "barriers to new entrants" (Porter, 1979) such as economies of scale, capital requirements, switching costs, access to distribution channels and proprietary standards. Porter (2001) noted that a "flood" of new entrants had come into many industries and that "anything the Internet technology eliminates or makes easier to do reduces barriers to entry". Open electronic market places and standardised metadata platforms should create access to markets previously locked up in established inter-firm relationships for small firms and new entrants. However, this also creates, from the buyer perspective, the constancy of a "new buy" situation (Robinson *et al.*, 1967). Dynamic e-commerce will not thrive unless risks relating to investment in a new business relationship are reduced to levels where the risk-reward ratio favours agility rather than inertia. Jacoby and Kaplan (1972) posit that risk consisted of six components: financial, performance, physical, social and convenience. The potential costs to a business of inferior inputs, in both financial and reputation terms, are very high due to problems such as product recalls or late completion of projects. Business-to-business (B2B) purchasing requires a detailed appraisal of the vendor in which the key stages are relationship formation (Ford *et al.*, 1990) and initial trust formation (McKnight *et al.*, 1998). Ford et al (1990) proposed "capability" as a key aspect of vendor appraisal. Factors such as the "Not Invented Here" syndrome (Katz and Allen, 1982) and "spatial learning myopia" (Levinthal and March,1993) may constrain the firm's ability to adopt such an approach. SME (Small and Medium Sized Enterprises) managers, in particular, tend to work with people they know and trust leading to insularity (Zhang *et al*., 2004). This is an example of high "bonding social capital" (Putnam, 2000) but low "bridging social capital" (Putnam, 2000) whereby the "ties that bind can also be the ties that blind" (Cohen and Prusak, 2001). For the "out-supplier" (Robinson *et al.*, 1967) the task of changing a straight re-buy situation into a modified re-buy can be very difficult. Trust builds up over time and stable, long-term purchasing and collaboration relationships are very resilient to potential new partners – whether because they function well or through a sense of 'better the devil you know'. In the 1980s UK Prime Minister Thatcher's government recognised this and had to force public sector organisations to open up to potential new suppliers through Compulsory Competitive Tendering.

Bauer (1967) defines risk as the perception that "any action of the consumer will produce consequences which he cannot anticipate with anything approaching certainty and some of which are likely to be unpleasant", recognising the limited cognitive capacity of the consumer. Trust attenuates perceived risk – the unresolved tension between a consumer's purchasing goals and the outcome of the purchase decision (Cox, 1967; Doney and Cannon, 1997). Morgan and Hunt (1994) defined trust as "a generalised expectancy held

by an individual that the word of another can be relied upon" and further expand its meaning to be a confidence that the other party is "reliable, honest, consistent, competent, fair responsible, helpful and altruistic". Moorman *et al.* (1993) define trust as "a willingness to rely on an exchange partner in whom one has confidence". Anderson and Naurus (1990) and McKnight *et al.* (1998) give similar definitions. Sako and Helper (1998) defined "competence trust" as confidence that a supplier is capable of doing what they say they will do. Establishing trust online (Stewart, 2003) is considered even more significant in online transactions than traditional ones due to its impersonal nature (Ba, 2001; Ba and Pavlou, 2002; Castlefranci and Falcone, 1998).

5. A failure of taxonomy and trust: UDDI

Tapscott (2006) believes that "firms that figure out how to establish trust across a dynamic [business web] through automatic IT-based methods that substitute for formal contracts can gain agility and speed". The Universal Description and Discovery Language (UDDI) (www.uddi.org) was designed as a standard that would help companies conduct business with each other in an automated fashion but provides a key example of the challenges facing such initiatives. Companies could publish the services they offered and how they wanted to interact at a central registry, the UDDI Business Registry (UBR). Other companies could find that information and use it to establish a relationship. It was supported by over 250 organisations including Microsoft, IBM, Oracle, Ariba, HP, Intel and SAP. Once billed as the global yellow pages for business services, the UBR closed in January 2006 (Krill, 2005). UDDI is now to be found acting as an internal resource management application. One of the main issues preventing the widespread adoption of such a public directory is trust. Public UDDI failed for two principal reasons (1) business classifications in the registry were often misleading, (2) perceived risk - very few businesses would be willing to take a chance on an unknown service provider. The part Enterprise2.0 may play in addressing these two flaws will now be explored.

