

Market Definition and Free Online Services: The Prospect of Personal Data as Price

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I. INTRODUCTION

Market definition is an essential part of antitrust law. When companies are penalized for their behavior, it is because their actions restrict competition *within a certain market*. The delineation of that market has important consequences for companies, affecting whether they are dominant, or whether their agreements are deemed anti-competitive. Google, the world's biggest search provider, is experiencing this first-hand: the European Commission ordered it to pay a staggering fine of 2.42 billion euro for abusing its dominant position in the "general search market."¹ But this market definition has been a source of criticism, as it disregards key features of the industry in which Google operates.² Internet businesses have specific traits, which render the application of existing principles of market definition more complicated: expanded geographical boundaries, decreased marginal costs, multi-sided markets and network effects. Market definition is particularly challenging when online services offer some of their products for free. As the traditional tools of market definition rely heavily on price, the question arises how to define "market" for these in the absence of a monetary price. This challenge arises world-wide: many jurisdictions adopt variations of a price-based test (like the SSNIP³ test) to define markets and assess market power.⁴

¹ Press Release, European Comm'n, Antitrust: Commission fines Google €2.42 billion for abusing dominance as search engine by giving illegal advantage to own comparison shopping service (June 27, 2017), http://europa.eu/rapid/press-release_IP-17-1784_en.htm [<https://perma.cc/LRR7-7UER>].

² James D. Ratliff & Daniel L. Rubinfeld, *Is There a Market for Organic Search Engine Results and Can Their Manipulation Give Rise to Antitrust Liability?*, 10(3) J. COMPETITION L. AND ECON. 517, 518 (2014); Florence Thépot, *Market Power in Online Search and Social Networking: A Matter of Two-Sided Markets*, 36(2) WORLD COMPETITION 195, 196 (2013).

³ 'Small but significant non-transitory increase in price'.

⁴ INT'L COMPETITION NETWORK, REPORT ON MERGER GUIDELINES, *Market Definition*, ch. 2, at 4 (2004), <http://www.internationalcompetitionnetwork.org/uploads/library/doc562.pdf> [<https://perma.cc/D3BH-5QTQ>](hereinafter 'ICN Guidelines'); ORG. FOR ECON. CO-OPERATION AND DEV. [OECD], POLICY ROUNDTABLE ON MARKET DEFINITION 11 (2012),

Trying to fit free online services into traditional price-based tests may seem like attempting to square a circle: if no money is exchanged, no price is paid, and a market cannot be defined. To overcome this challenge, this article rethinks the idea of price. It explores the possibility of conceptualizing personal data as the price consumers pay for free online services, for the purpose of market definition. 'Data is the currency of the 21st Century' has become a catchphrase, invoking a futuristic image of consumers wielding 'personal data' credit cards at every cash register. Although personal data is not (and will probably never be) the common currency of modern society, that notion may not be as far-fetched as it sounds. Consumers routinely act as the providers of an important input of businesses of the digital economy: personal data. In return for providing this input they obtain access to services for which they would otherwise pay a monetary fee. As the collection of personal data becomes more common and consumer awareness grows, the sensitivity of consumers to the amount of personal data demanded could increase. As a result, consumers who feel they are not getting value for their money, or more accurately 'value for their personal data' may switch to other services. In that case, personal data as a price could be used as a measure of demand-side substitutability, and thus as a part of market definition.

Two jurisdictions have inspired this article: The United States and the European Union. Not only have both jurisdictions adopted the SSNIP test as part of market definition, but the U.S. and the EU are also closely linked: consumers and businesses on the Internet increasingly interact, regardless of geographical barriers between the U.S. and Europe. The recent Google case illustrates this: an American Internet company is the subject of scrutiny in Europe for objections which were dismissed in America. The growth of the Internet means that these two jurisdictions will increasingly be fighting comparable battles. Market definition will need to be performed for similar companies in a similar environment on both sides of the Atlantic.

The structure of this article is as follows. The first part introduces the issues explored in this article. The second part analyzes the notion of 'free', as well as its challenges for competition law practice. It also explores the concept of market definition, its basic concepts and application, as well as its shortcomings. The third part evaluates the notion of personal data as price, beginning with a definition of

Tradable Personal Data (“TPD”) and a definition of price as a certain amount demanded of a medium of exchange. It continues by setting out the requirements which personal data needs to satisfy to be a medium of exchange. Specific attention is given to the requirements of acceptability and value, as these appear the most difficult to fulfill regarding personal data. The fourth part discusses the implementation of personal data as price into the hypothetical monopolist test. All of this leads to the conclusion that despite the current imperfection of personal data as price, it is an interesting alternative to market definition in markets where no monetary price exists. This article aims to demonstrate that rapid changes in society need not be an obstacle to legal decision-making. With the necessary flexibility and creativity, traditional tools can become modern solutions.

II. THE NOTION OF “FREE” AND MARKET DEFINITION

A. “Free” on the Internet

Google, Amazon, Facebook, Twitter and YouTube... Everyone knows these names and what they stand for. The companies who own these websites have almost become synonymous with the Internet. They provide search, social networking and video streaming services; they enable increased access to information; they connect those who would have found it hard to find each other in the ‘offline’ world. They have opened what seems like endless possibilities for many in the 21st Century. And what is more, these services are completely free! Or, at least, that is how it seems. No money exchanges hands, no credit card details are provided. This lack of price has baffled authorities around the world for quite some time, with some courts arguing that there cannot be a market if there is no price.

Yet, the companies offering these services are not charities, they are out to make a profit. A monetary price may not be exchanged, but something else is: users of the service may provide ‘attention’ to advertising or provide their personal data.⁵ The type of ‘free’ service

⁵ Michael S. Gal & Daniel L. Rubinfeld, *The Hidden Costs of Free Goods: Implication for Antitrust Enforcement*, 80 ANTITRUST L.J. 521, 527 (2016); Chris Jay Hoofnagle & Jan Whittington, *Free: Accounting for the Costs of the Internet’s Most Popular Price*, 61 UCLA L. REV. 606, 608 & 626 (2014); John Newman, *Antitrust in Zero-Price Markets*, 164 U. PA. L. REV. 165 (2015); CHRIS ANDERSON, *FREE: THE FUTURE OF A RADICAL PRICE*, 12, 20 (Hyperion Books 2009).

which is offered to consumers in order to generate advertising revenue is not exclusive to the online world. It was, and to some extent still is, prevalent in traditional media such as television broadcasting.⁶ There is no monetary exchange between content provider and consumer, but there is an economic exchange: consumers provide access to themselves.⁷ In the words of Newman, users literally ‘pay’ attention to advertising, thus signaling the existence of a market in which an exchange takes place.⁸ Examples include Google Search, which offers users access to its search engine at no monetary cost, but subjects users to targeted advertisement, or Amazon, which started offering its advertising-supported Kindle Fire Tablets at a discount. Consumers also frequently give up their personal data for the use of services. As Lanier puts it, “it has become commonplace to expect online services to be given for free, or rather, in exchange for acquiescence to be spied on.”⁹ Some price comparison sites, for example, collect and resell consumers’ personal data in exchange for the use of their sites.¹⁰ It can be argued that services are not truly ‘free’ when they are provided *in exchange* for something. The provision of free goods and services raises some interesting issues for competition law practice. Traditional tools were designed around competition on price, an easy factor to quantify.¹¹ When a product is free, the price dimension that

⁶ C. Edwin Baker, *Giving the Audience What It Wants*, 58 OHIO ST. L.J. 311, 319 (1997); Ellen P. Goodman, *Media Policy Out of the Box: Content Abundance, Attention Scarcity, and the Failures of Digital Markets*, 19 BERKELEY TECH. L.J. 1389, 1424 (2004); Jean J. Gabszewicz et al., *Media as Multi-Sided Platform*, in HANDBOOK ON THE ECONOMICS OF THE MEDIA 8 (Robert G. Picard & Steven S. Wildman eds., 2015).

⁷ EUROPE ECON., MARKET DEFINITION IN THE MEDIA SECTOR – ECONOMIC ISSUES – REPORT FOR THE EUROPEAN COMMISSION, DG COMPETITION 44 (2002), http://ec.europa.eu/competition/sectors/media/documents/european_economics.pdf [<https://perma.cc/VVA8-UZ6H>].

⁸ Newman, *supra* note 5, at 171.

⁹ JARON LANIER, WHO OWNS THE FUTURE? 10 (Simon & Schuster, 2013).

¹⁰ BEAT THAT QUOTE, <http://www.beatthatquote.com/> [<https://perma.cc/E9A5-HUGK>]; See Sean Poulter, *Beware the Company Websites that are Selling on your Personal Details*, DAILY MAIL (Apr. 8, 2011), <http://www.dailymail.co.uk/news/article-1375066/Beware-company-websites-selling-personal-details.html> [<https://perma.cc/C975-SXFV>].

¹¹ Gal & Rubinfeld, *supra* note 5, at 30; Fabio Polverino, *Hunting the Wild Geese: Competition Analysis in a World of ‘Free’*, *Concorrenza e Mercato* 545, 548 (2012).

authorities have come to rely on falls away.¹² It has been argued that if there is no price, there can be no abuse: a zero price means that there are no monopoly overcharges and thus no harm to consumers.¹³ Yet it is important to realize that not all zero-priced products are actually ‘free’: when consumers provide something in return, they do provide a ‘payment’, in attention or in personal data. When consumers incur such costs, this is a signal that a market exists.¹⁴ Companies offering ‘free’ goods have risen to prominence in the recent past, forcing a rethinking of the price theory in which market definition is rooted.¹⁵

B. *The Use of Market Definition*

Market definition is a universal tool, adopted in many jurisdictions to determine the boundaries within which to assess market power and the effects on competition.¹⁶ U.S.¹⁷ and EU¹⁸ authorities consistently

¹² Aleksandra Gebicka & Andreas Heinemann, *Social Media and Competition Law*, 37 *WORLD COMPETITION* 149, 154 (2014); Miguel Sousa Ferro, “*Ceci n’est pas un marché*”: *Gratuity and Competition Law*, 1 *CONCURRENCES* 1, 3 (2015); David Stallibrass & Sharon Pang, *Clash of Titans: How China Disciplines Internet Markets*, 6 *J. EUR. COMPETITION L. & PRAC.* 418, 419 (2015).

¹³ Ferro, *supra* note 12, at 4; Robert H. Bork, *Antitrust and Google*, HUDSON INST. (Apr. 6, 2012), <http://hudson.org/research/8861-antitrust-and-google> [<https://perma.cc/2V7W-UQ2K>]; Nathan Newman, *Search, Antitrust and the Economics of the Control of User Data*, 31 *YALE J. ON REG.* 401, 412 (2014); *Kinderstart.com, LLC v Google, Inc.*, No. C 06-2057 JF (RS), 2007 WL 831806 (N.D. Ca. Mar. 16, 2007).

¹⁴ Newman, *supra* note 13, at 420.

¹⁵ *Id.* at 446; Polverino, *supra* note 11, at 3; Maurice E. Stucke & Allen P. Grunes, *No Mistake about It: The Important Role of Antitrust in the Era of Big Data*, in *THE ANTITRUST SOURCE, UNIVERSITY OF TENNESSEE LEGAL STUDIES RESEARCH PAPER SERIES* 5 (2015); Thépot, *supra* note 2, at 216.

¹⁶ OECD, *supra* note 4, at 21.

¹⁷ *United States v. E. I. Du Pont De Nemours & Co.*, 353 U.S. 586, 593 (1956); *See United States v. Aluminum Co. of Am.*, 377 U.S. 271 (1964); U.S. DEP’T OF JUSTICE AND FED. TRADE COMM’N, *HORIZONTAL MERGER GUIDELINES* 7 (2010), <https://www.justice.gov/sites/default/files/atr/legacy/2010/08/19/hmg-2010.pdf> [<https://perma.cc/2QL9-KAGB>] (hereinafter ‘DOJ & FTC Merger Guidelines’).

¹⁸ *Case 27/76, United Brands Co. & United Brands Continental BV v. Comm’n*, [1978] ECR 207, §10; *Case 31/80, L’Oreal v. De Nieuwe AMCK*, [1980] ECR 3775, §25; *Case 62/86, AKZO Chemie BV v. Comm’n*, [1991] ECR I-3359, §51; *Case T-62/98, Volkswagen v. Comm’n*, [2000] ECR II-2707, § 230; *Case T-65/96, Kish Glass & CO Ltd v. Comm’n*, [2001] ECR II-1885, §62; Eur. Comm’n, *Notice on the Definition of Relevant Market for*

acknowledge it as a critical tool in competition law assessments, allowing for the identification of primary competitive constraints. Defining a relevant market involves the delineation of two dimensions:¹⁹ the geographic market and the product market.²⁰ This article focuses on the product market, which consists of those goods or services that compete to satisfy consumers' needs. The question that is asked when determining the product market is whether goods or services are interchangeable ("substitutable") from the point of view of consumers (and sometimes, from the point of view of suppliers).²¹ To put it in economic terms, the product market is found through an assessment of demand-side substitutability.²² Demand-side substitutability is particularly important due to the substantial competitive constraint that arises from consumers who are prepared to switch to other products. The possibility of demand-side substitutability cautions an undertaking not to increase the price because it is unlikely that the increase would be profitable. If the price of a product goes up, consumers switch to alternatives that they consider substitutes, thus causing a loss in sales because the decrease in output offsets the increase in unit price margin.²³

Purposes of Community Competition Law, OJ C 372, 9.12.1997, p. 5 (hereinafter 'EU Comm. Notice Market Definition').

¹⁹ In some cases, authorities take into account a third dimension, the temporal market, when time has a specific effect on the market, such as in the case of season specific fruit, for example. We will not address this dimension here.

²⁰ RICHARD WHISH & DAVID BAILEY, *COMPETITION LAW* 30 (OUP, 7th ed. 2012); ROBERT O'DONOGHUE & JORGE PADILLA, *THE LAW AND ECONOMICS OF ARTICLE 102 TFEU* 95 (Hart Publishing, 2d ed. 2013); SIMON BISHOP & MIKE WALKER, *THE ECONOMICS OF EC COMPETITION LAW: CONCEPTS, APPLICATION, AND MEASUREMENT* 113 (Sweet & Mawell, 3d ed. 2010).

²¹ DOJ & FTC Merger Guidelines, *supra* note 17, at 7; *United States v. E.I. Du Pont de Nemours and Co.*, 351 U.S. at 395 (1956); *United States v. Aluminum Co. of Am.*, 377 U.S. at 276–77 (1964); EU Comm. Notice Market Definition, *supra* note 18, at §7; *Case 6/72, Europemballage Co. & Continental Can Co. v. Comm'n of the Eur. Communities*, [1973] Common Mkt. L. Rep. 199, §32; *Case 27/76 United Brands Co. and United Brands Continental BV v. Comm'n*, [1978] ECR at §22.

²² EU Comm. Notice Market Definition, *supra* note 18, at §14; Jonathan B. Baker, *Market Definition: An Analytical Overview*, 74 *ANTITRUST L.J.* 129, 134 (2007).

²³ WHISH & BAILEY, *supra* note 20, at 31; O'DONOGHUE & PADILLA, *supra* note 20, at 100; BISHOP & WALKER, *supra* note 20, at 118.

