



How info-firms use big data to target customers

Dolfsma, W., & van der Eijk, R.

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Welfare Consequences of Big-Data Strategies

Wilfred Dolfsma
Loughborough University London
w.a.dolfsma@lboro.ac.uk
+44 7584155112

Rene Van der Eijk
RSM Erasmus University
reijk@rsm.nl

Abstract: In many markets a firm's competitive advantage derives from its information position. Firms that actively and extensively collect customer information we refer to as Info-firms - they may develop a number of strategies to increase their competitiveness. Some firms indeed only collect, use and sell data about consumers. In developing strategy, Info-firms can target ~~either~~ customers or other firms. ~~In addition, and~~ they target ~~either~~ markets they are currently active in, or they can target adjacent markets. We introduce a 2x2 matrix characterizing such strategies. Some strategies are known, but their effects are more pronounced on online markets because of the overwhelming amount of data available, while other strategies we discuss are relatively new. The strategies adopted affect the market as well as value chain dynamics, and determine which parties in a market are likely to benefit (most).

1. Introduction

The abundance of information about markets and their customers has fundamentally changed market and value chain dynamics (Brynjolfsson & McAfee 2012). Firms extensively use customer information in strategy development. Firms on online markets analyze big data to support their decision making and increasingly firms in off-line markets also extensively analyze big data. Information-enabled strategies determine firms' competitive position - the effects of their use are beginning to become more broadly noticeable. Indeed, the differences between off-line and online markets in terms of market dynamics blur. We refer firms that develop and improve market strategies based on big data on customer preferences, willingness-to-pay and behaviors "Info-firms".

Extensive use of customer data may benefit customers more than it does firms, due to an increased range of available products increasing the chance customer preferences are met (Kelly 1998). Companies can customize their products and services better the more information they have about their potential clients. Furthermore, increased firm competition globally may cause an overall reduction in prices and profit margins. Firms increasingly serve smaller market niches, covering the long tail of markets.

We argue, instead, however, that especially what we call Info-firms benefit on markets where information positions drive firms' competitive performance. We discuss a number of strategies that such firms adopt. We classify these strategies according to when they target customers *or* other firms, as well as according to when they target existing markets *or* markets new to a the firm. We suggest a 2x2 characterization of Info-firm strategies (Table 1), then determine who stands to gain most from big data strategies and why.

2. INFO-FIRMS TARGETING CUSTOMERS

Big data allows for the adoption of a number of strategies in the existing markets a firm is in, and allows it to move into adjacent markets as well. We classify Info-firm strategies (Table 1), and discuss each at length.

Same-Market Strategies (I). Many firms follow the examples of the likes of Amazon in using information about customers to customize products and price discriminate. Airlines seem particularly adept at price discrimination based on customer information.

The first step for Info-firms to develop strategies of price discrimination and product differentiation is data collection. Firms collect data from customers as they reveal their preferences explicitly through their communication or implicitly by their (online) behaviors. Internet browsing history conveys customer preferences and purchase habits, through time spent on a site, the speed with which individuals leave or return to a website and which goods are bought at the same time. Information can be purchased or otherwise obtained such as through exchange. Customer preference information from discussion boards, blogs, and social media sites are scraped and used (Economist “Stat oil – credit scores” February 9, 2013). Extensive databases with consumer data, the content of which may be protected under copyright law to the benefit of Info-firms, is used to fine-tune marketing efforts (Economist, “How’s my driving – insurance and telematics” February 23, 2013). The extension of copyright law to include databases prohibits customers from taking the information about themselves to other Info-firms, limiting the extent to which competition between Info-firms. More competition between firms might lead to consumers being offered better goods, services, or privacy conditions. Profiles of current consumers but also of customers who no longer consider themselves a customer help firms to more quickly construct profiles of new customers. Nevertheless, it is only after some time that the customer will notice the benefits of having provided information about themselves to an Info-firm in the form of (more) customized products.

Table 1: Classifying Info-firm strategies

		Action of Info-Firm targeted at:	
		Customers	Firms
Info-firm target Markets:	Same market(s), same value chain	I -- Product Differentiation, Price Discrimination	III – Consulting and Marketing Assistance to Incumbent Firms
	New market(s), different value chain	II -- Product bundling	IV -- Enticing Third Parties to Enter a Market

New Market Strategies (II). In addition to product differentiation (customization) and price discrimination by Info-firms in their core market, such firms can move into adjacent markets, possibly benefitting from economies of scope. Companies such as American Express use the information obtained – for instance buying groceries at Wal-Mart – to predict its customers’ behavior in other markets than their own market of offering financial services (Economist, “Spies in your wallet” November 5, 2011). American Express might start offering specific health insurance packages, for instance. When targeting customers in adjacent markets, Info-firms bundle different goods. Bundling products typically yields a higher profit than the combined profits of the goods sold separately (Whinston *et al.* 1997). Bundling can be more or less compelling: separable goods may not even be sold separately or may be available separately only at a much higher price. A retailer offer banking and insurance services such as UK-based Tesco obtains customer information which enable it to customize pricing in both markets (Economist, “Building with big data” May 28, 2011; Economist, “Shopping at the bank” October 27, 2012). Health insurance can be more attractively priced for those who are on a healthy diet (New York Times, “How Companies Learn Your Secrets” February 16, 2012). Knowing customers’ preferences and willingness-to-pay on these different markets allows an Info-firm to customize, price discriminate as well as to bundle.