5.1 Folksonomies

> *O would some Power the gift to give us To see ourselves as others see us! ("To a Louse", by Robert Burns)*

A defining characteristic of Web2.0 is "tagging" whereby users add their own metadata to content they produce, consume and share (this paper has been "tagged" with author-defined keywords). On Flickr (www.flickr.com) and Del.icio.us (del.icio.us) for example, any user can attach tags to digital media items (files, bookmarks, images). The aggregation of these tags creates an organic, free-form, "bottom-up" taxonomy. The information architect Thomas VanderWal coined the term or "folksonomy" derived from the idea of a "folk-taxonomy" (Fitzgerald, 2006) . Folksonomies are flat (that is, they have no hierarchy, and show no parent-child relationships) and, critically, are completely uncontrolled. A key implication of their lack of structure is that they do not support functions such as drill-down searching and cross-referencing. A key implication of their "anything goes" approach is the potential for highly idiosyncratic classifications. The growth of folksonomies has generated a great deal of discussion regarding their potential to interfere with "official" taxonomies and thus to generate "search noise". However there is also much discussion of the potential for folksonomies to co-exist with and complement the "official" taxonomies.

6. Notable practical applications

- Meyer and Weske (2006) present an approach to defining service semantics in which modelling is incrementally refined by the users instead of prescriptively defined by the originator.
- Todd-Stephens (2006) argues the business case for using folksonomies to build customer-centric classifications of business services.
- IBM's Thinkplace project is a company wide, intranet-based "suggestion box" scheme where a global network of subject matter experts use data mining tools to track the most promising ideas and help manage top-rated ideas through the formal review processes. The project recognised that users' terms didn't always match IBM's official taxonomies for content such as industry and products and created "a way for users to enter keywords, or tags, that would be appended to the suggested terms from the formal taxonomy and thereby improve their ability to find relevant ideas" (Fitzgerald, 2006).
- IBM [www.ibm.com/ibm/responsibility/people/communications/online-jams.shtml] have also used an Enterprise2.0 approach to redefine their corporate values statement. The "ValuesJam" project allowed the entire company to collectively discuss, debate and define IBM's core values for the first time in more than 75 years.

- Fitzgerald (2006) also suggests that "companies could also test product concepts by letting users tag them and see what terms they use".
- Rubell (2005) suggests that folksonomies may be used " to get some early buzz going around your product/service before it officially debuts by planting links and/or photos on these sites".
- McConnell (2005) notes that Amazon has launched a new feature called ProductWiki that allows for “customer editable product information”, extending the concept of the customer as co-creator (von Hippel, 2005).
- The National Center for Biomedical Ontology (bioontology.org) used the Protege semantic development environment (Knublauch et al., 2004) to allow users to guide the development of the Open Biomedical Ontologies (OBO) library (obofoundry.org). The project recognised that users may wish to use an ontology even though some portions are not well designed and that they may choose semantic definitions with which they disagree.

7. Reputation systems

Reputation, reputation, reputation! O! I have lost my reputation. I have lost the immortal part of myself, and what remains is bestial. (Cassio, in Shakespeare's Othello, the Moor of Venice, Act II, Scene III)

Reputation is a valuable asset to traders, leading to higher trust in buyers (Ganesan, 1994; Andersen and Weitz, 1989). It is unlikely a trader with a good reputation will risk damaging it by acting opportunistically (Williamson, 1991; Chiles and McMakin, 1996). The surest way of generating trust is through personal experience of satisfaction in dealing with a person or organisation over a long period of time. Trusted brands are a powerful asset in risk mitigation (Roselius, 1971). Though industrial buying is generally thought more rational than consumer purchase behaviour, trusted brands till play an important role (Mudambi *et al.*, 1997), particularly if failure of the component would have dire consequences (Hutton, 1997), hence the old adage “no one ever got fired for buying IBM". Peceived risk drives information search (Dowling and Staelin, 1994; Johnston and Lewin, 1996). If a buyer is contemplating purchasing from an unknown supplier then buying behaviour must be informed by the supplier’s public-domain reputation (Thompson *et al*., 1998) through a mechanism based on transitive trust. Put crudely, if A trusts B and B trusts C, then A can trust C. There are two ways of generating a trust transitively: reputation derived from an authoritative, trusted third party (“top down”) and reputation derived from collaborative filtering (“bottom up”).