Demand-side substitutability has been conceptualized through the Hypothetical Monopolist Test (“HMT”), developed in the U.S. by the Department of Justice and the Federal Trade Commission.²⁴ It has been widely accepted throughout various jurisdictions, including the EU, where it has become part of the Notice on Market Definition.²⁵ Under the HMT, a market consists of a good or service, or a group of goods or services, on which a hypothetical undertaking (both the present and future seller, wishing to maximize its profits and not subject to price regulations) could impose a significant and lasting price increase. It seeks to determine the narrowest market on which a hypothetical monopolist could exercise its market power. Thus, the relevant market is the smallest market worth monopolizing.²⁶ The most direct implementation of this concept is the SSNIP test, which stands for ‘Small but Significant Non-Transitory Increase in Price’. It reformulates the concept of the HMT into a test, by asking the following: ‘If the undertaking in question were to introduce a SSNIP, would customers switch to other products or services in a manner that makes the price increase unprofitable?’ The SSNIP test broadly consists of four steps. First the candidate market will be determined, which essentially consists of the products or services offered by the undertaking in question. Second, it will be assessed whether a SSNIP will induce consumers to switch to such an extent that the increase becomes unprofitable. If it does not, the test will end here; this is the relevant market. If it does, the third step will be to broaden the market to include those ‘next-best substitutes’ the consumers have switched to. The final step is to repeat the whole process.²⁷ These four steps amount to a study of demand-side substitutability.

The second of these steps – the assessment of whether it is profitable to apply a SSNIP – requires more clarification. First, an

²⁴ BISHOP & WALKER, *supra* note 20, at 111; Malcolm B. Coate & Jeffrey H. Fischer, *A Practical Guide to the Hypothetical Monopolist Test for Market Definition*, 4 J. COMPETITION L. & ECON. 1031, 1035 (2008); DOJ & FTC Merger Guidelines, *supra* note 17, at 8.

²⁵ Safinaz Mohd Hussein et al., *Market Definition and Market Power as Tools for the Assessment of Competition*, 13 INT’L J. BUS. & SOC’Y 163, 171 (2012).

²⁶ O’DONOGHUE & PADILLA, *supra* note 20, at 108; BISHOP & WALKER, *supra* note 20, at 111; Coate & Fischer, *supra* note 24, at 1035.

²⁷ O’DONOGHUE & PADILLA, *supra* note 20, at 110; WHISH & BAILEY, *supra* note 20, at 31; Coate & Fischer, *supra* note 24, at 1036.

increase in price is considered small but significant if it is a 5 to 10% increase.²⁸ Second, the increase should be non-transitory and thus permanent, or at least stable, for a significant period of time. Lastly, assessing whether a SSNIP would be profitable requires empirical data. It may be that past occurrences have illustrated that such an increase would or would not be profitable. Previous shocks in the market due to entry or exit, changes in output, quality, marketing policy, or costs, may illustrate this sufficiently after discarding external factors. This is what Coate and Fischer call the use of “natural experiments.”²⁹ Another way of assessing the profitability of a price increase is the “critical loss analysis.”³⁰ The critical loss is the loss of sales that would result in a SSNIP having no net effect on profits. If the actual loss of sales resulting from the SSNIP is greater than the critical loss, the price increase is unprofitable. Put differently, the SSNIP is unprofitable if customers desert to substitutes to such an extent that the increase in the profit margin per unit sold does not make up for the loss of output in total.³¹ As the market is broadened to include more demand substitutes, a point will eventually be reached at which a hypothetical monopolist could impose a SSNIP because there are no longer enough demand substitutes to which consumers could turn. There would no longer be other products constraining the hypothetical monopolist from increasing its price. This is the end of the assessment: the relevant market has been found.³²

²⁸ BISHOP & WALKER, *supra* note 20, at 115; O'DONOGHUE & PADILLA, *supra* note 20, at 110; WHISH & BAILEY, *supra* note 20, at 32; E.U. Comm'n Notice Mkt. Definition, *supra* note 18, at §17; DOJ & FTC Merger Guidelines, *supra* note 17, at 10 (guidelines do caution that what constitutes a small but significant increase may vary depending on the specific industry and thus even fall below 5%).

²⁹ Coate & Fischer, *supra* note 24, at 1044.

³⁰ O'DONOGHUE & PADILLA, *supra* note 2020, at 111; David S. Evans, *Lightening Up on Market Definition*, in RESEARCH HANDBOOK ON THE ECONOMICS OF ANTITRUST LAW 53, 70 (Einer Elhauge 2012); Baker, *supra* note 22, at 154; Coate & Fischer, *supra* note 24, at 1040. Cases with Critical Loss Analysis: FTC v. Occidental Petroleum Corp., (1986-1) Trade Cas. ¶67,071 (D.D.C. 1986) at 62-513; FTC v. Swedish Match, 131 F.Supp. 2d 151, 161-62 (D.D.C. 2000).

³¹ There is a trade-off: the price-cost margins increase to those customers who continue to purchase from the undertaking, but the undertaking loses the entire price-cost margin it would previously have received from those customers who are now buying elsewhere. Baker, *supra* note 22, at 142.

³² BISHOP & WALKER, *supra* note 20, at 116; Coate & Fischer, *supra* note 24, at 1040; O'DONOGHUE & PADILLA, *supra* note 20, at 111.

C. *The Problem of Price*

A summary glance at the market definition tests immediately reveals a problem: the tests require the existence of a price. Yet, many online services are offered to users for “free.” How can a market be defined through consumers’ reactions to price increases if there is no price?³³ Authorities and scholars have argued that competition law cannot be applied to zero-price products; without a price there can be no market, no market power, and no anticompetitive effects.³⁴ In the *KinderStart* case, an American court declared that antitrust law does not “concern itself with competition in the provision of free services” and that Google or any other search provider does not “sell its search services.”³⁵ The validity of this can be disputed. An important part of services on the Internet are offered for free, by undertakings who run profitable businesses. “Free” should not always be taken to mean “for nothing.” In some business models the user is asked to provide something in return for the service, such as personal data, which the undertaking can monetize.³⁶ Furthermore, competition has not disappeared merely because the undertakings offer their product for “free.” Antitrust enforcement – and thus market definition – remains possible. If no monetary price is charged, it is necessary to find alternatives to the traditional application of the SSNIP test to define the market.³⁷

³³ Sondergutachten 68: Wettbewerbspolitik: Herausforderung digitale Märkte (Special Report No. 68: Competition Policy: The Challenge of Digital Markets), June 1, 2015, MONOPOLKOMMISSION at ¶ 59 (Ger.).

³⁴ Ferro, *supra* note 12, at ¶14; Newman, *supra* note 5, at 161; Stucke & Grunes, *supra* note 15, at 6; Jared Kagan, *Bricks, Mortar, and Google: Defining the Relevant Antitrust Market for Internet-Based Companies*, 55 N.Y. L. SCH. L. REV. 271, 277 (2010); Nicolo Zingales, *Product Market Definition in Online Search and Advertising*, 9 COMPETITION L. REV. 29, 33 (2013).

³⁵ *Kinderstart.com LLC v. Google, Inc.*, No. C 06-3057 JF(RS), 2007 WL 831806 at *5 (N.D. Cal. Mar. 16, 2007).

³⁶ Graef, *supra* note 13, at 474; Newman, *supra* note 5, at 152, 165.

³⁷ Some suggestions have included the replacement of price by quality, thus measuring not a SSNIP but a SSNDQ (small but significant non-transitory decrease in *quality*), Gebicka & Heinemann, *supra* note 12, at 156; or the integration of two-sided market analysis into the market definition, trying to find a common measurement for the prices on both sides. Zingales, *supra* note 34, at 33.

This article puts forward such an alternative and begs the reader to consider that consumers do pay a price for services: the price of personal data. Conceptualizing personal data as a “price” would enable the assessment of demand-side substitutability by determining whether consumers are sensitive to increases in the personal data collected, thereby inducing them to switch to other products they consider substitutes. This analysis can be performed through the SSNIP test, by fitting “personal data as price” within the confines of the test. In order for personal data to be a price for the purposes of the SSNIP test, it is necessary to define what is meant by price and whether personal data fulfills this definition. In assessing these definitions, it is essential to remember the scope of this thought experiment: the feasibility of personal data as a “price” for the purpose of assessing demand-side substitutability. This requires a micro-view of consumers and their potential approach to personal data in B2C (Business-to-Consumer) relationships. A macro-analysis of the role of data in all economic relationships is beyond the scope of this article.

III. PERSONAL DATA AS PRICE

A. Introduction and Definitions

The definition of “free” in the dictionary is that something does not “cost anything” or comes free of “charge.”³⁸ Although seemingly straightforward, this definition is ambiguous. The common assumption is that “free” signifies something that is received without the need for financial payment, but this need not be so. A “charge” or a “cost” can refer to an “amount of money” or to “something given to get a particular thing.”³⁹ When someone tells you that an online service can be used “for free,” it may be worth asking, “what kind of free do

³⁸ *Free*, CAMBRIDGE DICTIONARY, <http://dictionary.cambridge.org/dictionary/english/free> [<https://perma.cc/P88B-VL83>]; *Free*, OXFORD LIVING DICTIONARIES, <https://en.oxforddictionaries.com/definition/free> [<https://perma.cc/7VVS-HM37>].

³⁹ *Charge*, CAMBRIDGE DICTIONARY, <http://dictionary.cambridge.org/dictionary/english/charge> [<https://perma.cc/JU4R-UZF5>]; *Cost*, CAMBRIDGE DICTIONARY, <http://dictionary.cambridge.org/dictionary/english/cost> [<https://perma.cc/5R6Q-MPL8>]; *Charge*, OXFORD LIVING DICTIONARIES, <https://en.oxforddictionaries.com/definition/charge> [<https://perma.cc/C35S-SHGJ>]; *Cost*, OXFORD LIVING DICTIONARIES, <https://en.oxforddictionaries.com/definition/cost> [<https://perma.cc/C2GY-4ZMB>].

you mean?” Often, online services do not require money, and so call themselves “free,” while at the same time collecting personal data on its users. It can be argued, although no money changes hands, that a price is being paid: personal data is that price. This argument is the premise on which the following thought experiment is based. Thus, attention to the concrete meaning of this hypothesis is warranted, with particular consideration of the understanding of the concepts “personal data” and “price.”

Personal data is widely defined as any information relating to an identified person (i.e. distinguishable as an individual from other members of a group, or an identifiable natural person).⁴⁰ This information may relate to an individual in several ways, making him directly or indirectly identifiable. The category “indirectly” refers to information which may not directly reveal the identity of the data subject, but allows for his identification by combination with other

⁴⁰ EU: Article 2(a) of Directive 95/46/EC of the European Parliament and of the Council on the protection of individuals with regard to the processing of personal data and on the free movement of such data, 1995 O.J. (L 281) 31; Article 2(a) of Regulation 45/2001 of the European Parliament and of the Council on the protection of individuals with regard to the processing of personal data by the Community institutions and bodies and on the free movement of such data, 2001 O.J. (L 8) 1; Article 4 of Regulation 2016/679 of the European Parliament and of the Council on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, 2016 O.J. (L 119) 1 (effective May 25, 2018) (hereinafter GDPR); Article 3 of Directive 2016/680 of the European Parliament and of the Council on the protection of natural persons with regard to the processing of personal data by competent authorities for the purposes of the prevention, investigation, detection or prosecution of criminal offences or the execution of criminal penalties, and on the free movement of such data, 2016 O.J. (L 119) 89 (to be transposed by EU Member States by May 6, 2018); *Opinion of the Article 29 Data Protection Authority Working Party on the Concept of Personal Data*, 2007 4/2007, 7. U.S. data protection laws do not use a similar definition; however, the U.S. Code contains references to the identifiability of the individual (the term “record” means any item, collection, or grouping of information *about an individual* that is maintained by an agency, including, but not limited to, his education, financial transactions, medical history, and criminal or employment history *and that contains his name, or the identifying number, symbol, or other identifying particular* assigned to the individual, such as a finger or voice print or a photograph, Privacy Act of 1974, Pub. L. No. 93-579, § 3, 88 Stat. 1896, 1897 (1974)(emphasis added); the California Online Privacy Protection Act defines “*personally identifiable information*” as “*individually identifiable information about an individual consumer collected online by the operator from that individual and maintained by the operator in an accessible form*,” (Cal. Bus. & Prof. Code § 22577(a)(1)–(7); and the California Government Code identifies ‘electronically collected personal information’ as “any information that is maintained by an agency that identifies or describes an individual user.” Cal. Gov. Code § 11015.5(d)(1).

pieces of information.⁴¹ The OECD specifically lists the following categories of personal data:

- User generated content (blogs, comments, photos, videos);
- Social data (contacts on social networks);
- Activity or behavioral data (search terms, browsing history, purchases...);
- Locational data (including IP address);
- Demographic data (age, gender, sexual orientation, political affiliation, ethnicity...); and
- Official identifying data (such as names, ID or social security numbers, credit card information...)⁴²

This definition is broad, purposely so, as it has been used to capture many types of information under data protection regulation.⁴³ Although it may be a useful definition in that context, it lacks specificity for the purpose of this thought experiment, as it includes information that is collected without commercial purpose. The focus of this analysis is on personal data which can be part of an exchange between a seller, or service provider, and a user, and which can be monetized by the seller. This type of information will be called “tradable personal data” (TPD) throughout this article. This definition is similar, but narrower, than the one proposed by Dinev and Hart, who define personal information as “the type of information necessary to conduct an online transaction.” Their definition includes any information *necessary* to purchase goods or services or to register at websites (i.e. information which acts as a means to facilitate some interaction), whereas this article's definition focuses on the benefit one party wants to obtain in an exchange, as the objective itself of the transaction.⁴⁴

⁴¹ *Opinion of the Article 29 Data Protection Authority Working Party on the Concept of Personal Data*, *supra* note 40, at 13.

⁴² Org. for Econ. Co-Operation and Dev. [OECD], *Exploring the Economics of Personal Data: A Survey of Methodologies for Measuring Monetary Value*, DSTI/ICCP/IE/REG (2011) 2/FINAL 8 (2013).

⁴³ Note that the U.S. has a different approach and the definition coming closest to this definition can be found in the VPPA. Paul M. Schwartz & Daniel J. Solove, *Defining Personal Data*, 13 PRIVACY AND SEC. L. REP. 1581 (2014).

⁴⁴ Tamara Dinev & Paul Hart, *An Extended Privacy Calculus Model for E-Commerce Transactions*, 17 J. INFO. SYS. RES. 61, 63 (2006).

The second concept in need of a definition is the notion of “price.” This term – “price” – is routinely used in a wide range of settings: from conversations between private individuals to policy debates and academic theoretical discourse. In most situations its meaning is taken for granted, as it is clear from the context in which the term is used. Generally, it is used to describe some form of payment: something that has to be “given up” to receive something else.⁴⁵ Consumers use the word price to mean the “cost” of obtaining what they want. They enter into a transaction with another entity, which provides something they want, and give something in return. Price, thus, involves a notion of “quid pro quo:” giving X (the price) to receive Y (the good or service). This is what is called, in common law of contracts, “consideration:” the reciprocity that makes a contract legally binding, when each party to a contract is both promisor and promisee of something of value.⁴⁶ Consideration does not require money per se. Barter, or the exchange of goods or services for other goods or services, falls within its ambit.⁴⁷

In *Gottlieb v. Tropicana*, an American court held that, despite the lack of monetary price, there had been sufficient consideration for a contract to be established. This case specifically concerned the exchange of personal information for a service. The facts revolved around the offer of a Diamond Club card at a casino, which entitled the holder to spin a wheel of fortune, the Million Dollar Wheel, once a day. To obtain the Diamond Club card a customer had to submit personal data, which would be used for targeted marketing. In the case, a Diamond Club card holder had spun the wheel and won the grand prize, which the casino refused to pay out. The casino claimed before the court that, *inter alia*, there was no valid contract because there was insufficient consideration. The court disagreed, holding that “[b]y presenting her Diamond Club card to the casino attendant and allowing it to be swiped into the casino's machine, *she was permitting the casino to gather information about her gambling habits.*”⁴⁸ The

⁴⁵ Donald RUTHERFORD, *ECONOMICS: THE KEY CONCEPTS* 159 (Routledge Key Guides 2007).