3. INFO-FIRMS TARGETING FIRMS

An Info-firm can target firms as well, in their own core market or in adjacent markets (cf. Table 1).

Same-Market Strategies (III). Based on information it has about the market, an Info-firm can approach other firms in its own core market, most notably by offering consultancy and marketing services. The better Info-firms' information position, the higher its fees or commissions will be. Firms such as Acxiom and Experian offer consulting and marketing services to peers in the financial services industry. Google Adwords developed a strategy fitting with Cell III offering other firms services based on the buyer-information it collects (Economist, "Sipping from the fire hose" October 1, 2011).

New Market Strategies (IV). Drawing on the information it has on the market, an Info-firms can also approach firms in new markets. This is shown in Cell IV in Table 1 and is a strategic option that only few firms have started noticing. On the basis of information about products, market dynamics and customers' willingness-to-pay in other markets, an Info-firm can determine the extent to which incumbent firms make supra-normal profits. An Info-firm can offer its services to incumbents stimulating competition between them, or it can entice firms to enter this market. In pursuing this strategy, Info-firms increase the costs of offering goods and services to the incumbents. eBay is in the process of doing this with its Developer Network where it has API's (application programming interfaces) available for other firms to use to develop a business case. Xaxis, which defines itself as "a global audience buying company" and is affiliated to marketing company WPP, is an Info-firm that helps its customer target new markets. Clearly, to the extent that the consumer information that Info-firms possess allows for more precise targeting, that information is more valuable.

The strategy of Info-firms targeting companies in another market has received little attention. Implementing such strategies boils down to an Info-firm as an outsider expropriating what is called producer surplus in welfare economics. As this involves confidential negotiations between private players, the effects of these strategies are not immediately noticeable. Strategies such as price discrimination are more visible and are considered damaging to (potential) customers' sense of fairness. Nevertheless, TomTom, a global positioning service provider company, for instance, allowed governments to use the data about drivers' speed to allow for the better positioning of speed control meters, entering a new market, the market for regulation. Spokeo, Facebook and others sell customer information they collect to a wide variety of firms beyond the markets they

are active in themselves (Time Magazine, “Where everybody knows your name” March 26, 2012). Google collects information on just about any kind of markets. Google and other firms have been carefully enticing firms to enter various markets neither the entrant nor Google was active in.

Implementing this strategy, Info-firms lower entry barriers for companies to enter a market, intensifying competition on such markets, and thereby reducing supra-normal profits enjoyed in that market. Rather than increased competition benefiting consumers, however, Info-firms should be expected to expropriate at least part of the reduction in profits from firms in this market, however. To the extent that Info-firms are monopoly gatekeepers for third parties to enter a market, more of the producer surplus in a market is expropriated by the Info-firm rather than advantaging customers. Cell IV strategies (in Table 1) will thus lead to a redistribution of surplus away from regular and entering firms in a market towards Info-firms.

Info-firm strategies as shown in Table 1 are not mutually exclusive. Furthermore, firms may develop and implement other strategies, drawing on insights and tools presented here. They can, for instance, exploit network effects in a market.

4. DISTRIBUTION OF BENEFITS BETWEEN FIRMS AND CUSTOMERS

Customers as well as firms may benefit from these developments in absolute terms, especially when the market grows. Info-firms may both increase the economic pie as well as change the distribution of the pie, however. We suggest Info-firms benefit more from deploying strategies discussed, at least in relative terms. Countervailing tendencies suggested by some are not strong enough to counteract the distributional consequence we predict.

Customers may not realize that their interactions with Info-firms inform company strategies. The information conveyed by the consumer to an Info-firm is very specific and constitutes what transaction cost economics an idiosyncratic investment (Williamson 1975) – the information cannot be transported to a competing Info-firm. The investments that a firm needs to make to collect and process the information is generic, however: natural language processing, machine learning, and similar techniques help companies profile customers easily (Economist “How deep are your pockets” June 30, 2012). Because the investment by consumers is only valuable in a relation with a specific Info-firm, the investment by consumers is idiosyncratic. Customers are locked into a relation with the Info-firm and thus become vulnerable to scholars in transaction

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cost economics and strategic management literature call being held-up. The opposite is not true, however: Info-firms will not be held-up. This gives Info-firm the opportunity to extract higher profits, or rents, from consumers.