8. Collaborative filtering

A reputation is not possessed by a person or organisation - it is held by the individuals and groups with which they interact. Collaborative filtering occurs through the interaction of interested parties that share opinions to form a collective judgement. It is thus an aspect of Enterprise2.0 and is supported in the Semantic Web application FOAF ("friend of a friend", www.foafproject.org). The attraction of a public domain system of rating the reputation of vendors is that it mitigates information asymmetry (Akerlof, 1970; Spence, 1970; Rothschild and Stigliz, 1976). The Internet creates a situation were anonymity and information asymmetry are highly significant but which affords great potential for peer-assessment and collaborative filtering. Rating systems are important features of major consumer-to-cosnumer (C2C) commerce (e.g. eBay, www.ebay.com), as well as Business-to-Consumer (B2C) commerce (e.g. Amazon, www.amazon.com). Consumers shopping on eBay or Amazon can, with little effort and at no cost, obtain and contribute to the quality judgments made by peer consumers. E-Bay's feedback system is simple, and contains both a quantitative and qualitative element. The quantitative element is a positive, neutral, or negative (scored 1, 0, -1 respectively) rating for each transaction. The sum of a user's past ratings is represented as a score. The qualitative element is represented by comments made by other users. Based on an investigation of the eBay rating system, Reznick and Zeckhauser (2001) argue that the Internet provides a superior mechanism for distribution of the information which supports trust decisions.

9. Credibility

Trust and credibility are two fundamentally different concepts. Aristotle saw credibility as a persuasive factor deriving from good character ("ethos") rather than emotional ("pathos") or logical appeal ("logos"). Wathen and Burkell (2002) equate trust to dependability and credibility to "believeability". The credibility issue was highlighted recently in the mainstream media as concerns were raised about the value of online reviews on the sites of companies such as Tripadvisor (www.tripadvisor.com). Fearis (2007) reported that such sites have been increasingly affected by fake reviews and that it was unacceptable for hotels "to influence what was written or pass themselves off as travellers and post positive reviews". Online rating tools have so far been slower to catch on in B2B markets. This is because the products, services and transactions are

generally more complex and the number of ratings available is fewer and thus decisions based on them are less statistically valid. In this situation the credibility of the source becoming much more signifcant. Hovland *et al.* (1953) defined source credibility in terms of perceived expertise (or "authority") and perceived trustworthiness (or "good character"). Such work has informed advertising for many years (for example the use "men in white coats" and trusted celebrities). The antecedents of credibility of websites have been explored by, for example, Fritch and Cromwell (2001) and Metzger *et al.* (2003) but are not well researched in the B2B e-commerce context.

10. Notable practical applications

- Ekstrom *et al.* (2003) propose a credibility-weighted rating tool ("TrustBuilder") that enables the industry practitioner to utilise their experience, judgment and relationships. The user can take advantage of knowledge, which is pooled across the industry, while being confident that the opinions of persons that he or she knows and trusts will be given added weight.
- Xiong and Liu (2004) present an adaptive, distributed, reputation-based model of trust ("PeerTrust") based on the following five parameters : (1) satisfaction (2) scope (3) credibility (4) transaction context (5) community context. The last two contextual parameters reflect the significance a particular transaction (e.g. monetary value) and the nature of the community (e.g. its cohesiveness).
- Users (who are also collaborative developers) of the The National Center for Biomedical Ontology's (bioonotology.org) Open Biomedical Ontologies (OBO) library (obofoundry.org) can “rate the raters” to express preferences for those reviewers whom they trust to define semantics in a manner agreeable to themselves.

11. Conclusion

The emerging paradigm for e-business is specialisation and cooperation. Companies focus on their core competences, and rely on a network of business partners for the support services required to compose a comprehensive offer for their customers. This vision depends on the establishment of appropriate platforms and global standards to enable smooth interaction between the service components, in particlular, appropriate metadata such as ontologies. The Internet has been hailed as a means by which entrepreneurs could gain access to markets previously locked up by powerful brands or established inter-firm relationships. However, a small, unknown firm, even if it objectively offers the best product or service, may suffer from risk aversion in the marketplace. For its advocates, Enterprise2.0 techniques promise to contribute the evolution of dynamic ecommerce. However, its egalitarian and permissive nature creates challenges. Folksonomies allow a more customer-centric view of an organisation's value proposition but may also undermine carefully devised official ontologies. Collaborative filtering may provide a mechanism for generating trust online but technologies must recognise and incorporate of the importance of source credibility in the business to business context.

References

Akerlof, G. (1970) “The Market for Lemons : quality uncertainty and the market mechanism”, *Quarterly Journal of Economics*, Vol. 84, pp. 488-500

Anderson, E. and Weitz, B. (1989) “Determinants of Continuity in Conventional Industrial Channel Dyads”*, Marketing Science*, Vol 8, No 4, Fall, pp. 310-323.