⁴⁶ EMILY FINCH & STEFAN FAFINSKI, *LAWEXPRESS: CONTRACT LAW* 36 (Pearson, 3d ed. 2013).

⁴⁷ RUTHERFORD, *supra* note 45, at 159.

⁴⁸ *Gottlieb v. Tropicana Hotel & Casino*, 109 F. Supp. 2d 324, 329 (E.D. Pa. 2000) (emphasis added).

idea implicit in the reasoning of the *Gottlieb* court is that things other than the promise of money can constitute consideration. This holds true for price in general, as well.

The idea of “quid pro quo,” or consideration, can form the basis for a definition of the concept of price. A price is a tool of communication, a way for buyers and sellers to express their intentions, to signal that they value what the other has to offer, and to indicate how much they are willing to give in exchange. Price is broadly speaking the amount of *money or something of worth* that has to be sacrificed to obtain one unit of a good or service.⁴⁹ Although prices are customarily expressed in terms of money, they can be rendered in terms of other goods or services. Although not expressed in this way by the court, this was the case in *Gottlieb v. Tropicana*; the price had been rendered in ‘swipes’ and in personal information - the swipe of the Club Card to spin the wheel, personal information to obtain the Club Card. Price, in other words, is the amount of a *medium of exchange* which needs to be paid to obtain a good or service. A medium of exchange is the object which, although it may have little intrinsic value, is widely used and accepted to pay for goods or services. People will readily accept it, even if they do not need it for itself, because they know they can use it to purchase other goods or services.⁵⁰ The object occupies a particular position in the economy, acting as a sort of “go-between.”⁵¹ Without it, trade would be more difficult, as the exchange of goods would require a double coincidence of wants.⁵²

The definition of price, then, can be formulated as follows: price is the amount of something of worth that has to be exchanged to obtain

⁴⁹ RUTHERFORD, *supra* note 45, at 159; Irena Asmundson, *Back to Basics: What Is a Price?* 50 FIN. & DEV. 42 (2013).

⁵⁰ Nobuhiro Kiyotaki & Randall Wright, *Acceptability, Means of Payment, and Media of Exchange*, in FEDERAL RESERVE BANK OF MINNEAPOLIS QUARTERLY REVIEW 18 (Summer 1992); Robert A. Jones, *The Origin and Development of Media of Exchange*, 84 J. POL. ECON. 757, 758 (1976).

⁵¹ W. T. NEWLYN, *THEORY OF MONEY* 1 (Oxford University Press 1971); Geoffrey Ingham, ‘*Babylonian Madness*’: *On the Historical and Sociological Origins of Money*, in 1 THEORIES OF MONEY AND BANKING: DEVELOPMENT OF HETERODOX APPROACHES TO MONEY AND BANKING 82 (Elgar Research Collection 2000).

⁵² NEWLYN, *supra* note 51, at 53; WILLIAM STANLEY JEVONS, *MONEY AND THE MECHANISM OF EXCHANGE* 13 (K. Paul, Trench, & Co. 1909); JOSEPH HARRIS, *AN ESSAY UPON MONEY AND COINS. PART I. THE THEORIES OF COMMERCE, MONEY, AND EXCHANGES* 36 (1757).

one unit of a good or service, i.e. price is an agreed amount of a medium of exchange. This means that personal data could be used as a price, if it can be a medium of exchange. Although many items could be used as a medium of exchange (past media of exchange have included cattle, shells, stones, corn, cacao nuts, tobacco, salt, and so on) in practice one article will be selected by custom or by force of circumstances. Money is our current medium of exchange – the set of assets in the economy regularly used to buy goods – in addition to being our unit of account, store of value and standard of deferred payment.⁵³ This is unlikely to change any time soon. However, it can be argued that in a particular subset of the economy – the online business models centered on the offer of free goods for profit – personal data may come to fulfill that function. Whether an item has the potential to be a medium of exchange is interesting for multiple areas of academic and policy debate, ranging from the macro-economic views of currencies and prices, to the regulation of relationships between people at a micro-level. This article does not mean to get involved in those debates, however fascinating they may be. What is of concern, for the purposes of this analysis, is the way in which this definition of price (as an amount of a medium of exchange) can assist with market definition. Market definition involves an assessment of demand-side substitution. The use of media of exchange (the payment of prices) indicates the willingness of individuals to trade, and the value they attribute to goods and services relative to each other. Because their access to the medium of exchange fluctuates, individuals distribute it according to their own preferences and priorities. They will use less of the medium for products of lesser value to them, and more of the medium for products of higher value. Thus, the attribution of media of exchange in the economy – the “prices paid” – reflects demand.

In general, eight different requirements need to be fulfilled for an item to be an “ideal” medium of exchange, although not all historical media of exchange have fulfilled every one. These requirements are: value, acceptability, relative durability and stability, portability,

⁵³ N. GREGORY MANKIW, *PRINCIPLES OF ECONOMICS* 612 (CENGAGE Learning, 7th ed. 2015); CHARLES A. CONANT, *THE PRINCIPLES OF MONEY AND BANKING* 20 (Harper & Bro. 1905); Iulia Bucur & Stefan Sambotin, *On Money as an Institution and Medium of Exchange*, 16–17 *STUD. & SCI. RES. ECON. ED.* 37, 38 (2011-2012); JEVONS, *supra* note 52, at 13; NEWLYN, *supra* note 51, at 2; HARRIS, *supra* note 52, at 37; Ingham, *supra* note 51, at 82.

divisibility, storability, recognizability and homogeneity.⁵⁴ Two caveats need to be made regarding these requirements. First, it is important to remember that these requirements are the criteria for an “ideal” medium of exchange. Money itself does not fulfill all of these perfectly at all times. Even items that do not satisfy all of these requirements can be media of exchange, as long as they are valued by trade participants and accepted by them in exchange for goods and services. The fulfillment of these two requirements – value and acceptability – is essential for any item to function as a medium of exchange. Second, the threshold for the fulfillment of these requirements may vary depending on the ultimate use of the item. If the medium of exchange is to be used as a currency for the wider economy, or as an investment vehicle, the item may have to satisfy the criteria to a higher degree, and in the eyes of more trade participants, than in the context at hand. In this article, the concept of personal data as a medium of exchange is approached for the purpose of being a measure of demand-side substitutability. The most important requirements, therefore, are value and acceptability, to be fulfilled from the perspective of the consumers of the services for which personal data is exchanged. Users of an online service should attribute a certain value to their data, and accept that their data is provided in exchange for goods or services. If they do, their purchasing actions can reveal their opinion on the extent that products fulfill their needs and wants. By “spending” less personal data on one service, but more on another, they signal their preferences for certain products. If consumers value personal data, and accept it as a means of exchange, their consumption patterns would reveal which products they consider to be substitutes. Personal data would be the price they pay, and a way to measure demand-side substitutability. Value and acceptability will be discussed in more detail in the following sections.

B. *Value*

1. *Value in Theory*

In order for an item to be a medium of exchange, it needs to have a recognized value. Without the existence of this value in the minds of those exchanging in trade, the item will not readily be accepted as a

⁵⁴ CONANT, *supra* note 53; JEVONS, *supra* note 52; NEWLYN, *supra* note 51; HARRIS, *supra* note 52, at 39; JONES, *supra* note 50; Kiyotaki & Wright, *supra* note 50, at 18-19.

medium of exchange. The medium can derive its value from different sources: the value can be intrinsic, meaning that it corresponds to the independent value of the good it is composed of; the value may be external, because it is a consequence of the item's relationship to other goods; or it can purely be a result of social convention.⁵⁵ TPD can only be used as a medium of exchange if it has value, whether it is intrinsic, external, a result of social convention, or a combination of all of these. It may be worth examining whether there are any reasons TPD could have value in the minds of the persons engaging in commerce online.

The intrinsic value of a medium of exchange is often a result of the scarcity or the utility of its composing object. In some cases, it can also be the result of the cost of parting with it. In the first case, the medium of exchange is valuable because the item itself is finite and highly desired.⁵⁶ The composing good is in limited supply, and in high demand. It should not be too scarce, however, as it has to exist in sufficient quantity to meet the needs of trade.⁵⁷ Scarcity does not need to be universal: it may be that an object is scarce in one place, but not in another. The high cost or difficulty involved in transporting the object from one place (where the object can be found in abundance) to another (where it cannot or can hardly be found) can make it scarce in the last place and give it value. The value can also be a consequence of the cost involved in the collection, production, or reproduction of the medium.⁵⁸ Extensive labor input can give the medium value. A modern example of a medium which acquires value because of the labor required is the digital currency Bitcoin, which needs to be 'mined'⁵⁹ by individuals.⁶⁰ An earlier example is the sea shells which were used as media of exchange in the East Indies and by Native American Tribes,⁶¹ and had to be collected, sorted, polished and

⁵⁵ JEVONS, *supra* note 52, at 9, 11; CONANT, *supra* note 53, at 71.

⁵⁶ HARRIS, *supra* note 52, at 41, 45.

⁵⁷ HARRIS, *supra* note 52, at 78; JEVONS, *supra* note 53, at 49.

⁵⁸ HARRIS, *supra* note 52, at 42.

⁵⁹ "Mining" refers to the process of running mathematical hash verification processes to generate bitcoins and to validate Bitcoin transactions, thus ensuring the security of the Bitcoin ledger.

⁶⁰ Nikolei Kaplanov, *Nerdy Money: Bitcoin, the Private Digital Currency, and the Case against its Regulation*, 25 LOY. CONSUMER L. REV. 111, 119-21 (2012).

⁶¹ JEVONS, *supra* note 52, at 24.

assembled on string. The second cause of intrinsic value lies in the utility of the composing object. The extent a commodity gratifies a need or desire determines its value to members of society.⁶² An object's use may be ornamental, which was the case for shell beads which were used for ornamental purposes by Native American tribes and later adopted as media of exchange. Commodities with a particular use, such as input or consumption goods, have also been used as media of exchange in the past, deriving their value from their use purely as a commodity and their utility as a medium of exchange.⁶³ The last cause of intrinsic value is the cost of parting with a medium. This cost may be tangible or intangible.

It is possible to argue that TPD has intrinsic value. This intrinsic value is unlikely to lie in the scarcity of TPD. Personal data may be in high demand, but in principle the supply of personal data is not limited, in so far as the technical means and regulatory framework enable its collection. The amount of times an individual can give the same personal information is generally not limited, as personal data is a non-rivalrous good. Although effort is required in the development of technology for its collection and storage, the reproduction of personal data is no exorbitant cost. The utility of data may be a partial source of its value. It is used as an input for consumer services, targeted advertising, analytical services, and other applications being developed in the digital economy. Although scarcity and utility can provide theoretical explanations for the intrinsic value of data from the point of view of the businesses who collect it, personal data needs to be valued by users as well. Only then can it be a medium of exchange and a measure of demand-side substitutability. The cost of parting with personal data could explain the value of personal data to users, as sharing personal data entails privacy and opportunity costs. Sharing personal information involves some loss of privacy, and the knowledge that companies may possess information about you which they will put to use. Additionally, although an individual could give the same information to multiple entities, in some cases data may be the most valuable the first time it is shared. Therefore, sharing it comes with the opportunity cost of not being able to reveal it for the first time to another company.

⁶² JEVONS, *supra* note 52, at 9-10.

⁶³ JEVONS, *supra* note 52, at 42.

Regardless of its intrinsic value, a medium of exchange's value may be external, or a result of social convention. The relationship to other goods, such as gold, may attribute external value to a coin or piece of paper, which it does not intrinsically possess. The external goods guarantee the value of the medium, often strengthened by social convention. Habit, custom or legal enactment may attribute value to a medium of exchange, without reference to the properties of the medium or to another good. The intrinsic value of a good may still matter but is not necessary: an object can derive its value solely from the social agreement.⁶⁴ The force of the social convention as an assignor of value coincides with the quality of acceptability described below. The acceptance and use of an object as something with value by members of the society enforces the notion that it has a purpose and thus value.

2. *Value in Practice*

Asserting the causes of a medium's value is an interesting theoretical exercise. The real valuation of data, however, requires a more practical approach. Several methods can be used to determine the value of personal data. Unsurprisingly, each of these methods has its drawbacks. Studies on the value of data are fairly recent, and the research on the topic is still in its infancy. The economic use of personal data is a growing business with a lot more room for research. As the business grows, the literature on the topic is supplemented with additional research. Based on this research, there are three ways to approach the valuation question: studies can assess the value from the point of view of businesses, from the point of view of the users or 'data subjects', or from the point of view of an exchange between businesses and users. Two categories of valuation methods will be discussed: first, business-to-business (B2B) market-based assessments and second, valuations that incorporate the data subject. All methods have their pros and cons and still require refinement. Their existence, however, shows that it is indeed possible to attribute a value to personal data. The ideal valuation would consist of a combination of these different rudimentary methods.

The first category of valuation methods consists of business-based assessments, which determine the value of personal data solely on

⁶⁴ Xavier Cuadras-Morato, *Can Ice Cream Be Money?: Perishable Medium of Exchange*, 66 J. ECON. 103, 105 (1997).

information from corporate activities which do not directly involve the data subject, the consumer. The use of personal data by companies is thriving and growing. This is illustrated by the development of the field of *infonomics*, which is the study of the economic significance of information. The term was coined by Douglas Laney, and this field of research recognizes the potential of information as a business asset and studied how to quantify information's value.⁶⁵ As the corporate use of personal data grows, so does the interest in the value of data. Broadly, three groups of valuation methods will be discussed: valuations on the basis of company performance, valuations based on the cost of data loss or data replacement, and the market price of personal data. The first two groups of methods are based on indications of individual companies, whereas the valuation of personal data based on its market price refers to business-to-business relations.

The valuations based on company performance can look at either key performance indicators, or at the economic value of a personal data asset. The first option entails running experiments to compare how a company performs on one or more performance indicators including the use of personal data, with how the company performs on those indicators without the use of data.⁶⁶ The second option evaluates the contribution of data assets to the revenue of an organization. The aggregated market capitalization (total market value of the shares), revenue or net income of the company is divided by the number of personal data records held, to determine the value of each record.⁶⁷

⁶⁵ Douglas Laney, *Introducing Infonomics: Valuing Information as a Corporate Asset*, GARTNER RES. (2012), <https://www.gartner.com/doc/1958016?refval=andpcp=mpe> [<https://perma.cc/ZE42-TZ5H>]; Daniel Moody & Peter Walsh, *Measuring the Value of Information: An Asset Valuation Approach*, Presented at the European Conference on Information Systems 2 (1999), <http://si.deis.unical.it/zumpano/2004-2005/PSI/lezione2/ValueOfInformation.pdf> [<https://perma.cc/2S7W-TDZC>].