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Even when customers realize they are vulnerable to possible **hold-up** that may not stop customers from maintaining or initiating a commercial relationships with an Info-firm. If all firms in a market build and use customer profiles, customers may not have an alternative. In addition, even if customers do not voluntarily offer information about themselves, information about them can be collected or purchased. Information about reluctant customers can be inferred based on relevant similarities with others whose profiles are known. For more **myopic** customers the benefits of customized products are available immediately, while the costs may only arise in the future and may go unnoticed.

As new goods are introduced into the market, and versions of these are also created, a market is flooded. For pure information goods this will even more readily happen, as versions of these can be created exceptionally easily, at low costs. When comparing goods, customers then find it difficult to determine their value (Shapiro & Varian 1999; Whinston *et al.* 1997). Especially if goods are experience, rather than search goods, and have characteristics that cannot be assessed immediately, their value can only be determined based on judgment during use (Zeithaml 1981). Asking peers about their experiences using a particular good is less useful if the good that they have is different from the good one is considering. As firms customize products using big data, this makes it even more difficult for customers to evaluate products: a product becomes a **credence** good, where its value cannot even be determined by peers, but only by experts. Customers will have to rely on the reputation of established firms, relying on the hope that an existing firm cannot afford to lose their reputation (Dolfsma 2011). Only when customers are risk-takers, when the investment is small, such as cheap smartphone applications, or when a completely new market is created do customers in such circumstances tend to choose products of new, smaller firms that do not have a strong reputation and information position yet.

Firms know more about their goods than customers, thus creating information asymmetry between them and customers (Stiglitz 2002). To estimate product quality customers would have to see the full product, yet for pure information goods that would eliminate the need to purchase the good since once a pure information good is viewed fully, there is no need to buy the good any longer: firms thus face an **information paradox** about how much they should inform customers about products. On the other hand, as with movie trailers, a firm might be 'adversely select' to show the parts to consumers that are unrepresentative of the full product. In the information economics literature, this is referred to as the moral hazard² problem.

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May customers organize a countervailing power by forming online communities to prevent allocation of benefits from moving in favor of Info-firms? **Communities** that operate virtually are not bound by geography and could more easily organize themselves, using additional possibilities to express their voice. The market for music products is an example: local music bands may now have a global membership and record, live performance and merchandising sales may increase (Stahl 1997). The background and sources of information at the disposal of members of the community differs more than in traditional, physical markets, and so the suggestion is that online communities constitute a powerful force. Empirical studies of online communities present a more mixed perspective, however (Jones 1998). Existing, off-line relations tend to be reflected in relations on the Internet. Online communities in addition consist of large numbers of customers with diverse interests: a small number of parties such as Info-firms with a well-defined interest often find it easy to mobilize against a large(r) group of customers with multiple concerns (cf. Olson 1965). Firms may also seek to influence an online community, perhaps by providing information that is biased (New York Times “Give Yourself 5 Stars? Online, It Might Cost You”, September 22, 2013). Sometimes a firm may come under pressure, for instance to adopt a policy that avoids customer information use in ways that hurt customers, but this pressure will not be exerted consistently over time and to all Info-firms, and is in any way likely to be restricted to firms’ that approach consumers directly.

Increased **demand volatility** on markets may constitute a second countervailing power. New products, or variants of existing products, may quickly find their way to the market, perhaps jeopardizing the market position of incumbent Info-firms. Playing into the demands especially of volatile markets is what incumbents rather than new firms are well adapted to, however, using their marketing skills, financial position and other economies of scale and scope (Scherer & Ross 1990). Flooding a market with versions is a practice incumbent firms especially in markets for ‘fast moving consumer goods’ adopt to construct barriers to entry as a matter of course (Scherer & Ross 1990). As creating versions of existing products is easier, the competitive position of incumbent Info-firm will not easily be threatened by market volatility. Indeed, in volatile markets such as for entertainment industries, high levels of market concentration occurs *because* only large firms can weather the risks and have the required marketing and distribution capabilities (Rietveld 2011).

5. Conclusion

Many markets today are markets on which firms develop and deploy strategies based on big customer data. We refer to such firms as Info-firms – they use their data to target customers as well as firms, both in market they are already active in as well as in markets that are new to them. We classify strategies of these firms and discuss each, as well as the consequences of their use for distribution of benefits, using a number of different economic theories. We argue that Info-firms -are in a position to appropriate a relatively large share of the benefits available on the market- [- consumers will benefit less, in relative terms](#). Use of the strategies discussed here should thus create potential anti-trust concerns not currently given much consideration as firms might even influence the dynamics on and extract profits from a market in which they are not active themselves.

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