Anderson, J.C. and Naurus, J.A. (1990) “A Model of Distributor Firm and Manufacturer Firm Working Partnership”, *Journal of Marketing*, Vol. 54, January, pp. 42-58

Ba, S. (2001) “Establishing on-line trust through a community responsibility system”, *Decision Support System*, Vol. 31, pp. 323-336

Ba, S. and Pavlou, P.A. (2002) “Evidence of the Effect of Trust Building in Electronic Markets : price premiums and buyer behaviour”, *Management Information Systems Quarterly*, Vol 26, No 3, pp. 243-268

Bauer, R. A. (1967) “Consumer Behaviour as Risk Taking”, In D.F. Cox (ed.), *Risk Taking and Information Handling in Consumer Behaviour*, Harvard

University Graduate School of Business Administration : Boston, MA, pp. 23-33

Benjamin, R.I. and Wigand, R.T. (1995) "Electronic Markets and Virtual Value Chains on the Information Superhighway", *Sloan Management Review*, Vol. 2, pp. 62-72

Berners-Lee, T., Hendler, J. and Lassila, O. (2001) ‘The Semantic Web’, *Scientific American*, Vol 284, No 3, 17th May, pp.35-43

Boynton, A.C. and Victor, B. (1991) "Beyond Flexibility : Building and Managing the Dynamically Stable Organisation", *California Management Review*, Vol. 34, No. 1 (Fall), pp. 53-66

Brandenburger, A.M. and Nalebuff, B.J. (1996) *Co-opetition*, Doubleday, New York, NY.

Castlefranchi, C. and Falcone, R. (1998) “Principles of Trust for Multi-agent Systems : cognitive anatomy, social importance and qualification*”, Proceedings of the International Conferences on MAS-ICMAS ’98*, Paris, 2-8 July, AAAI-MIT Press

Chiles, T.H. and McMakin, J.F. (1996) “Integrating Variable Risk Preferences, Trust and Transaction Economics”, *Academy of Management Review*, Vol 21, No 1, pp. 73/99

Cohen, D. and Prusak, L. (2001) In Good Company : How Social Capital Makes Organizations Work, *Harvard Business School Press*, Boston: MA

Cox, D.F. (1967) “Risk Handling in Consumer Behaviour : an intensive study of two cases”, in Cox, D.F. (Ed.) *Risk Taking and Information Handling in Consumer Behaviour*, Graduate School of Business, Harvard University : Boston, MA, pp. 34-81

Cravens, D.W., Piercy, N.F. and Shipp, S.H. (1996) "New Organizational Forms for Competing in Highly Dynamic Environments: the Network Paradigm",
British Journal of Management, Vol 7, No 3, pp. 203–218.

Davidow, W.H. and Malone, M.S. (1992) *The Virtual Corporation : Structuring and Revitalizing the Corporation for the 21st Century*, Harper Collins : New York, NY

Doney, P.M. and Cannon, J.P. (1997) “An examination of the nature of trust in buyer-seller relationships”, *Journal of Marketing*, vol 61, April, pp 35-51

Dowling, G.R. and Staelin, R. (1994) “A Model of Perceived Risk and Intended Risk-Handling Activity”, *Journal of Consumer Research*, Vol 21, June, pp. 19-134

Ekström, M., Björnsson, H. and Nass, C. (2003) "Accounting for rater credibility when evaluating AEC subcontractors", *Journal of Construction Management and Economics*, Vol 21, No 2, pp. 197-208.

Evans, P. B. and Wurster, T.S. (1999) *Blown to Bits : How the Economics of Information Transforms Strategy*, Harvard Business School Press : Boston, MA

Fearis (2007) "Authenticity of Hotel Reviews Questioned", *Telegraph*, 20/02/07, [online], [www.telegraph.co.uk/travel/main.jhtml?xml=/travel/2007/02/20/ethotereview.xml]

Fritch, J. W. and Cromwell, R. L. (2001) "Evaluating Internet resources: identity, affiliation, and cognitive authority in a networked world", *Journal of the American Society for Information Science and Technology*, Vol 52, No 6, pp. 499-507

Fitzgerald, M. (2006) "The Name Game : Tagging Tools Offer Powerful Way to Organize Information", *CIO*, April, [online], [www.cio.com/archive/040106/et_main.html]

