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Special Section: When Machine Meets Society: Social Impacts of Information and Information Economics

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The academic study of information systems has transformed over half a century, as progress in computing itself became more the focus of large firms. In parallel, academic research began to focus more on managing computing and computing professionals, and on understanding the economic, social, and societal impacts of computing. Our special section includes three very different articles, addressing very different problems, using very different research traditions. All three articles address issues in the use of computing and in the impact of computing on individuals and organizations.

The first article, by Debabrata Dey and Atanu Lahiri, uses closed-form modeling to analyze a problem in pricing of online goods, and examines the implications for consumer surplus, producer profits, and social welfare. Their article, "Versioning: Go Vertical in a Horizontal Market?" addresses a frequently occurring phenomenon involved in software release. The problem they address is that of an initial software release along with a collection of upgrades available at additional cost, when those upgrades are provided *at the time of initial release*. Is it exploitive, even rapacious, to get some users hooked on a stripped-down version and then to opportunistically overcharge them once they are committed to the product? Is social welfare enhanced if everything is bundled at once and sold at a single bundled profit-maximizing price? Or is this strategy, with an initial version and optional enhancements, better in some sense, for at least some consumers? Dey and Lahiri demonstrate that the answer is, indeed, complex, and depends on a number of factors, including heterogeneity among consumers in their horizontal preferences, the distribution of these consumers, and their uncertainty about the product's actual location in its horizontal product attribute space. Their findings demonstrate that under various combinations

of conditions about consumers' uncertainty about the product's actual location in its product attribute space (PAS), their preferences for their ideal location of a product in its PAS, and the distribution of customers with these preferences in the product attribute space, this vertical versioning is the preferred mechanism for enhancing sales. The authors demonstrate the advantages of this sales strategy in terms of consumer surplus and seller profits. In addition, they are able to characterize the regions in which one or both groups benefit from this sales strategy and the regions in which this strategy is strictly welfare enhancing. Perhaps the most intuitive way of viewing their findings is that all consumers who believe they might want a product are able to sample it at a reduced price; those who love the product, or who demand the highest quality, find that their initial purchases include an embedded option to upgrade.

The second article, by Thomas A. Weber, analyzes another phenomenon of increasing economic importance, the rise of the sharing economy. The problem Weber addresses in "Product Pricing in a Peer-to-Peer Economy" dates back, although in a somewhat different context, to film studios' having to deal with the impact of video rentals on their revenues. Do movie rentals—in essence *sharing*—tend to increase sales by opening up a market to individuals with enough propensity to use it but not enough to buy it? Or do rentals tend to reduce market size because many users who would have acquired a product for a single use now forgo a purchase in exchange for a single rental? Weber analyzes the problem by allowing for heterogeneous consumer characteristics in terms of their propensity of need and use value, that—together with the consumers' level of patience (their common discount factor)—determine the strategic consumption behavior, reflected by a tendency to either defer use or else to invest in ownership early in order to capitalize on a peer-to-peer sharing market. The study shows that while sharing markets are generally beneficial to consumers because they add flexibility to their choices, they may or may not be beneficial for firms. A firm's gain or loss from sharing depends critically on the marginal cost of the product relative to consumers' valuations. For low-cost products, a monopolist would prefer no sharing, provided consumers are not too patient. For high-cost products, sharing does actually increase the monopolist's payoff. For example, referring to the situations with relatively cheap products, where firms are worse off with sharing, the author notes: "a peer-to-peer economy increases both consumer surplus and social welfare, thus creating an implicit imperative for a social planner to help promote collaborative consumption."

The final article, by Josephine Wolff, is largely empirical, and draws heavily from anthropological and sociological research traditions. As the title suggests, "Perverse Effects in Defense of Computer Systems: When More Is Less" explores situations in which attempts to increase computer security actually make computer systems less safe. Some situations are the direct result of human response to poorly designed security policies. If institutional security policies require users to make frequent changes to their passwords and require that passwords be complex, without embedded recognizable words or even without embedded pronounceable sequences of letters, users will respond by writing their passwords down in readily accessible

locations, paradoxically increasing rather than decreasing vulnerability. If institutional security policies involve broadcast messages to users demanding that they revalidate all their security credentials, this invites targeted *spear phishing*, in which intruders masquerade as members of the institution's data center and harvest large numbers of previously secure IDs and passwords. While the article does not always offer solutions, understanding potential security problems makes a meaningful contribution to solving those problems. For example, once data center directors are aware of the vulnerability of spear phishing, there are simple solutions. Before a major effort is undertaken to have users revalidate their credentials, everyone can be notified to respond only to requests that come from a recognized data center URL.

Each of the three articles thus contributes to our understanding of an aspect of the social and societal aspects of computing. Dey and Atanu teach us about optimal strategies for versioning and multileveled initial software releases in the presence of heterogeneous consumers, and indicate when indeed this increases social welfare. Weber explores widening the boundary of the sharing economy, by making the providers of the shared products an essential part of consideration. Wolff shows us how users, system administrators, and technology interact in the implementation of computer security policies.