⁶⁶ Nicole Laskowski, *Six Ways to Measure the Value of your Information Assets*, in CIO DECISIONS: THE NEW INFONOMICS REALITY: DETERMINING THE VALUE OF DATA (SearchCIO TechTarget 2014), <http://searchcio.techtarget.com/feature/Six-ways-to-measure-the-value-of-your-information-assets> [<https://perma.cc/K4RW-DJTS>] (based on Douglas Laney, *Why and How to Measure the Value of your Information Assets*, GARTNER RES. (2015), <https://www.gartner.com/doc/3106719/measure-value-information-assets>); Bilyana Petkova & Philipp Hacker, *Reining in the Big Promise of Big Data: Transparency, Inequality, and New Regulatory Frontiers*, 13 LECTURE & OTHER AFFILIATE SCHOLARSHIP SERIES 19 (2016).

⁶⁷ OECD, *supra* note 42, at 20; Laskowski, *supra* note 66 (based on Laney, *supra* note 66); Petkova & Hacker, *supra* note 66, at 20.

Revenue can come from multiple sources, such as the use of data for targeted advertising⁶⁸ or the sale of analytical services. This method, however, relies on the concept that every record is comparable. In addition, it is a reliable method only if most of the company's revenue is generated through the use of personal data or if the data-driven part of the company's activities is split into a clearly separate and distinct part of the company. This method requires information on the company, which may not always be public knowledge. Most of the available information used to this date comes from U.S. companies. The OECD, for example, analyzed the U.S. figures of data broker Experian and of social network site Facebook in its 2011 report. The concept of valuations based on the cost of data if it needs to be replaced is best illustrated by the loss of data in case of a security breach. Such a loss will imply multiple costs, such as the risk of damages claimed by customers, but also the cost of replacing the data.⁶⁹ This cost value of information has been set out by Laney, based on the accounting principles of replacement costs, used for most intangible assets that do not have a discernible market value.⁷⁰ The last approach to business-based valuations tries to determine the market value of personal data, by assessing the revenue generated from the sale, license, or barter of personal data. It determines the price in competitive markets, which is, in principle, the market clearing price at the intersection of supply and demand. As personal data is non-rivalrous (use does not diminish the supply), the market clearing price may not fully coincide with the full economic value of the underlying personal data record. In addition, the market clearing price may also include other elements such as the costs incurred by the company in the collection and management of the data.⁷¹ However, for the purposes of market definition, it seems that the market clearing price is a sensible determinant of personal data's value. A bigger problem with the reliance on market prices is that the information available on market prices refers to B2B relations, such as sales by data brokers or by companies, such as Facebook or Twitter, to third parties. For a more comprehensive understanding of the value of

⁶⁸ Method used by Petkova & Hacker, *supra* note 66.

⁶⁹ OECD, *supra* note 42, at 20-29.

⁷⁰ Laskowski, *supra* note 66 (based on Laney, *supra* note 66); OECD, *supra* note 42, at 25.

⁷¹ OECD, *supra* note 42, at 25.

personal data, it is necessary to introduce the consumer side into the equation.

Valuations that incorporate the data subject are vital to the use of personal data as a price for the definition of the market with regard to 'free' services on the Internet. These services are part of B2C (business-to-consumer) relationships in which personal data is the price paid by consumers, the data subjects. Only taking into account the value of personal data for a company's activities, or the value within the B2B relationships, would not be appropriate. Information on the value that data subjects attribute to their personal data is less readily available than information on the value attributed by businesses. This does not mean, however, that no methods exist to approximate such an evaluation. Over time the interest in the valuation of personal data by individuals has grown and the literature on the subject has expanded. Surveys and experiments have been done on the individual valuation of specific personal data records by consumers, as well as on their willingness to pay for privacy and willingness to accept money for personal data. This research reveals that a value can be assigned to personal data by individuals, which often varies depending on the types of personal data.⁷² It also revealed that the amount of consumers willing to accept money in exchange for their personal data is generally greater than the number of consumers willing to pay the same price for the protection against disclosure of this information.⁷³ These differences between willingness to pay for privacy (WTP) and willingness to accept money for personal data (WTA) illustrate that WTP alone may not be the most accurate method for determining the valuation of personal data by individual consumers. Moreover, surveys and experiments have clear downsides. Surveys reveal *stated* preferences, which, as illustrated by the privacy paradox, may not coincide with reality. Experiments have the drawback that the context and framing of the experiment can have a

⁷² Bernardo A. Huberman, Eytan Adar & Leslie R. Fine, *Valuating Privacy*, 3 IEEE SECURITY & PRIVACY, Sept-Oct. 2005, at 22, 22 (2005); Jens Grossklags & Alessandro Acquisti, *When 25 Cents is Too Much: An Experiment on Willingness-To-Sell and Willingness-To-Protect Personal Information*, SIXTH WORKSHOP ON THE ECONOMICS OF INFORMATION SECURITY 16, 29 (2007).

⁷³ OECD, *supra* note 42, at 30; Alessandro Acquisti, Leslie K. John & George Loewenstein, *What is Privacy Worth?* 42 J. LEGAL STUD. 249 (2013); Grossklags & Acquisti, *supra* note 72; Christine Bauer, Jana Korunovska & Sarah Spiekermann, *On the Value of Information – What Facebook Users are Willing to Pay*, Proceedings of the European Conference on Information Systems Paper 197, at 3 (2012).

decisive impact on participants' decisions, thus skewing the results. These disadvantages should not be construed as a reason to discontinue further research into the valuation of personal data by consumers, especially if experiments can be set up in such a way as to more closely resemble real-life scenarios of the exchange of personal data for monetary benefits. Consumers routinely encounter situations in which they exchange personal data for a benefit, such as for a free service or discounted good. These scenarios can be used as points of reference for the valuation of personal data by consumers. Nonetheless, results from such experiments would not suffice on its own, as it may not reveal the actual value consumers can obtain for their personal data in relation to a company.⁷⁴ Another, potentially more appropriate, method of assigning user-based value to personal data is to perform a market analysis which includes the data subject. A market approach captures an economic value resulting from the intersection of supply and demand.⁷⁵ As of yet, the direct sale, license or barter of personal data is mostly done in B2B relations, but markets where individuals trade their own data are developing, as described below.⁷⁶ Companies like Datacoup or People.io offer consumers the possibility to exchange their personal data for monetary benefits, such as money, offers by third parties, or credits. The offer of credits in exchange for the personal data may not sound wholly new: even before the advent of digital markets, consumers received credits (or 'points') when using certain loyalty or 'frequent shopper' cards which record data about their shopping behavior.⁷⁷ The modern schemes take this a step further, by making the exchange of personal data for credits more explicit, and clearly articulating how many credits one obtains in exchange for the personal data. A study of these businesses could provide valuable insights into the value of personal data. When trying to ascertain the value of TPD, it could be instructive to establish the amount of credits individuals get in these schemes for their

⁷⁴ OECD, *supra* note 42, at 32.

⁷⁵ OECD, *supra* note 42, at 32.

⁷⁶ See C.3. Acceptability: Data Markets and Other Shifts to TPD.

⁷⁷ Timothy R. Graeff & Susan Harmon, *Collecting and Using Personal Data: Consumers' Awareness and Concerns*, 19 J. CONSUMER MARKETING 302, 304 (2002); Nils Zurawski, *Local Practice and Global Data: Loyalty Cards, Social Practices, and Consumer Surveillance*, 52 SOCIOLOGICAL Q. 509, 510 (2011); Acquisti & Grossklags, *supra* note 72, at 29.

personal data and what it is they can buy with their credits. Let's assume that information on the phone brand a consumer uses is worth 10 credits.⁷⁸ If 100 credits equals a \$5 discount in an online store, then one personal data record, in this instance the information on the consumer's phone brand, is worth \$0.50. To be able to posit, with some degree of certainty, that such a valuation is representative of the B2C market in data trade would require information from multiple data locker services, which at present is lacking. These nascent services could improve the process of valuation of personal data, as they incorporate both the demand side and the supply side in the B2C relationship. It will be interesting to see how they develop and whether more such business models emerge.⁷⁹

Business-based value assessments		
<i>Method</i>	<i>Based on</i>	<i>How</i>
Company performance	Individual company	<ul style="list-style-type: none"> - How company performs with vs without personal data - How data assets contribute to revenue (market cap, revenue, net income)
Cost of loss/replacement	Individual company	Cost value of personal data cf. accounting principle of replacement costs for intangible assets without discernible market value
Market price	B2B	Market clearing price for sale, license or barter of personal data between businesses
Valuation incorporating the data subject		
Surveys and experiments	On valuation of specific personal data records or on WTP for privacy or WTA money for personal data	
Market price	Sale, license or barter of personal data in B2C relations (limited as of yet, but in developing: f.ex. Datacoup, People.io)	

⁷⁸ Which it seems to be on the People.io website – People.io offers 10 credits for an answer to certain questions when you first start using the website. People.io are not yet active in Yorkshire, but they are in London, however. It is not clear what the exchange rate of credits is.

⁷⁹ OECD, *supra* note 42, at 34.

Each of the methods described above suffers from the novelty of personal data as an asset and as a medium of exchange. It is important to acknowledge that, without more research and practical evidence on the value of data, the use of TPD as price for the purposes of market definition would not be feasible. This article continues on the assumption that it is possible to value TPD, and that future studies and business practice will contribute to enabling B2C *and* B2B valuations. From the perspective of companies, the research on valuations of data by companies as part of their intangible assets is scarce, but growing, as more and more companies collect and sell data. As this industry expands, so does the demand for proper valuation methods which overcome some of the current problems with the transposition of current accounting methods.⁸⁰ From the perspective of consumers, there is yet more work to be done, as the development of B2C data trade is younger and less developed. Thus, there remains many opportunities for research into the business-to-consumer valuation of personal data, in particular with regard to a potential market price for personal data. However, as more companies venture into the sale, license or barter of personal data from consumer to business, practical evidence and expertise increases, allowing for a better idea of the B2C value of personal data. This is essential to establish personal data as a medium of exchange in the future.

C. Acceptability

A key requirement for an object to be a medium of exchange is that it is accepted as such by the members of the economy in which it is used. This means that its position as a 'go-between' is acknowledged or capable of being accepted by a majority of the individuals in that community. Acceptability may be the result of social convention, the force of circumstances or custom, or it may be imposed from higher up. An item might be accepted as a medium of exchange only in part of a society – a 'sub' community or economy – as is the case with Bitcoin, as long as members of that economy or community are aware, and accepting, of its use. In order for TPD to be a medium of exchange in a subset of the digital economy, it is necessary for it to be widely

⁸⁰ Juergen Sidgman & Malcolm Crompton, *Valuing Personal Data to Foster Privacy: A Thought Experiment and Opportunities for Research*, 30 J. INFO. SYS. 169 (2016); Adam B. Thimmesch, *Transacting in Data: Tax, Privacy, and the New Economy*, 94 DENV. L. REV. 145, 173 (2016).

accepted as such in the relationship between businesses and consumers. The difficulty lies not with the businesses, who routinely engage in a trade of data,⁸¹ but with consumers. Acceptability requires that consumers are aware of its use and are willing to treat it as medium in a trade relationship. Two elements of consumers' current and future attitude to TPD will be discussed briefly: their awareness of data collection and use, and their willingness to exchange personal data for benefits.

1. Awareness

It is paramount that a certain degree of awareness exists for the argument that TPD may be (or may become) a medium of exchange, and a measure of demand-side substitutability. Consumers need to be aware of three things: 1) the phenomenon of data collection itself and the circumstances in which it takes place, 2) the types of information collected and their use, and 3) the fact that the collection happens in exchange for benefits.

First, consumer awareness of data collection is an important element within the relationship between a data subject and a commercial entity. It seems that consumers are increasingly conscious of the regular collection of data by companies.⁸² Around 80% of the survey respondents in Deloitte's 2013 report reported awareness of the existence of data collection, and the subsequent report in 2014 stated that these numbers were increasing.⁸³ Respondents to the U.K.

⁸¹ UK Competition & Markets Authority, *The Commercial Use of Consumer Data: Report on the CMA's Call for Information* 34 (2015), https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/435817/The_commercial_use_of_consumer_data.pdf [<https://perma.cc/V53A-P7MR>] [hereinafter CMA].

⁸² Consumer Focus survey cited in CMA, *supra* note 81, at 98, n. 111 (98% of consumers think that some personal data and information is collected by 'free' services); JAMIE BARTLETT, *THE DATA DIALOGUE* 14, 34 (Demos Report 2012), http://www.demos.co.uk/files/The_Data_Dialogue.pdf?1347544233 [<https://perma.cc/5LRU-RXMZ>] [hereinafter Demos Report] (85% aware that online purchasing history data collected and used).

⁸³ HARVEY LEWIS, CECILIA LIAO & NEHA PANDEY, *DATA NATION 2013: BALANCING GROWTH AND RESPONSIBILITY 1* (Deloitte Insight 2013), <https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/deloitte-analytics/data-nation-2013-balancing-growth-and-responsibility.pdf> [<https://perma.cc/KW3E-XVGD>] [hereinafter Deloitte 2013]; HARVEY LEWIS & CECILIA LIAO, *DATA NATION 2014: PUTTING CUSTOMERS FIRST 3* (Deloitte Insight 2014), <https://www2.deloitte.com/contentconten>

Competition and Markets Authority's (CMA) call for information proposed that awareness was high due to companies' frequent privacy notices, terms and conditions, and cookie bars (informing consumers of cookies on the website).⁸⁴ This might indicate that mandatory information obligations do indeed serve a purpose: that of making consumers conscious of the phenomenon of data collection. Nonetheless, although consumers know that data collection is a reality, they are less aware of how and when data is being collected. Information duties may increase awareness of the phenomenon itself, but they manage to increase awareness of the methods and circumstances only to a limited extent. Privacy policies are often vague, and assessing them is time-consuming.⁸⁵ According to Deloitte's 2013 report, it would take an individual 31 hours to read the privacy policies of all new websites they visit in a year.⁸⁶ Agreements on the collection personal data are often incomplete or (intentionally) opaque, lacking details on the use of the data (including transfers to third parties).⁸⁷ Although consumers are conscious of the collection of data in general, the specific means of collection, usage, and storage are far less engrained. Of the 80% of consumers who were aware of data collection in general, only 35% claimed to understand it "fully," whereas 45% said they did not know the details.⁸⁸ There is a notable

tcontent/dam/Deloitte/uk/Documents/deloitte-analytics/deloitte-uk-data-nation-2014.pdf [https://perma.cc/5QU9-EEZU] [hereinafter Deloitte 2014].

⁸⁴ CMA, *supra* note 81, at 99.

⁸⁵ Carlos Jensen & Colin Potts, *Privacy Policies as Decision-Making Tools: An Evaluation of Online Privacy Notices*, 6 Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, ACM PRESS 471 (2004); Aleecia M. McDonald & Lorrie Faith Cranor, *Beliefs and Behaviors: Internet Users' Understanding of Behavioral Understanding*, Presentation at the TPRC2010 Conference 41 (2010), <http://ssrn.com/abstract=1989092> [https://perma.cc/N8VW-RYDJ]; Alessandro Acquisti, Curtis R. Taylor & Liad Wagman, 54 J. ECON. LIT. 442, 479 (2016).

⁸⁶ Deloitte 2013, *supra* note 83, at 6; David B. Meinert et al., *Privacy Policy Statements and Consumer Willingness to Provide Personal Information*, 4 J. ELECTRONIC COMMERCE IN ORGANIZATIONS 1, 13 (2006) (while respondents were generally aware of privacy policy statements, most do not take the time to read them).