Ford, D., Hakansson, H. and Johanson, J. (1990) “How Do Companies Interact?”, In D. Ford (Ed.) *Understanding Business Marketing : interaction, relationships, networks*, Academic Press

Fulk, J. and deSanctis, G. (1995) "Electronic Communication and Organisational Forms", *Organisation Science*, Vol. 6, No. 4 (July/August), pp. 337-349

Ganesan, S. (1994) “Determinants of Long-term Orientation in Buyer-Seller Relationships”, *Journal of Marketing*, Vol 58, No 2, April, pp.1-19

Hagel, J.and Singer. M. (1999) "Unbundling the Corporation", *Harvard Business Review*, Vol. 77, No. 2, pp. 133-141

Hovland, C.I., Janis, I.L., and Kelley, H.H. (1953) *Communication and Persuasion*, Yale University Press : New Haven, CT

Hutton, J. G. (1997). A study of brand equity in an organizational-buying context.
Journal of Product and Brand Management, vol 6, No 6, pp. 428-39

Iansiti, M. and Levien, R. (2004) *The Keystone Advantage: What the New Dynamics of Business Ecosystems Mean for Strategy, Innovation, and Sustainability*, Harvard Business School Press, Boston, MA.

Jacoby, J. and Kaplan, L. (1972) “The Components of Perceived Risk”, In Venkatesan, M. (ed.) *Proceeding of the 3rd Annual Conference*, Association for Consumer Research, pp. 82-93

Johnston, W.E. and Lewin, J.E. (1996) “Organizational buying behaviour: towards an
integrative framework”, *Journal of Business Research*, Vol. 35, pp. 1-15

Jonas, N. (1986) "The Hollow Corporation", *Business Week*, March 3rd, pp. 56-62

Katz, R. and Allen, T.J. (1982) "Investigating the Not Invented Here (NIH) Syndrome : A Look at the Performance, Tenure, and Communication Patterns of 50 R&D Project Groups", *R&D Management*, Vol. 12, No. 1, pp. 7-19

Knublauch, H., Fergerson, R.W. Noy, N.F. and Musen, M.A. (2004) "The Protege OWL plug-in: An open development environment for semantic web applications", In *Proceedings of the 3rd International Semantic Web Conference*, Hiroshima, Japan, pp. 229–243

Krill, P. (2005) "Microsoft, IBM, SAP discontinue UDDI registry effort", *InfoWorld*, December 16th,[online], [www.infoworld.com/article/05/12/16/HNuddishut_1.html]

Levinthal, D. A. and March, J.G. (1993) "The Myopia of Learning", *Strategic Management Journal*, Vol. 14, pp. 95-112

Lorenzoni, G. and A. Lipparini (1999), “The Leveraging of Interfirm Relationships as a Distinctive Organizational Capability: A Longitudinal Study,” *Strategic Management Journal*, Vol 20, pp. 317-338

McConnell, B. (2005) "Amazon's customer collaboration", [online], [customerevangelists.typepad.com/blog/2005/11/amazons_custome.html]

McKnight, H., Cummings, L. and Chervany L. (1989) “Initial Trust Formation in New Organisational Relationships”, *Academy of Management Review*, Vol 23, No 3, pp. 473-9

Metzger, M. J., Flanagin, A. J., Eyal, K., Lemus, D., and McCann, R. (2003) "Credibility for the 21st century: Integrating perspectives on source, message, and media credibility in the contemporary media environment", In P. Kalbfleisch (Ed.), *Communication Yearbook 27*, Lawrence Erlbaum : Mahwah, NJ, pp. 293-335

Meyer, H. and Weske, M.(2006) "Light-Weight Semantic Service Annotations through Tagging", In *Proceedings of the 4th International Conference on Service Oriented Computing*, Chicago, USA, Lecture Notes in Computer Science (LNCS), Vol. 4294, pp. 465-470 [online], [bpt.hpi.uni-potsdam.de/twiki/pub/Public/HaraldMeyer/tagging.pdf]

Moore, J.F. (1996) *The Death of Competition : Leadership and Strategy in the Age of Business Ecosystems*, HarperBusiness, New York, NY.

