

# Reduction of price dispersion through Semantic E-commerce : A Position Paper

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## ABSTRACT

The emergence of semantic web opens up boundless possibilities by enabling software agents to intelligently reason about its content. Over 300 million searches are conducted everyday on the Internet by people trying to find what they need. A majority of these searches are in the domain of consumer e-commerce, where a web user is looking for something to buy. This represents a huge cost in terms of people hours and an enormous drain of resources. Agent enabled semantic search will have a dramatic impact on the precision of these searches. It will reduce and possibly eliminate information asymmetry where a better informed buyer gets the best value. By impacting this key determinant of market prices semantic web will foster the evolution of different business and economic models. We submit that there is a need for developing these futuristic models based on our current understanding of e-commerce models and nascent semantic web technologies. We believe these business models will encourage mainstream web developers and businesses to join the “semantic web revolution.”

## 1. INTRODUCTION

The success of semantic web relies heavily on its wide spread adoption by the mainstream web development community [1]. Unless there is a well understood gain that can be demonstrated, it is difficult to convince the web community to embrace semantic web development. Unfortunately, a successful application

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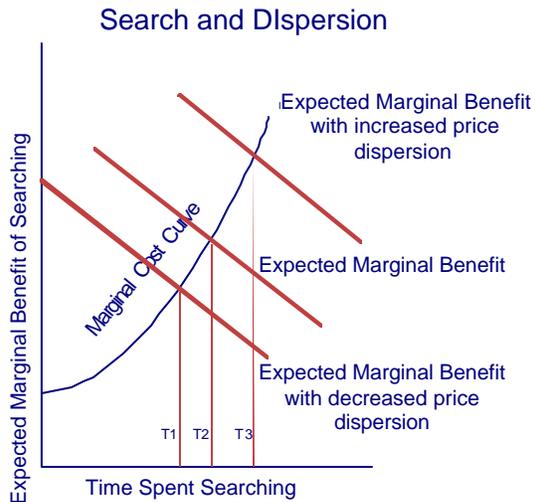
of semantic web needs a large amount of semantic data, which is difficult for the small knowledge representation and semantic web community to provide. One approach to resolving this catch-22 situation is to disseminate visions of semantic web applications in the hope that it will attract developers to start working on semantic web technologies. The famous article by Berners-Lee et. al. in Scientific American[2] is a pioneering step towards that direction. Following their footsteps, we have chosen to predict a semantic web e-commerce scenario and its economic impact.

In this position paper we describe the current state of the art e-business transaction. We show the information asymmetry that exists in current e-commerce and how this creates market inefficiencies. We then describe how this model will be revolutionized on a semantic web. We submit that this futuristic scenario will help generate enthusiasm among mainstream web developer by exposing them to the potentials of a semantic web.

## 2. E-COMMERCE AT PRESENT

Information asymmetries create situations where a better informed buyer gets the best value. For a specific example in the context of E-commerce; let's take the case of an actual price search for a specific model of a camcorder: Panasonic PV-DV102 Digital Camcorder. There are several websites that sell the exactly same product at different prices. A consumer, new to online purchasing may go to Amazon and buy the product for 599.99. A consumer who is more educated about internet searches is able to do a quick but detailed search through websites such as [www.dealtime.com](http://www.dealtime.com) or [www.pricegrabber.com](http://www.pricegrabber.com). In this manner, she identifies the same product being sold at <http://www.tristatecamera.com> for a cost of 509.99 and total with shipping for 533.22. The total savings is \$66.77. There is a significant gain due to the information asymmetry, this is price dispersion. Price dispersion implies that households and firms must spend time and energy in looking for the best value. Search is considered an important and costly economic activity. As it is costly it will stop before the consumer has all the information she needs and may result in poor bargains. As the opportunity cost

of a search increases with each additional unit of time, the amount of search will be at the exact point where the marginal benefit equals the marginal cost. With an increase in the phenomenon of price dispersion (i.e. same good, different prices), the search amount increases.



Thus we see that a problem created by information asymmetry and price dispersion is that the costly economic activity of search takes place; which can be seen as a loss in precious resources as well as an inefficiency in the market. Another problem is that consumers do not get the best value for their money if they place a high value on their time. When this happens, firms that offer good quality for the consumer dollars may lose out. They are also adversely impacted because it takes time for the market to absorb price reduction information.

The current search engines are contributing somewhat to reduction in information asymmetry; but because they still require the consumers to be fairly adept in searches, the information asymmetry still results in price dispersion. A sampling of the search engines at [http://directory.google.com/Top/Home/Consumer\\_Information/Price\\_Comparisons/?tc=1](http://directory.google.com/Top/Home/Consumer_Information/Price_Comparisons/?tc=1) indicated a measurable price dispersion.

### 3. SEMANTIC E-COMMERCE

Millions of searches (over 300 million) are conducted everyday on the Internet by people trying to find what they need. This represents a huge cost in terms of people hours and an enormous drain of resources. The semantic web will transform millions of dumb (read “un-searchable”) web pages into intelligent, semantically annotated web pages where search for a particular product or service will be comprehensive and precise. In near term a fatal blow will be dealt to competition among search engines as all search engines will give relatively similar results, in long term agents will replace the search functions

completely. Price differentials will also be driven down as a result. The additional advantage possessed by consumers with search engine skills will disappear while the premium that customers had been hitherto willing to pay for convenience will decrease. Under this scenario, anyone looking for a Panasonic PV-DV102 Digital Camcorder will know that the lowest price available for this product is \$533.22. Consumers who then choose Amazon over Tristate Camera will be consciously paying the additional \$66.67 for conveniences such as customer service, support, reliability etc. – advantages that Amazon has due to brand recognition.

In this way, through the Semantic web, price dispersion is likely to decrease significantly. It may not reduce to zero as there will still be a difference in the perceived quality and reliability of the providers as well as the value placed on the search time and convenience. The significant decrease in price dispersion caused by the Semantic Web will increase the efficiency of the e-market and provide increased utility to consumers and e-firms.

### 4. CONCLUSION

Information asymmetries and resulting price inefficiencies have been around for a while and often taken for granted. Semantic web will help society make major gains in reducing information asymmetries. Reduction of information asymmetry results in markets getting closer to the model of perfect information and by extension, a step closer towards perfect competition. In this position paper we have looked at the economic impact of evolving semantic web and attempted to predict the future e-commerce model. We take the position that detailed analysis should be done to identify sturdy gains in this area.

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