⁸⁷ Alastair R. Beresford et al., *Unwillingness to Pay for Privacy: A Field Experiment*, 117 ECON. LETTERS 25, 25 (2012); Tony Vila et al., *Why We Can't Be Bothered to Read Privacy Policies: Models of Privacy Economics as a Lemons Market*, in PROC. IN 5 INT'L CONF. ON ELECTRONIC COMMERCE 1, 2 (2003).

⁸⁸ Deloitte 2013, *supra* note 83, at 1.

difference between awareness of active data collection and awareness of passive collection. Active data collection implies the direct solicitation of information from the consumer, which happens, for example, when a consumer fills in a form or survey. Consumers are aware of active data collection.⁸⁹ Passive data collection, such as cookies tracking the websites visited or purchasing habits, is less obvious. The degree of consumer knowledge varies depending on the method concerned.⁹⁰ For example, only a small number of consumers (21%) surveyed by Hoofnagle et al. were unaware of the existence of cookies,⁹¹ but as companies frequently develop new techniques to collect data, consumers have a hard time keeping up.⁹² In their 2010 article, McDonald and Cranor summarized this problem in one sentence: “[our] lab study quickly disabused us of any idea of studying user perceptions’ of some of these techniques.”⁹³

Second, awareness of the types of information being collected, and of the actual use of this information, requires examination. Consumers expect that services will collect a wide range of data.⁹⁴ It would seem sensible, then, to assume that consumers would read privacy policies, and, thus, would know *which type of information* they divulge. However, many of these policies describe broad categories of information—such as “personal information”—or give a list of data without describing exactly when they are being collected.⁹⁵

⁸⁹ DANIEL CAMERON ET AL., IPSOS MORI: SOCIAL RESEARCH INSTITUTE, DIALOGUE ON DATA: EXPLORING THE PUBLIC’S VIEW ON USING ADMINISTRATIVE DATA FOR RESEARCH PURPOSES 20 (2014); IPSOS MORI SOC. RESEARCH INSTITUTE, BEING ONLINE: AN INVESTIGATION OF PEOPLE’S HABITS AND ATTITUDES 35 (2013).

⁹⁰ McDonald & Cranor, *supra* note 85, at 9; Chris Jay Hoofnagle et al., *Behavioral Advertising: The Offer You Cannot Refuse*, 6 HARV. L. & POL’Y REV. 273, 276 (2012).

⁹¹ Chris Jay Hoofnagle et al., *How Different Are Young Adults from Older Adults When It Comes to Information Privacy Attitudes and Policies?* 13 (2010), <http://ssrn.com/abstract=1589864> [<https://perma.cc/TB5V-NC6Q>].

⁹² Hoofnagle et al., *supra* note 90, at 277-83; Acquisti et al., *supra* note 85, at 25.

⁹³ McDonald & Cranor, *supra* note 85, at 7.

⁹⁴ CMA, *supra* note 81, at 99 (revealed that 70% of users of ‘free services’ expected these services to collect search history, sites visited, ‘likes’, location and purchases.)

⁹⁵ *E.g.*, *Privacy Policy*, GOOGLE, www.google.com/policies/privacy/ [<https://perma.cc/Y5PS-ZNUU>]; *Privacy Notice*, AMAZON, <https://www.amazon.co.uk/gp/help/customer/display.html/ref=gss?nodeId=502584> [<https://perma.cc/W27A-YM7H>] (last modified July 6, 2017), *Data Policy*, FACEBOOK,

Even if they were more specific, many consumers do not even read the privacy policies of the companies they interact with. Thus, the awareness of the types of data collected remains limited. When it comes to actual *usage of data*, consumer knowledge varies. Advertising and marketing purposes are the most commonly cited examples of data use. According to a 2014 survey by the Royal Statistical Society (RSS), 77% of respondents are aware that targeted advertisement is based on previous browsing data.⁹⁶ Although advertising and marketing are currently the most important example of data usage for purposes other than the improvement of the service, companies could also sell, share, or license data for other purposes, which are not widely understood and not always specifically communicated to the consumers. Awareness of the types of information collected, as well as the uses, could increase as companies' policies come under scrutiny through media coverage or regulatory intervention. Currently, "transparency" and data protection is very in vogue.⁹⁷ If discussion and intervention continue, it seems likely that consumer knowledge of data collection will increase.

Lastly, it is important to know whether consumers realize that the services they use are not "free," but part of an exchange of benefits. The CMA call for information⁹⁸ revealed that respondents are increasingly thinking of being part of a "mutual value exchange."⁹⁹ Some of the benefits that were cited by the consumers and businesses responding to the call were: personalized offers and discounts, product improvement, and free access to services, which would likely charge money for use if they could not generate revenue through the

<https://www.facebook.com/policy.php#> [<https://perma.cc/4B63-D2D9>] (last modified Sept. 29, 2016).

⁹⁶ IPSOS MORI SOC. RESEARCH INSTITUTE, PUBLIC ATTITUDES TO THE USE AND SHARING OF THEIR DATA 21 (2014).

⁹⁷ Emma Cradock et al., *Nobody Puts Data in a Corner? Why a New Approach to Categorising Personal Data is Required for the Obligation to Inform*, 33 COMP. L. & SEC. REV. 142, 142 (2017).

⁹⁸ CMA, *supra* note 81, at 17 (Carried out in January 2015 throughout UK amongst consumers, consumer representatives, individual firms and their representatives, trade bodies, research/academic organizations and others, including infomediaries. The Call for Information was supplemented with information from factual reviews commissioned from DotEcon and Analysis Mason.).

⁹⁹ *Id.* at 102; Demos Report, *supra* note 82, at 14.

trade of data.¹⁰⁰ There is evidence that the public is generally not willing to pay for free services (in money).¹⁰¹ Although a “trust deficit,” as described by the RSS,¹⁰² may make consumers wary of data sharing,¹⁰³ it seems they are increasingly conscious of the use of data for purposes, which may be beneficial to them. However, this knowledge is the result of media coverage rather than of an actual exchange of information between companies and consumers. If the provision of personal information is to be an actual trade, consumers should know in more detail, at the time of exchange, which benefits they may expect in return for their TPD. Transparency on the collection and use of information is vital to create an environment of mutual benefit and exchange. As articulated in the Demos report, “At the moment people are entering into an exchange but are not always sure what they are trading. It is vital to make the currency of the exchange more explicit to all parties, so that trust is established.”¹⁰⁴ Some CMA respondents suggested that awareness would rise with ongoing growth in more explicit data-driven services.¹⁰⁵ This may indeed contribute to an environment in which the exchange of personal information is seen as an explicit trade. Indeed, organizations are emerging which focus on the benefits individuals can obtain from the trading of their personal data. These are discussed below.

2. *Willingness*

The second question is whether consumers would be willing to exchange TPD for economic benefits. That businesses derive value from data and engage in data trades is well-known, but how do

¹⁰⁰ CMA, *supra* note 81, at 54, 59.

¹⁰¹ *Id.* at 103.

¹⁰² IPSOS MORI, *supra* note 96, at 9; See THE ECONOMIST: INTELLIGENCE UNIT, THE BUSINESS OF DATA 15 (2015) (“It’s a question of trust”).

¹⁰³ CMA, *supra* note 81, at 103 (Consumers seem to consider that the benefit they receive in exchange for their data is by far exceeded by the benefit companies derive from the use of their data.).

¹⁰⁴ Demos Report, *supra* note 82, at 18.

¹⁰⁵ CMA, *supra* note 81, at 100; Demos Report, *supra* note 82, at 40; DIRECT MARKETING ASSOCIATION, DATA PRIVACY: WHAT THE CONSUMER REALLY THINKS 10-12 (2012).

consumers approach the personal data trade? The disclosure of TPD is likely to generate trade-offs with tangible economic dimensions.¹⁰⁶ Individuals will disclose TPD only if they perceive that the overall benefits of disclosure are at least balanced by, if not greater than, the assessed risk of disclosure.¹⁰⁷ These efficient bargaining arguments depend on consumers internalizing the costs and benefits of trading their personal information.¹⁰⁸ This implies a calculation of the costs and benefits involved in the disclosure of TPD. One can ask, however, whether such a calculation is indeed possible.

A calculus of expected returns may be impeded by the lack of (perfect) information on the use of the personal data. In addition, even if a consumer were aware of every possible usage of that information, bounded rationality and optimism bias mean individuals may hyperbolically discount future costs and benefits. Individuals appear to be more inclined to reveal information if the immediate gratification from this revelation seems or is superior to the delayed (and thus discounted) future consequences (this is called “time-inconsistent discounting”).¹⁰⁹ Thus, consumers may be more willing to provide personal data, such as location, gender, IP address and brand preference, in order to receive an application at no monetary cost in that very instant, even if they know this information may be sold to and used by third parties in intrusive manners at a later time.

The costs and benefits are both tangible and intangible.¹¹⁰ One particular cost is the harm to privacy; whose measurement raises specific questions. First, privacy means different things to different people, as well as to different societies.¹¹¹ Whether privacy is considered an inviolable human right or an economic good has an impact on the assessment of its “loss.” Second, the boundaries of

¹⁰⁶ Acquisti et al., *supra* note 85, at 3.

¹⁰⁷ Dinev & Hart, *supra* note 44, at 62.

¹⁰⁸ Acquisti et al., *supra* note 85, at 12-13.

¹⁰⁹ Alessandro Acquisti, Laura Brandimarte & George Loewenstein, *Privacy and Human Behavior in the Age of Information*, 347 SCI. 509, 510 (2015); Alessandro Acquisti, *Privacy in Electronic Commerce and the Economics of Immediate Gratification*, in PROC. IN 5 INT'L CONF. ON ELECTRONIC COMMERCE 21-22 (2004).

¹¹⁰ Acquisti et al., *supra* note 85, at 6.

¹¹¹ See Daniel J. Solove, *A Taxonomy of Privacy*, 154 U. PA. L. REV. 477, 479 (2006); Acquisti et al., *supra* note 85, at 1.

privacy harm can be both subjective (the perception of unwanted observation¹¹²) and objective (the unanticipated or coerced detrimental use of personal information¹¹³). It is difficult to generally quantify subjective privacy harm. Objective privacy harm, though easier to quantify, goes beyond the loss, which results from a monetary payment. When a transaction involves a payment in money, that money cannot be “used” against the individual at a later date. This is not the case for TPD. TPD is, by definition, related to a person. Its disclosure comes with risks of identity theft, fraud, and the divulgence of this information to third parties. Calculating this cost requires prior knowledge of the uses the data could be put to. There is a problem of information asymmetry. Consumers are rarely, if ever, completely aware about the purposes for which their data is being collected and the extent of third-party use.¹¹⁴ Third, the value of privacy to an individual varies on the circumstances in which that value is considered. An individual may value privacy more if specifically asked about privacy protection than when given the option to reduce it in exchange for benefits.¹¹⁵

The majority of scholars agree that consumers’ concern for privacy is not absolute. Individuals are willing to exchange their personal data for economic benefits. Most individuals are privacy pragmatists, according to a Harris Interactive poll: while concerned about privacy, they will trade it for other benefits.¹¹⁶ Most research on consumers’ willingness to disclose information is survey-based, with a lesser amount of in-depth analytical research of consumers’ actual behavior.¹¹⁷ The lack of empirical evidence presented on the

¹¹² Ryan Calo, *The Boundaries of Privacy Harm*, 86 IND. L.J. 131,133 (2011).

¹¹³ *Id.*

¹¹⁴ Alessandro Acquisti & Jens Grossklags, *Privacy and Rationality in Individual Decision Making*, 3 IEEE SECURITY & PRIVACY 26, 29 (2012); Dinev & Hart, *supra* note 44, at 64-65.

¹¹⁵ Acquisti & Grossklags, *supra* note 114, at 26-28.

¹¹⁶ Harris Interactive, *Most People Are ‘Privacy Pragmatists’ Who, While Concerned About Privacy, Will Sometimes Trade It Off for Other Benefits, Says Harris Interactive Study*, PR NEWSWIRE (Mar. 19, 2003), <http://www.prnewswire.com/news-releases/most-people-are-privacy-pragmatists-who-while-concerned-about-privacy-will-sometimes-trade-it-off-for-other-benefits-says-harris-interactive-survey-74721077.html> [https://perma.cc/57UA-BQCS].

¹¹⁷ Catherine E. Tucker, *The Economics of Advertising and Privacy*, 30 INT’L J. INDUS. ORG. 326, 327 (2012).

willingness to trade information for benefits is, according to Norberg, Horne, and Horne, due to a couple of challenges. First, privacy perceptions vary according to origin and age of the population as well as the type of information involved. Second, the diversity in measurements used by researchers has resulted in some confusion regarding the implications that can be drawn; some aim to measure privacy concerns, whereas others look at privacy-related behavioral intentions. Empirical research into actual disclosure behavior remains far more limited.¹¹⁸ Considerable academic attention has been devoted to a phenomenon commonly called the “privacy paradox,” i.e. the dichotomy between the expressed concern over privacy and actual disclosure behavior.¹¹⁹ Although individuals express significant concern about privacy in surveys, their actual disclosure behavior does not reflect this, as revealed in several studies¹²⁰

Surveys have indicated that consumers are willing to trade personal information for benefits. These surveys have been done by

¹¹⁸ Patricia A. Norberg, Daniel R. Horne & David A. Horne, *The Privacy Paradox: Personal Information Disclosure Intentions versus Behaviors*, 41 J. CONSUMER AFF., at 100, 101-03 (2007).

¹¹⁹ Alessandro Acquisti, Laura Brandimarte & George Loewenstein, *Privacy and Human Behavior in the Age of Information*, 347 SCI. 509, 510 (2015); Janice Y. Tsai, Serge Egelman, Lorrie Cranor & Alessandro Acquisti, *The Effect of Online Privacy Information on Purchasing Behavior: An Experimental Study*, 22 INFO. SYS. RES. 254, 255 (2011); Sarah Spiekermann, Jens Grossklags & Bettina Berendt, *E-Privacy in 2nd Generation Commerce: Privacy Preferences versus Actual Behavior*, 48 CACM 38, 38 (2005); Acquisti & Grossklags, *supra* note 114, at 26; Dinev & Hart, *supra* note 44, at 61.

