Interview with Hemant Bhargava on “Pricing on the Internet”

Career

Dr. Hemant K. Bhargava joined the Graduate School of Management at UC Davis in Summer 2003, and also holds a joint appointment as Professor of Computer Science. He has previously worked at the Naval Postgraduate School, Carnegie Mellon University, and Penn State University. Dr. Bhargava studied in India – at Delhi University and the Indian Institute of Management – and did his doctoral work in Decision Sciences at The Wharton School, University of Pennsylvania. Hemant’s current research is in the economics of information systems, and covers pricing, product design, marketing and operations for IT-intensive products and networks. He has also done extensive work in the design of computer-based modeling languages and decision technologies. His work has appeared in INFORMS Journal on Computing, Information Systems Research, Journal of Management Information Systems, and IEEE Computer. His research on DecisionNet won Best Paper Awards at leading Information Systems conferences. Dr. Bhargava was awarded the Menneken Prize for Excellence in Research at the Naval Postgraduate School in 1998.

WI: Professor Bhargava, how did you get into research involved with the Internet?

Bhargava: Well, I came of academic age in the Internet era. My first research passion was to facilitate the use of mathematical models and data for business decision problems. But while we worked on decision technologies at the desktop level, suddenly the Internet (and world wide web) became widely available (in the early 1990s). We saw this meant a whole new way of deploying and delivering decision technologies – decision models, algorithms, data, visualization routines etc. could be separated and distributed over the Internet, and accessed by decision makers simply through a web browser. So, this was really my first research project that deeply involved the Internet. We called it DecisionNet – an electronic marketplace of tools relevant to decision making, open to both providers and users of such tools. This also opened the door to technologies aimed at consumer decision problems. I spent some years helping a Silicon Valley firm in building web-based decision tools for health plan selection. These two projects also opened my eyes to a new issue – how to price such services, and more fundamentally what portfolio of services would make economic sense?

WI: Why do you think is pricing on the Internet such an important topic?

Bhargava: The Internet's impact on pricing techniques has surprising breadth and depth – and it involves a lot of innovation. This combination is very powerful! Let’s start with breadth: First, obviously, the Internet is a new marketing channel, with unusual characteristics related to marketing and distribution costs, price display, product search, quality information etc. All this affects what price you want to set if you sell on the Internet. Second, the Internet affects what firms can charge in any channel. Some reasons: price search engines suddenly make comparison shopping possible, the low administrative costs of conveying new prices means that prices might change more frequently, prices can be personalized to individual users, and so on. Third, the power of the Internet means that a greater portfolio of goods and services can be digitized and delivered over the Internet: financial trading services, music, books, software, video etc. Such digitization turns traditional models for such goods on their head.

WI: Can you say a few words about “depth” of impact of Internet pricing?

Bhargava: The impacts I mentioned above – what firms can charge, how they
set prices etc. – are rather superficial. But these changes have deeper implications: for example, the display of price information in electronic exchanges can force firms to reconsider which products they make, which markets they sell to, where they buy their supplies from. In some cases – like telecommunications, media and entertainment – the pricing changes are leading to complete restructuring of industries.

WI: And innovation?

Bhargava: The Internet has been a hotbed for innovation in pricing techniques: name-your-own-price mechanisms, reverse pricing, group pricing, a huge variety of auction mechanisms, methods that allow distress sales (low priced sale of perishing inventories) while diminishing threat of cannibalization, and of course settings like eBay – your global garage sale over the Internet.

WI: What are the most interesting pricing aspects on the Internet?

Bhargava: One that interests me most is the use of performance-based pricing. Let’s say product quality is uncertain before purchase – but now we won’t let this affect our trade. We negotiate a relationship between price and quality and agree to monitor quality over the Internet. Quality realization occurs after purchase, and now we know what price to apply. This method has very broad applicability in information goods, but one area it is widely transforming is advertising, which was traditionally sold by “cost per thousand impressions” (CPM). But on the Internet, it becomes “cost per click” – you will pay the advertising platform only if the message generates some performance. Moreover, what’s fascinating is how such advertising slots are sold. Internet search engines conduct continuous sequential auctions to sell sponsored search slots for thousands of popular search terms.

WI: What do we already know about sponsored search auctions?

Bhargava: We know that designing such auctions is fascinating and complex. The revenue obtained by giving a slot to some advertiser is uncertain – because it depends on performance of the ad! So how to choose between hundreds of competing advertisers? You need to rank advertisers by a combination of their bid and likely performance rate, and you need to set up complex learning mechanisms to continuously refine your estimates of their performance rate. And all this infrastructure works on one keyword at a time. In the future we will want to allow advertisers to bid simultaneously on related phrases, such as “digital camera” and “video camera” – designing such auctions will be many times more complex.

WI: Are there any problems that are associated with pay for performance advertising?

Bhargava: Well, imagine what this transformation means to an advertising manager – you must now manage budgets for hundreds of terms independently, rather than think of your budget for the “Who wants to be a millionaire?” show? And of course you must simultaneously participate in these hundreds of auctions, which are all run independently even though from your perspective they are all interconnected. You must also contend with the possibility that your competitors build programs (or hire low-wage people in third-world countries) to continuously click on your ads and cost you money. This is called click-through fraud, it’s real! And, again, the implication is deeper – it goes right to the heart of “pay for performance” – do we have any performance when clickers are fraudsters?

WI: You are from India, a country, that attracted an enormous demand on software engineers in recent times. Do you think that this demand last on?

Bhargava: Yes, the overall demand will last for the foreseeable future. Our economies will continue increasing their use of information technologies. Even India – with its education capacity of thousands of software engineers each year – cannot satisfy the demand. So, now, Indian IT companies are outsourcing to China, Thailand, Indonesia, Singapore! NIIT (one of India’s premier IT training companies) has 125 training centers in China. And, Infosys is setting up offices in China to increase its workforce capacity for handling outsourcing contracts from the West.

WI: Professor Bhargava, thank you very much for sharing your insights with the readers of Wirtschaftsinformatik and thanks for contributing to the Summer School on Digital Pricing in Frankfurt.


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