Moorman, C., Deashpandi, R. and Zaltman, G. (1993) “Factors affecting Trust in Marketing Relationships, *Journal of Marketing*, Vol 57 (January), pp. 81-101

Morgan, R.M. and Hunt, S.D. (1994) “The Commitment Trust Theory of Relationship Marketing”, *Journal of Marketing*, Vol 58 (July), pp. 20-38

Mudambi, S.M., Doyle P. and Wong V. (1997) “An Investigation of Branding in Industrial Marketing”, *Industrial Marketing Management*, Vol. 26, pp. 433-446

Porter, M.E. (1979) “How competitive forces shape strategy”, *Harvard Business Review*, Vol 57 (March/April), pp. 137-45.

Porter, M.E. (1980) *Competitive Advantage*, Free Press : New York, NY.

Porter, M.E. (2001) *“Strategy and the Internet”,* Harvard Business Review, March, pp. 62-78

Putnam, R.D. (2000) *Bowling Alone : The Collapse and Revival of American Community*, Simon and Shuster, New York, NY.

Resnick, P. and Zeckhauser, R. (2001) “Trust Among Strangers in Internet Trans-

actions: Empirical Analysis of eBay’s Reputation System. The Economics of the Internet and E-Commerce”, In M. R. Baye (Ed.) *Advances in Applied Microeconomics*, vol. 11, Amsterdam, Elsevier Science

Robinson, P.J., Faris, C.W. and Wing, Y. (1967) *Industrial Buying and Creative Marketing*, Allyn and Bacon

Roselius, T. (1971) “Consumer Rankings of Risk Reduction Methods”, *Journal of Marketing*, Vol. 35, pp. 56-61

Rothschild, M. and Stiglitz, J.E. (1976) “Equilibrium in competitive insurance markets : an essay on the economics of imperfect information”, *Quarterly Journal of Economics*, Vol 80, pp. 629-649

Rubell, S. (2005) "Folksonomies: A New Opportunity For Marketers", [online], [www.webpronews.com/insiderreports/2005/01/18/folksonomies-a-new-opportunity-for-marketers]

Sako, M. and Helper, S. (1998) “Determinants of Trust in Supplier Relations: Evidence from the Automotive Industry in Japan and the United States”, *Journal of Economic Behavior and Organization*, Vol.34, No 3, pp. 387-417.

Sanchez R. and Mahoney J. T. (1996) Modularity, Flexibility, and Knowledge Management in Product and Organization Design. *Strategic Management Journal*, Vol 17, pp. 63-76

Spence, H.E., Engel, J.F., and Blackwell, R.D. (1970) “Perceived Risk in Mail Order and Retail Store Buying” *Journal of Marketing Research*, Vol 7, August, pp. 364-369

Stewart, K.J. (2003) “Trust Transfer on the World Wide Web”, *Organisational Science*”, vol 14, No 1, January-September, pp. 5-17

Tapscott (2006) newparadigm.com/media/Winning_with_the_Enterprise_2.0.pdf

Tapscott, D. and Williams, A.D. (2006) *Wikinomics: How Mass Collaboration Changes Everything*, Portfolio

Thompson, K., Mitchell, H. and Knox, S. (1998) “Organisational Buying Behaviour in Changing Times”, *European Management Journal*, Vol. 16, No. 6, pp. 698-705

Todd-Stephens, R. (2006) "Integrating Consumer Taxonomies within the Enterprise Metadata environment", Paper read at *Semantic Technology Conference*, San Jose, CA, USA, March 6-9, [online], [www.semantic-conference.com/program/sessions/F3.html]

Von Hippel, E. (2005) *Democratizing Innovation*, MIT Press : Cambridge, MA

Wathen, C.N. and Burkell, J. (2002) "Believe it or not: factors influencing credibility on the Web", *Journal of the American Society for Information Science and Technology*, Vol 53, No 2, 134-144.

Williamson, O. E. (1983) "Credible Commitments: Using Hostages to Support Exchange", *American Economic Review*, Vol 73, No 4, pp. 519-38

Williamson, O. E. (1991) "Comparative Economic Organization: The Analysis of Discrete Structural Alternatives", *Administrative Science Quarterly*, Vol. 36**,** pp. 269-296

Xiong, L. and Liu, L. (2004) "PeerTrust: Supporting Reputation-Based Trust for Peer-to-Peer Electronic Communities", *IEEE Transactions on Knowledge and Data Engineering*, Vol 16, No 7 , July , pp. 843 - 857

Zhang, M., Macpherson, A., Taylor, D. and Jones, O. (2004) "Networks of Learning : SME managerial approaches and learning. Project Report", Centre for Enterprise, Manchester Metropolitan University Business School, [online], [www.business.mmu.ac.uk/centreforenterprise/networksoflearning_report.pdf]