¹²⁰ Tsai, Egelman, Cranor & Acquisti, *supra* note 119, at 254, 259 (survey and shopping experiment); Spiekermann, Grossklags & Berendt, *supra* note 119 (survey and shopping experiment); Acquisti & Grossklags, *supra* note 114 (survey and self-reported behavior); Norberg, Horne & Horne, *supra* note 118, at 118 (survey and disclosure test); Il-Horn Hann, Kai-Lung Hui, Tom S. Lee & I.P.L. Png, *Online Information Privacy: Measuring the Cost-Benefit Trade-Off*, TWENTY-THIRD INT. CONFERENCE ON INFO. SYS., 5-7 (2002) (survey); Andreas Krause & Eric Horvitz, *A Utility-Theoretic Approach to Privacy in Online Services*, 39 J. ART. INTELL. RES. 633 (2010) (survey); JOSEPH TUROW, MICHAEL HENNESSY, & NORA DRAPER, THE TRADEOFF FALLACY: HOW MARKETERS ARE MISREPRESENTING AMERICAN CONSUMERS AND OPENING THEM UP TO EXPLOITATION (2015), https://www.asc.upenn.edu/sites/default/files/TradeoffFallacy_1.pdf [<https://perma.cc/R8PZ-D3PG>] (survey); Sabine Trepte & Leonard Reinecke, *The Reciprocal Effects of Social Network Site Use and the Disposition for Self-Disclosure: A Longitudinal Study*, 29 COMP. HUM. BEHAV. 1102, 1102 (2012) (survey); Joseph Phelps, Glen Nowak & Elizabeth Ferrell, *Privacy Concerns and Consumer Willingness to Provide Personal Information*, J. PUB. POL'Y & MARKETING 27 (2000) (survey).

both commercial and non-commercial entities.¹²¹ A PwC study revealed that an average of 73% of respondents would consider sharing information depending on the benefits they would receive in exchange. This seemed to hold even more for younger consumers (18-29).¹²² According to Deloitte's 2014 Report, nearly two-thirds of consumers would be willing to exchange their personal information for benefits, ranging from money savings to improved or personalized services.¹²³ As early as 2000, Phelps, Nowak, and Ferrell concluded that catalogue shoppers' purchase intentions are greater when shopping benefits or time savings are offered in exchange for information.¹²⁴ Krause and Horvitz found that there is a willingness to share personal information in return for gains in efficiency in web search.¹²⁵ In a questionnaire by Norberg, Horne, and Horne on self-reported disclosure behavior, respondents were asked whether they would provide information to a large bank for a \$20 incentive. The researchers found that the level of actual disclosure significantly exceeded individuals' intentions to disclose.¹²⁶ In addition to these surveys, a handful of research experiments performed in the last 20 years revealed consumers' willingness to provide personal information

¹²¹ David Rogers, *Study Shows that Consumers are Willing to Share Personal Data if the Benefits – and Brand – Are Right*, COLUM. BUS. SCH. (Oct. 29, 2015), <http://www8.gsb.columbia.edu/newsroom/newsn/3850/study-shows-that-consumers-are-willing-to-share-personal-data-if-the-benefits-and-brand-are-right> [<https://perma.cc/QLJ3-D5ZR>]; DMA GROUP, DATA PRIVACY: WHAT THE CONSUMER REALLY THINKS (2015), http://www.dma.org.uk/uploads/ckeditor/Data-privacy-2015-what-consumers-really-thinks_final.pdf [<https://perma.cc/92LE-MS4C>]; *Consumers almost as willing to share data as pay money to get access to communication services, survey finds*, OUT-LAW.COM, <http://www.out-law.com/en/articles/2015/september/consumers-almost-as-willing-to-share-data-as-pay-money-to-get-access-to-communication-services-survey-finds/> [<https://perma.cc/Y3YX-4FLW>]; Bob Tedeschi, *E-Commerce Report: Everybody Talks About Online Privacy, But Few Do Anything About It*, N.Y. TIMES (June 3, 2002), <http://www.nytimes.com/2002/06/03/business/e-commerce-report-everybody-talks-about-online-privacy-but-few-anything-about-it.html> [<https://perma.cc/D5MD-MH7T>].

¹²² PWC, THE SPEED OF LIFE: CONSUMER INTELLIGENCE SERIES 2 (2012), <http://www.pwc.com/us/en/industry/entertainment-media/assets/pwc-consumer-privacy-and-information-sharing.pdf> [<https://perma.cc/G9G7-KGUS>].

¹²³ LEWIS & LIAO, *supra* note 83, at 6.

¹²⁴ Phelps, Nowak & Ferrell, *supra* note 120, at 36.

¹²⁵ Krause & Horvitz, *supra* note 120.

¹²⁶ Norberg, Horne & Horne, *supra* note 118.

in exchange for benefits. These benefits are operationalized as monetary rewards, future time savings, enhancement in quality, or personalization.¹²⁷ In Spiekermann, Grossklags, and Berendt's study into the privacy paradox, most participants did not live up to their self-reported privacy preferences.¹²⁸ They displayed a surprising readiness to reveal highly personal information to an anthropomorphic 3-D online shopping bot. The study indicates that internet users do not act in accordance with their (self-reported) views on privacy. Given the right circumstances, online users forget about their privacy concerns and communicate even their most personal details. This holds true in particular when enticing benefits are offered.¹²⁹ An experiment by Beresford, Kubler, and Preibusch tested consumer willingness to engage in an exchange of personal information for monetary benefits; however, they framed it as the unwillingness to pay for privacy rather than the willingness to provide data in exchange for benefits. In their test, subjects had the choice to purchase from one of two stores asking for their information. The test was framed in such a way that the first store was asking for more sensitive information. That store offered a lower price, and more individuals chose to buy from it.¹³⁰ Grossklags and Acquisti also performed an experiment to test individuals' willingness to sell or protect personal information. In the second phase of their experiment, the researchers gave the individuals (who had received \$10 of game money) subsequent options of selling their personal information for revelation within the group of test subjects or paying to protect their information against such revelation. The researchers found that individuals almost always chose to sell their information and almost never to protect the information, even for as little a price as \$0.25.¹³¹ Whereas in this experiment individuals chose to sell their information

¹²⁷ Hann, Hui, Lee & Png, *supra* note 120, at 4-7; Ramnath K. Chellappa & Raymond G. Sin, *Personalization versus Privacy: An Empirical Examination of the Online Consumer's Dilemma*, 6 INFO. TECH. & MGMT. 181, 182 (2005); Krause & Horvitz, *supra* note 120.

¹²⁸ Spiekermann, Grossklags & Berendt, *supra* note 119.

¹²⁹ Berendt, Günther & Spiekermann, *Privacy in E-Commerce: Stated Preferences vs. Actual Behavior*, 48 COMM. ACM 101, 102-03 (2005) (in this test product recommendation and chance of a discount).

¹³⁰ Beresford, Kübler & Preibusch, *supra* note 87, at 26-27.

¹³¹ Grossklags & Acquisti, *supra* note 72.

on weight even for as little as \$0.25 - \$1, in Huberman et. al's experiment on the valuation of privacy, individuals had an average demand price of \$74.06 dollars for weight information. This difference in valuation is probably due to the experiments' set-ups as well as the difference in age range, with the average age in Grossklags and Acquisti's test around 20 and in Huberman et. al's test around 40 years old.¹³² Nonetheless, it does show a certain willingness to exchange personal information for monetary benefits.

The experiments revealed that the right commercial environment can induce a remarkable willingness to disclose personal information, which is often higher than what would be expected based on consumers' self-reported privacy concerns. The promise of commercial benefits increases the readiness to provide personal information. None of these experiments, however, directly address the question of how consumers would behave if they were fully aware that they were engaging in some type of personal data trade for monetary incentives. So far as can be ascertained, extensive research on this question has not to date been published. In all of the studies cited, the purpose of the research (such as testing the privacy paradox or determining the value consumers attribute to personal information) was not communicated to participants up front in order to avoid priming. For our research purposes, however, it would be interesting to ascertain how consumers behave when they are completely aware that they are exchanging personal information for economic benefits, i.e. paying with TPD. If, in a situation of perfect knowledge of such an exchange, they would be willing to trade, the concept of TPD as a medium of exchange would be viable.

The premise of this article is that, if undertaken, such studies would reveal that individuals are indeed willing to engage in such trade. Willingness to share personal data depends on a few criteria: the type of information, the characteristics of the party with whom the information is shared, the knowledge of how the information will be used, and personal preferences.¹³³ It is also contingent on the expected returns and the environment in which the exchange takes place. ¹³⁴

¹³² Huberman, Adar & Fine, *supra* note 72, at 24; Grossklags & Acquisti, *supra* note 72.

¹³³ CMA, *supra* note 81, at 113.

¹³⁴ For familiarity with environment and website, see Julia B. Earp & David Baumer, *Innovative Web Use to Learn about Consumer Behavior and Online Privacy*, 46 COMM. ACM 81, 81 (2003); Craig Van Slyke, J.T. Shim, Richard Johnson & James Jiang, *Concern for Information Privacy and Online Consumer Purchasing*, 7 J. ASS'N FOR INFO. SYS. 415

The privacy paradox and the notion of immediate gratification, discussed above, are important concepts. They imply that most people – even those who say they are concerned with privacy – will be willing to provide personal information, even for small rewards, if these rewards are immediate and thus seem to trump possible downsides such as loss of privacy.¹³⁵ Indeed, perceptions and attitudes concerning information disclosure are changing. Privacy concern is adaptive and context-dependent.¹³⁶ Human beings look for cues in their environment to make decisions, relying on cultural and context-bound criteria, as well as the behavior of others. People acclimate to some level of intrusion when they become more common-place, as illustrated by an experiment in Helsinki on the installation of monitoring technology in households.¹³⁷ The more prevailing the collection of data for “free” or discounted services becomes, the more likely it is that individuals will willingly engage in an exchange. Human beings are creatures of habit and society. As more human interaction moves to the Internet, where data collection is prevalent in both social and commercial exchange, the willingness to disclose is likely to increase. Trepte and Reinecke found that individuals who use social network sites (and thus gain social capital) show an increased tendency to self-disclose online.¹³⁸ The more visible it becomes that online companies are engaging in data collection, the more normal it starts to become to frequent Internet users. This idea is reinforced by the evidence that younger people, who have spent a bigger portion of their lives on the Internet, are more likely to disclose personal

(2006). For how information is going to be used, see Krause & Horvitz, *supra* note 120; Phelps, Nowak & Ferrell, *supra* note 120; Nadia Olivero & Peter Lunt, *Privacy versus Willingness to Disclose in E-Commerce Exchanges: The Effect of Risk Awareness on the Relative Role of Trust and Control*, 25 J. ECON. PSYCHOL. 243 (2004).

¹³⁵ Tsai, Egelman, Cranor & Acquisti, *supra* note 119, at 256.

¹³⁶ Acquisti, Brandimarte & Loewenstein, *supra* note 119, at 511-12; Norberg, Horne & Horne, *supra* note 123, at 118.

¹³⁷ Acquisti, Brandimarte & Loewenstein, *supra* note 119, at 512; Antti Oulasvirta, Aurora Pihlajamaa, Jukka Perkiö, Debarshi Ray, Taneli Vähäkangas, Tero Hasu, Niklas Vainio & Petri Myllymäki, *Long-Term Effects of Ubiquitous Surveillance in the Home*, 2012 ACM CONFERENCE ON UBIQUITOUS COMPUTING 41, 49 (2012).

¹³⁸ Trepte & Reinecke, *supra* note 120, at 1109.

information.¹³⁹ According to the 2014 Deloitte survey, consumers aged 15-24 are more trusting of organizations collecting their personal information and more willing to exchange information for benefits.¹⁴⁰

3. Data Markets and Other Shifts to TPD

Privacy perceptions are cultural and shifting. The prevailing approach in Europe, that privacy is an element of individual dignity and autonomy, is not universal. Different cultures have different views on what can be kept private and what is part of the public sphere. There are two main areas that can lead or stop this shift in perception: commerce and the law. The evolution of each with regards to personal data is discussed here.

The increased use of commercial data-driven services has allowed the view of personal data as an economic asset to take root.¹⁴¹ With the Internet being a global phenomenon, privacy as a purely non-commercial concept may be in decline. Discussions about property rights over personal data have emerged with both proponents and critics.¹⁴² Some authors have argued for the attribution to individuals of property rights over their personal data.¹⁴³ A detailed discussion of the legal and philosophical grounds for a property right over personal data falls outside the scope of this research. For the purpose at hand, it suffices to acknowledge that such proposals have been put forward

¹³⁹ To compare differences in tests and answers in surveys, see Grossklags & Acquisti, *supra* note 72; Huberman, Adar & Fine, *supra* note 72; PWC, *supra* note 122; Avi Goldfarb & Catherine Tucker, *Shifts in Privacy Concerns*, 102 AM. ECON. REV. 349. (2012).

¹⁴⁰ LEWIS & LIAO, *supra* note 83, at 6, 8; *New research finds data trust deficit with lessons for policymakers*, IPSOS MORI (July 23, 2014), <https://www.ipsos-mori.com/researchpublications/researcharchive/3422/New-research-finds-data-trust-deficit-with-lessons-for-policymakers.aspx> [<https://perma.cc/H4RJ-5PWK>]; OFCOM, INTERNET USE AND ATTITUDES (2012), http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr12/2012_metrics_bulletin.pdf [<https://perma.cc/P6X5-FXEG>]; Hoofnagle, King, Li & Turow, *supra* note 91.

¹⁴¹ THE ECONOMIST, *supra* note 102, at 7-10.

¹⁴² See Kenneth C. Laudon, *Markets and Privacy*, 99 COMM. ACM 92 (1996); Pamela Samuelson, *Privacy as Intellectual Property?*, 52 STAN. L. REV. 1125 (1999); Paul M. Schwartz, *Property, Privacy, and Personal Data*, 117 HARV. L. REV. 2056 (2004); Jessica Litman, *Information Privacy/Information Property*, 52 STAN. L. REV. 1283 (2000).

¹⁴³ See Marco De Boni & Martyn Prigmore, *A Hegelian Basis for Privacy as an Economic Right*, CONTEMP. POL. THEORY 168 (2004).

and that the discussion is on-going. Indeed, property rights over data may be one way to bring consumers' interests more in line with reality. Lanier argues, in his book *Who Owns the Future?*, for a system of commercial rights over personal data. He envisions a digital future in which individuals will derive benefits from allowing organizations to collect and use their data. This could be a solution to privacy concerns as "some people might choose more privacy and demand so much . . . as to make the use of their [photographs] prohibitive. Most people will choose some reasonable, conventional setting."¹⁴⁴ His view of the future ties in with the suggestion to create, or more precisely to expand, information markets where individuals can transfer the rights to their personal data to others in exchange for some type of compensation.¹⁴⁵ Markets for data trade already exist at the level of business-to-business relations. Data brokers, such as Acxiom, Datalogix or Epsilon,¹⁴⁶ facilitate the trade of personal data between companies. Now data trade is also expanding to include consumers directly. Start-ups are emerging that want to introduce individuals to the data trade from which they have until now been excluded. A new industry is growing, consisting of 'Personal Information Management Services' (PIMS) that enable individuals to manage their personal data, and use it to personalize services, make better informed decisions, or harness the economic benefits of the data trade.¹⁴⁷ 'Personal data lockers' are giving individuals the ability to store their information in one place and control who they share that information with. Data lockers are a type of 'data bank account,' which could be part of a future 'personal data ecosystem,' as envisioned by the World Economic Forum.¹⁴⁸ They allow individuals to store information and exchange it with others, in a manner similar to the storage and

¹⁴⁴ LANIER, *supra* note 9, at 320.

¹⁴⁵ Laudon, *supra* note 142, at 96; Acquisti, Taylor & Wagman, *supra* note 85, at 473-74; Schwartz, *supra* note 142, at 2094.

¹⁴⁶ ACXIOM, <http://www.acxiom.co.uk/> [<https://perma.cc/HR2B-A3BD>]; DATALOGIX, <http://www.datalogix.com/> [<https://perma.cc/LJZ4-47SN>]; EPSILON, <http://www.epsilon.com/emea/> [<https://perma.cc/35GD-J9WB>].

¹⁴⁷ CMA, *supra* note 81, at 83.

¹⁴⁸ WORLD ECONOMIC FORUM, PERSONAL DATA: THE EMERGENCE OF A NEW ASSET CLASS 9 (2011), http://gerdleonhard.typepad.com/files/wef_itte_personaldatanewasset_report_2011.pdf [<https://perma.cc/D8NA-5GW3>].

exchange of money today. The concept of personal data lockers is still young and has sparked a series of intense debates.¹⁴⁹ But while academics and policy-makers debate, some organizations have started making this vision a reality. They not only provide storage services, but also enable individuals to reap the profits of their personal data directly by exchanging TPD for economic benefits. Companies such as People.io¹⁵⁰, HAT¹⁵¹, Citizenme¹⁵² and Datacoup¹⁵³ have established such services.¹⁵⁴ Datacoup, for example, provides software that extracts personal data from online activities with the user's permission, and informs the user which information could be taken and the value it could have. The user indicates which personal data can be sold or exchanged and receives compensation for this exchange. Right now, Datacoup is still in its infancy, but as more companies join up as partners, this concept of consumer involvement in data exchange may gain traction. The benefits offered in exchange for personal data will not necessarily be limited to money either, with data purchasers being able to offer discounts or free goods in return for the TPD.¹⁵⁵ People.io takes a slightly different approach, offering

¹⁴⁹ David Siegel, *The Personal Data Locker*, VIMEO (Aug. 11, 2010), <https://vimeo.com/14061238> [<https://perma.cc/4XDH-FXPD>]; *Personal Data Lockers Can Protect Privacy and Help Businesses, Says Consultant*, OUT-LAW.COM (June 12, 2014), <http://www.out-law.com/en/articles/2014/june/personal-data-lockers-can-protect-privacy-and-help-businesses-says-consultant/> [<https://perma.cc/RP2E-5UZP>]; Matt Zimmerman, *Building a Personal Data Locker*, WE'LL SEE, <http://mdzlog.alcor.net/2011/08/15/building-a-personal-data-locker/> [<https://perma.cc/QR8P-J8GG>]; *It's Official*, FACE, <http://www.facegroup.com/blog/personal-data-lockers-the-future-of-data/> [<https://perma.cc/X8R8-GYWB>]; *Know Thyself: Data Lockers Promise to Help People Profit From Their Personal Information*, THE ECONOMIST (Dec. 15, 2012), <http://www.economist.com/news/business/21568438-data-lockers-promise-help-people-profit-their-personal-information-know-thyself> [<https://perma.cc/6FAD-EG7R>].

¹⁵⁰ PEOPLE.IO, <https://people.io/> [<https://perma.cc/BC9L-PQMW>].

¹⁵¹ HUB OF ALL THINGS, <https://hubofallthings.com/> [<https://perma.cc/G2TQ-LXRB>].

¹⁵² CITIZEN ME, <https://www.citizenme.com/> [<https://perma.cc/WN3T-LUS2>].

¹⁵³ DATACOU, <https://datacoup.com/> [<https://perma.cc/AJ93-XJFW>].

¹⁵⁴ See other examples, DIGI.ME, <https://digi.me/> [<https://perma.cc/F7RN-Z6T2>], and MEECO, <https://meeco.me/> [<https://perma.cc/WC3R-RN5W>]. A charitable alternative, THEGOODDATA, <https://thegooddata.org/> [<https://perma.cc/9CG2-FDBN>], is a 'data co-op' that encourages users to donate the value of their data to charities.

¹⁵⁵ Tom Brewster, *Meet Datacoup - The Company That Wants to Help You Sell Your Data*, THE GUARDIAN, (Sept. 5, 2014),

its customers credits in exchange for their personal data, which customers can later redeem for offers or discounts on digital products or services.¹⁵⁶ Both methods provide individuals with more control over their personal data, and an opportunity to reap the economic benefits of the data trade.

In addition to the commercial developments, it is important to acknowledge the impact that future data regulation can have on company and consumer behaviour. The change in businesses' and consumers' perception of privacy can be influenced by the approach taken by regulators. In theory, regulation may even bring the currently thriving data-driven commerce to a halt. However, it seems unlikely that regulation will actively halt the collection of data, as this is a thriving business and current regulatory proposals would rather foster it, instead of nipping it in the bud.¹⁵⁷ In a global industry reliant on data, it is more realistic to regulate the possible *use* of data after collection, than the *collection* itself.¹⁵⁸ Data protection regulation can also have an impact on consumers' involvement in the personal data economy.¹⁵⁹ Regulators can choose to protect consumers, not by

<http://www.theguardian.com/technology/2014/sep/05/datacoup-consumer-sell-data-control-privacy-advertising> [https://perma.cc/LJ8D-89G]; Laura Secorun Palet, *How to Take Control of Your Personal Data*, STAY INTERESTING OZY, (June 21, 2014), <http://www.ozy.com/fast-forward/how-to-take-control-of-your-personal-data/32176> [https://perma.cc/2P6K-N2K2]; Tom Simonite, *Sell Your Personal Data for \$8 a Month*, MIT TECH. REV., (Feb. 12, 2014), <https://www.technologyreview.com/s/524621/sell-your-personal-data-for-8-a-month/> [https://perma.cc/Y8VX-BM6A]; DATACOU, *supra* note 153.

¹⁵⁶ Natasha Lomas, *People.io Is Another Shot at Rewarding People For Sharing Personal Data*, TECHCRUNCH (Jan. 25, 2016), <http://techcrunch.com/2016/01/25/people-io-is-another-shot-at-rewarding-people-for-sharing-personal-data/> [https://perma.cc/C2AR-3FDP]; PEOPLE.IO, *supra* note 150.

¹⁵⁷ EU's new data protection package (Council Regulation 2016/679 and Council Directive 2016/680, *supra* note 40); Council Decision 2016/1250, 2016 O.J. (L 207) 1 (EU); European Commission Press Release IP/16/2461, European Commission Press Release IP/16/2461, European Commission Launches EU-U.S. Privacy Shield: Stronger Protection for Transatlantic Data Flows (July 12, 2016), http://europa.eu/rapid/press-release_IP-16-2461_en.htm [https://perma.cc/SN4B-552K].

¹⁵⁸ Konstantinos Stylianou, *Hasta La Vista Privacy, or How Technology Terminated Privacy*, in PERSONAL DATA PRIVACY AND PROTECTION IN A SURVEILLANCE ERA: TECHNOLOGIES AND PRACTICES 53 (Christina Akrivopoulou & Athanasios-Efstratios Psygkas eds. 2011).

¹⁵⁹ See generally Kenneth C. Laudon, *supra* note 142; Pamela Samuelson, *supra* note 142; Paul M. Schwartz, *supra* note 142; Jessica Litman, *supra* note 142.

putting a stop to data collection in general, but instead by empowering consumers through rights to better information and increased control.¹⁶⁰ If such regulation is established and sensibly applied, increased transparency may emancipate consumers by informing them of the use and value of their data, the benefits they could reap in a personal data exchange, and their capacity to choose not to ‘purchase’ certain services if the ‘price’ is too high.

All of these developments indicate that the acceptability of TPD as a medium of exchange is not so far-fetched. If within part of the economy, both businesses and consumers engage in the trade of TPD for economic benefits – a fact which seems to become increasingly likely as time goes on and the industry develops – TPD will gain traction as a medium of exchange. This article puts forward a thought experiment for a future in which users are more actively involved in the data economy and are more sensitive to the amount asked of a specific medium of exchange: personal data.

IV. PERSONAL DATA IN MARKET DEFINITION

The conceptualization of personal data in this article has a specific, and limited purpose: to assess the potential of personal data as a measure of demand-side substitutability. Personal data need not become the currency of a whole economy; as long as users of specific online services consider that they are providing personal data *in return for* the service, the amount of TPD they are willing to provide could be used as an indication of their choices between products. If TPD is the medium of exchange for free online services, a new avenue to define markets for free online services is opened: an analysis of demand-side substitutability through the incorporation of TPD as the price. Market definition tests would no longer ask whether consumers switch to other products after an increase in *monetary* price – which the service does not charge – but after an increase in *TPD*. As a thought experiment, the next section will integrate TPD into the SSNIP test, and each step of the test will be discussed.

¹⁶⁰ Gianclaudio Malgieri & Bart Custers, *The Right to Know the Value of your Personal Data*, COMP. L. & SEC. REV. 1, 1 (2017).

A. Preliminary Remarks

Before the discussion of the SSNIP test with TPD, it is necessary to address some underlying assumptions which guide this thought experiment. This research concerns a relatively novel phenomenon. When working with a new and quickly evolving concept, it is important to be aware that future developments may impact the framework constructed around it. These developments cannot always be accurately predicted. This certainly holds true for the use of personal data by online services. Some developments are assumed as likely for the purpose of this article, such as the continued collection of personal data by online service providers. In addition, this article makes assumptions about the future reactions by companies, regulators, and consumers.

First, this article works with the expectation that companies will act in accordance with data protection regulation, and that data protection regulation will not stifle the data economy. If properly drafted and enforced, regulation can increase the involvement of consumers in the data economy. The European Union's General Data Protection Regulation (GDPR), which will come into force on the 25th of May 2018, imposes consent and information obligations on those companies acting as personal data controllers and processors, even when these companies are established outside of the EU, if they offer goods or services to individuals in the EU.¹⁶¹ If implemented correctly by the companies that fall within its scope, the GDPR grants consumers more insight and control over the collection of their personal data.

Second, as discussed above, this article assumes that, as consumer involvement in the data economy increases, their familiarity with the commercial use of personal data will also increase. This would significantly reduce some of the challenges that currently arise from the use of TPD as price. One such challenge is that the amount of TPD asked as a price is not as easy to recognize as the amount of money asked. When consumers buy an apple in a supermarket, they know they will be paying \$1 because it says so on the price tag. However, when the same consumers purchase services online, the amount of TPD gathered may not be as straightforward. As Strandburg puts it, "Internet users do not know the 'prices' they are paying." Strandburg is right in arguing that consumers currently lack the extensive market

¹⁶¹ Council Regulation 2016/679, *supra* note 40, at art. 3.

experience required for personal data to serve as a price and signal consumer demand.¹⁶² This would change, however, as they become more familiar with the use of TPD as a medium of exchange. Their ability to estimate the value of what they are exchanging would increase. Another challenge is that personal data is not purely economic, but also involves privacy concerns, even if emphasis on economic ‘control’ rights by consumers over their personal data grows. This does not, however, mean that personal data cannot be used as a price, to signal consumer demand for products. If enough information is available about the collected data, consumers will become able to compare services based on the amount of TPD they have to provide. The fact that consumers have a certain level of disinclination to allow intrusions of privacy may play a part in their consideration of what a reasonable price is. In any case, they would be able to choose whether they are willing to use service X or service Y, depending on the amount of TPD each requires. Thus, they would be able to signal their preferences for one service over another.

Last, the article assumes that, as the data economy grows, and the participation of consumers in B2C exchanges increases, valuation methods for data will be refined and it will be possible to ascertain a B2C value of TPD. If this is not the case, the thought experiment set out in this article cannot hold. As discussed, the current valuation methods in use focus on B2B data trade or in-house valuations of data assets. However, with the growth of the PIMS and data locker market, the experience and evidence required to establish a B2C value of TPD becomes more readily available. Thus, it seems likely that, if more consumer-focused data companies emerge, the B2C valuation of TPD will be possible. This would then facilitate the use of personal data in the SSNIP test.

The article will now address what a SSNIP test with TPD as a price could look like. It is important to remember throughout this discussion that this thought experiment only aims to assess the possibility of TPD as a price for market definition. It does not mean to assert the feasibility of personal data as a currency in the general economy. That would go beyond the scope of this article, which mainly seeks to provide an alternative method to assess demand-side substitutability for market definition.

¹⁶² Katherine J. Strandburg, *Free Fall: The Online Market's Consumer Preference Disconnect*, 5 U. CHI. LEGAL F. 95, 132-33 (2013).

B. *Implementing the Test*

A SSNIP test with TPD as the price would involve asking the following question: 'If the undertaking were to introduce a small but significant increase in the TPD required for the service, would customers switch to other services in a manner that makes this price increase unprofitable?' The test would require three steps. First, a candidate market would have to be determined. Second, it would have to be assessed whether a small but significant non-transitory increase in the price (the TPD asked) would induce consumers to switch to other services, making the price increase unprofitable. Third, the market would have to be widened or maintained. If no switch takes place rendering the price increase unprofitable, the candidate market amounts to the right definition of the market and will not be widened. If the consumers do switch to other services, the candidate market will be widened, and the test repeated. The test can be repeated until the answer to the question is 'no' – an increase in price does not lead to an unprofitable switch by customers. These steps are the same regardless of whether the price of a service is rendered in money or TPD. However, there are practical implications of using TPD as the price for the test. In order to explore these, each step of the test will be discussed separately. A practical example will be used throughout this discussion. The SSNIP test will be applied to the hypothetical scenario that a case is brought regarding the behaviour of a company called *FableVideo Ltd.* This company offers an online service: video streaming within the Fantasy genre. *FableVideo* offers its services to its customers in 'streams' of video, which consist of 10 minutes of viewing time. Two other companies exist, which also offer video streaming, but of a general nature, without a specific genre focus. These are *GeneralVideo Ltd.* and *AllVideo Ltd.* Both *FableVideo* and *GeneralVideo* charge their customers in TPD, whereas *AllVideo* uses monetary prices.

1. *Increasing the Price*

The first step of the SSNIP test consists of choosing the candidate market to which the SSNIP test will be applied: that is, the smallest set of products, which will be assumed to be provided by the hypothetical monopolist. Usually the candidate market will consist of the products offered by the undertaking under review. In our example, an undertaking called *FableVideo Ltd.* offers a theme-specific streaming service that provides customers with streaming video within the

Fantasy genre. The candidate market is described as the Fantasy themed video streaming services. The hypothetical monopolist in the test would thus be the only one offering Fantasy themed video streaming.

Our candidate market: Fantasy themed video streaming, as offered by *FableVideo Ltd.*

The second step raises interesting questions. In this new iteration of the test, not the amount of money, but the amount of TPD required to use the service would be increased, by a significant but non-transitory amount. Then it would be assessed whether this increase would lead customers to choose another service, to such an extent that the increase would turn out to be unprofitable. In our example, the question would be whether consumers would switch to other streaming services if the hypothetical monopolist were to increase the TPD asked for 1 stream (a stream consisting of 10 minutes of video). Before it can be determined whether, and to which services, consumers switch, it is necessary to take a closer look at the price increase. The price increase in the SSNIP test must be ‘*small but significant.*’ The price increase must be sufficiently large to induce a response from customers,¹⁶³ induce them to re-evaluate the purchase of the product against other options; but it cannot be so large that there is no other possibility than a large change in demand. On both sides of the Atlantic a 5-10% increase is generally considered small but significant, even though some jurisdictions allow for deviations if the factual circumstances call for it.¹⁶⁴ In the case of TPD, it can be asked whether this somewhat arbitrary percentage can still be considered ‘small but significant.’ It may be that individuals are less sensitive to increased demands of personal data than they would be to higher monetary prices. There is scope for further research here, which could, for example, derive conclusions on this question from past reactions to changes in privacy policies. Because such research has not yet been

¹⁶³ OFFICE OF FAIR TRADING, MARKET DEFINITION: UNDERSTANDING COMPETITION LAW, 2004, §§ 2.9, 3.3 (U.K.) (hereinafter OFT guideline); DOJ & FTC Merger Guidelines, *supra* note 17, at 10.

¹⁶⁴ ICN guidelines, *supra* note 4, at 11; EU Comm. Notice Market Definition, *supra* note 18, at §17; OFT guideline, *supra* note 163, at §2.9; DOJ and FTC Merger Guidelines, *supra* note 17, at 10.

done, this thought experiment proceeds with the traditional 5-10% increase.

In addition, it is necessary to determine what constitutes an 'increase.' An increase in the TPD demanded could be two-fold: it could refer simply to an increase in the amount of TPD demanded, or it could mean that the data will be used for additional purposes. The latter understanding is novel, and peculiar to the idea of TPD as price. Whereas an individual can only give and 'use' money once, TPD can be given repeatedly and for multiple purposes. The question is whether consumers are sensitive, not only to the amount of TPD demanded, but also to what is done with the data. Consumers may consider that 'the price is too high,' for example, if data is no longer only sold to targeted advertisers, but also shared with third parties. This may be the case, in particular, when the third parties use the information for sensitive purposes, like *StreetCheck*, for example, which provides ethnic, cultural, and income information per street.¹⁶⁵ If consumers would indeed change their behaviour if the data is used for additional purposes, this change in behaviour may signal demand-side substitutability. It is more straightforward, however, to apply a percentage to a number than to try to 'significantly increase' certain actions. The sensitivity to changes in use of data, and the degree to which this is quantifiable, is an avenue for further research. This thought experiment continues by considering a price increase as an increase in the *amount* of TPD demanded, not an increase in usage. However, even the application of a SSNIP to the amount of TPD is challenging. It requires the ability to divide data records into categories of equal value. The possibility of doing so depends largely on knowledge of the value of data, which is addressed in part III. To run this thought experiment, the valuations used in the example on page 25 will serve as a baseline.¹⁶⁶

In our example, a hypothetical monopolist of Fantasy video streaming (like *FableVideo*) collects one record of TPD for each stream (10 minutes of video). The categories of TPD and their respective value are as follows: records on location, age, or brand

¹⁶⁵ STREETCHECK, <https://www.streetcheck.co.uk> [<https://perma.cc/T65R-P8KY>].

¹⁶⁶ In part III it was put forward that companies offering data locker or personal information management services could lead the way to reaching a 'B2C market price' for certain categories of personal data. In that part of the paper, the value of certain categories of personal data was translated into credits, which equal certain discounts for consumers: Personal data record on customer's phone brand was worth 10 credits, which had a value of \$0.50.

preferences are each worth \$0.50. Thus, if value of one stream is one record of TPD, the monetary value of that stream could be said to be \$0.50. Let's say that customers are paying for a 100-minute video (10 streams): they would have to provide 10 TPD records (with a value of \$5). A SSNIP of 10% would mean that customers have to provide one more TPD record. Thus, they would now have to provide 11 TPD records (\$5.50) instead of 10 TPD records (\$5).

The SSNIP: the initial price of 10 TPD records for 10 streams (100 minutes of video) is increased by 10% to 11 TPD records.

In the next step of the test, the reaction of customers to the price increase is gauged. If they switch to other services and render the price increase unprofitable, these will be included in the market. In our example, customers might switch from Fantasy video streaming to general video streaming services, which are offered by *GeneralVideo* and *AllVideo*. These companies' prices are lower than *FableVideo*'s increased price. This can be understood in two ways: either the price is lower because **less TPD** is asked, or because **the monetary price asked is less than the value of the TPD** collected by *FableVideo*. In this case, *GeneralVideo* offers general video streaming for less TPD, and *AllVideo* provides general video streaming for a monetary price of lower value. This is an important distinction, particular to TPD. It is that companies offer similar online services, and that one company charges a monetary price, whereas the other collects TPD. Customers may feel that the TPD price is too high and prefer to pay a lower monetary price. Disregarding the companies who charge monetary prices would mean underestimating demand-side substitutability.

FableVideo

Date	Price
1 January 2015	10 TPD records (value \$5)
1 February 2015	11 TPD records (value \$5.50)

<i>GeneralVideo</i>	<i>AllVideo</i>
10 TPD records	\$5

If the price increase would be unprofitable because consumers switch to general video streaming services, such as offered by *GeneralVideo* and/or *AllVideo*, these services need to be included in the market. The market would thus be widened to consist of both

Fantasy themed video streaming *and* general video streaming. The next step would be to apply the SSNIP again, to this redefined market. If the SSNIP in this redefined market is still unprofitable, the test will be repeated. If it is no longer unprofitable, because insufficient consumers switch to other services, the relevant market has been found.

Market: Fantasy themed video streaming + general video streaming
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2. Profitability and Monetary Value

A question that arises is how to assess whether the increase would be unprofitable. A critical loss analysis could be performed. Determining the critical loss of the company enables the assessment of the profitability of the price increase. If the actual loss is greater than the critical loss, because consumers have switched, the increase is unprofitable. In our example, this means that although the profit per stream increases, the loss of output is still greater because fewer customers are obtaining *FableVideo's* service. Performing the critical loss analysis when the price is in TPD has some interesting features. Applying a critical loss analysis when TPD is the price comes with a challenge. The calculation of critical loss requires knowledge of the revenue and gross margin of the company.¹⁶⁷ Costs (which need to be known to calculate margin and revenue) such as the maintenance of the database, the collection costs, the personnel required and so on, are expressed in money. To know what the profit is per unit sold, it may be necessary to express TPD in its monetary value. If one unit is sold for 10 TPD and the variable costs are \$2, then the unit margin will be 10 TPD minus \$2. In addition, it is not easy to pinpoint what constitutes 'revenue' when the price is TPD. In B2C trade with a monetary price, the revenue is the amount of money earned from the provision of services to consumers. In business models where the service is offered in return for TPD, however, revenue could mean two things. Either the TPD itself is the revenue, or it is the money received for the sale or license of the TPD to a third party at a later stage that

¹⁶⁷ BISHOP & WALKER, *supra* note 20, at 552; O'DONOUGHUE & PADILLA, *supra* note 20, at 111.

constitutes revenue. If the former is true and TPD *itself* is the revenue, much as money is in traditional trade, the revenue is assigned by the company at the moment it obtains the TPD. If the latter is true, the value is not assigned the moment the B2C transaction takes place, but at a later moment in time. In our example, the company was paid in 10 TPD for the service, and then later sells the data on for \$5. The revenue is the \$5 received from the third party. Knowing how the company achieves its revenue is important. If the revenue is a consequence of trade with a third party at a later date, the value could be quite different than if the TPD itself is seen as the revenue. The company may not (or may take a long time to) realize the value of the TPD through trade with a third party. External elements may impede the second stage of the company's business practice or shocks in the market may decrease the price the third party will be willing to pay. If the third party offers other goods or services in exchange for the TPD or the data-driven services offered by the company, the use of that transaction as a measure for the revenue may be quite difficult. The challenges in applying a critical loss analysis to TPD limit the use of this test to determine the profitability of the price increase. To address this limitation, TPD can, at least at an initial stage, be expressed in monetary value. In our example, the monetary value of 10 TPD is \$5. Expressing TPD in monetary value would enable the calculation of profit per unit (10 TPD at \$5, minus \$2 in costs, for example), and it would facilitate the expression of the revenue derived from TPD. It may, however, undermine the full development of TPD as a medium of exchange if the go-to measure remains money. This is a drawback that should be acknowledged and may lead to the reformulation of the way to assess the profitability of price increases.

Attributing monetary value to TPD is not just a matter for the critical loss analysis. In the hypothetical example of video streaming services, monetary value (B2C market value) was used as a *proxy* for the value of each TPD record. This facilitated setting out the thought experiment in a simple and comprehensible manner, in line with the current lack of inherent value recognition of TPD. However, if the use of TPD as a medium of exchange develops, consumers will automatically recognize TPD as valuable in itself. Services currently exist where the user is explicitly asked to accept advertising in return for the service. Zerocopy, for example, is a Belgian company enabling students to print their notes without monetary charge, but *with* ads.¹⁶⁸ A variation on this could exist, where companies explicitly ask for TPD

¹⁶⁸ ZEROCOPY, <http://zerocopy.be/welcome> [<https://perma.cc/NF9G-CLAM>].

as a *payment* for an *online* service. This possible development was recognized recently in the EU's proposal for a Directive on contracts for the supply of digital content. Recital 13 of that proposal states that "digital content is often supplied (...) against counter-performance other than money, i.e. by giving access to personal data."¹⁶⁹ As consumers become more familiar with *explicit* payments in TPD, they may think of the purchase of such services in terms of TPD, not money. The SSNIP test would not, then, require a conversion in money. It would suffice to increase the amount of TPD collected and monitor consumer reaction. Some types of TPD may be recognized as having the same inherent value, and thus be categorized in a similar way as in the *FableVideo* example. The TPD increase could happen within the same category of data collected or could consist of adding data from other categories to the collection. It is important to recognize that this is a hypothesis that has not (yet) come to fruition. It is a scenario with some apparent limitations, which would require further research. The question whether an increase in purposes should be considered would remain, as would the question as to how to measure profitability. The responses of consumers to TPD collected as a medium of exchange, and the attribution of value, also provide avenues for further studies.

The use of monetary value as a proxy is not the only choice made in this article in order to facilitate the thought experiment. The example used has been kept relatively simple. It starts from the premise that the video streaming companies decide on the amount of TPD required, irrespective of consumer choices with regards to the use of the service. In reality, the amount of personal data collected by online companies may vary as a result of users' choices in two ways. First, there are circumstances in which the user decides how much information to disclose. Indeed, when using social networking services, users can choose what to post and share with friends, the public, and the company. The question arises whether this disclosure can count as a price. The starting point should be that social information which is not monetized by the company, and not part of a conscious value exchange, is not TPD, and can thus not be deemed relevant to measure demand-side substitutability.¹⁷⁰ Second, users

¹⁶⁹ *Commission Proposal for a Directive of the European Parliament and of the Council on Certain Aspects Concerning Contracts for the Supply of Digital Content*, COM (2015) 634 final (Sept. 12, 2015).

¹⁷⁰ It seems useful to repeat that the personal data of concern is what has been called 'TPD', tradable personal data, which is part of a value exchange.

may have a degree of choice with regards to the level of service they purchase through their TPD. A service may require a minimum amount of TPD, which is a prerequisite for access to the most basic form of the service, whereas it requires more TPD to unlock access to more features of the service. For the purpose of this hypothesis, the types of data collected can be divided into: 1) TPD that a user needs to provide in exchange for access to the most basic form of the service, which can be called the 'access price,' 2) TPD that needs to be provided for the use of extra features of the services, to be called 'feature prices,' and 3) TPD that users voluntarily share with other users of the service, which do not enable extra features. The access price is the minimum TPD required for the most rudimentary version of the service, used by all, such as person search in a social network. If in accessing more features, for example contact options or social recommendations, more TPD will be collected, the extra TPD amounts to a feature price. Not all users use all the features of the service, or the same features of the service, in a similar way as car shoppers do not purchase the same options on a car. The question arises as to which categories a SSNIP should be applied: the base price alone, the feature prices on their own, a combination of the base price and features, or all of these in a specific order. This question, which is closely related to the question how to distinguish features from products, will be the subject of further research subsequent to this article.

V. CONCLUSION

'Free' online services raise problems for market definition, as common methods to define the market rely on price to assess demand-side substitutability. If no price can be discerned, market definition becomes near impossible. However, 'free' does not necessarily mean that no 'price' is charged. Consumers on the Internet routinely act as providers of an important input: personal data. In exchange for the provision of their personal data, consumers obtain access to these 'free' services. This article argues that personal data could be the price in these transactions. Price is defined as the amount of medium of exchange paid in a transaction, and personal data could become that medium of exchange for online service. As users grow more aware that the collection of TPD is a condition for the use of online services, they become more sensitive to the amount of personal data demanded. They may then compare services based on the personal data demanded, enabling the assessment of demand-side

substitutability through consumers' reactions to increases in the TPD demanded. This would open up a new way to define the market for online services in the absence of monetary price. This article hopes to spark a debate around the viability of this new approach by setting out a thought experiment on the viability of TPD as a 'price' for the purpose of market definition that is manifested through a rethinking of the SSNIP test, in which the 'increase in (monetary) price' is replaced by an 'increase in TPD.'

The article first discussed the requirements TPD (tradable personal data) would have to satisfy to be a medium of exchange and thus a price. It is clear that the notion of TPD as a price is not without its challenges. Money may have benefits as a price that personal data does not. Money is an engrained part of society, accepted in the minds of both businesses and consumers as a medium of exchange. Its value is uniformly and inherently recognized by the economic participants. TPD may not have a similar status. However, it could be a price in some transactions if certain conditions are fulfilled. The further growth of awareness and acceptability is a prerequisite for the adoption of TPD as a price. The further development of technology, society, and regulation will play important roles in the viability of TPD as a means of exchange. From the outset, the willingness of consumers to exchange their personal data for benefits seems bigger than expected. Studies have revealed that concern for privacy is less significant than indicated by consumers' self-revealed preferences. It seems likely that as consumer-oriented data-driven services increase, the awareness and sensitivity of consumers will also increase. If consumers are sensitive to demand of personal data for the use of services, TPD could be used as a price for the purposes of market definition for free online services. The article provided some thought on implementation of TPD in the SSNIP test. Some issues require further research, such as the sensitivity of consumers to increased data collection as opposed to higher monetary prices, which could prompt a re-evaluation of the 5-10% increased as the SSNIP benchmark. It would also be interesting to investigate whether users are sensitive to increases in the purposes for which data is collected. More pressing is the need to ascertain how to value TPD, and to increase the general knowledge of when and how much TPD is collected. This knowledge is also needed to assess whether TPD as price is a viable method for more complex settings, where the collection of personal data depends on the behaviour of users or varies depending on the form of the service used. This is research which can

only partially be done at this stage, as developments in the area may make imminent findings obsolete.

It is clear that using personal data as a price for the purpose of market definition is not without its challenges. Nonetheless, the concept should not be too readily dismissed. Although the extent and speed of a future growth in awareness and habit will only reveal itself over time, TPD as a price provides an interesting alternative to fall back on when quantitative market definition turns out to be difficult because no monetary price is charged. Market definition is about the interchangeability of products: would consumers switch to another product? Using personal data as a price might answer that question. Research could investigate consumers' responses to demands in personal data in real-life settings.¹⁷¹ Users of the App Store Google Play, for example, receive a warning of the type of personal data the app they are considering would collect. It might be interesting to analyze consumers' reactions on the Google Play store to similar apps with different requirements in terms of personal data. If consumers are (or were to become more) sensitive to demand of personal data for the use of services, using personal data as a price for the purposes of market definition in the digital economy may be a viable option for market definition when there is no monetary price. The SSNIP test is not an exact science. It is an approximation of demand-side substitutability with the purpose of defining the market to eventually assess whether there is significant market power and anti-competitive effects. It should be used with caution. Currently, however, it is widely used on both sides of the Atlantic. It is not because one element of it (the existence of a 'price') seems daunting that it is time to throw the baby away with the bath water. Conceiving of personal data as a price may be a way forward. Above all, this article shows that innovation need not imply the demise of established legal principles. With some creative thinking law can be reimagined to fit within a changing society.

¹⁷¹ A recent draft paper is a step in that direction. In James C. Cooper, *Anonymity, Autonomy, and the Collection of Personal Data: Measuring the Privacy Impact of Google's 2012 Privacy Policy Change*, Geo. Mason L. & Econ. Res. Paper Series 17-06 (forthcoming) the author measured actual consumer response to determine whether they would reduce their use of Google for *sensitive* search queries as a result of changes in Google's privacy policy.

