

Location Data – A Trade-off between Control and Value

Business Model Implications

Jonas Breuer, Heritiana Ranaivoson, Uschi Buchinger and Pieter Ballon
iMinds-SMIT, Vrije Universiteit Brussel, Brussels, Belgium

Keywords: Location based Services, Personal Data, Multi Sided Markets, Control & Value, Business Models.

Abstract: The evolution of mobile technologies, and the enormous increase of users have also consolidated location related services as an inherent part of the mobile service landscape. The possibilities to detect one's whereabouts and relate them to any kind of networked information offer benefits for users and various kinds of businesses. However, LBS also present issues, harmful particularly to users' privacy. This paper assesses mutually beneficial interaction in multi-sided markets (value is collective and actors are interdependent) and the gatekeeper role of user ownership (i.e. control over the user and data). It adopts a business modelling perspective to: a) define the value network around LBS as two-sided markets, where the LBS provider intermediates between end-users and Third Parties; and b) extract potential revenue models. It focuses on trade-offs between who has control in the ecosystem and how value is created. Finally, the paper assesses how current developments around LBS contribute to changes in the position of the user within the ecosystem.

1 INTRODUCTION

The combination of location-related services with mobile devices has opened up huge business opportunities and, beyond, a “new local-mobile paradigm” (BI-Intelligence, 2013). A survey conducted by the Pew Research Center in 2013 in the US confirms this paradigm, stating that “local is a bigger part of the broader social media landscape, and the rise of local services is strongly tied to the increase in smartphone ownership” (Zickuhr, 2013, p. 2). It states that 74% of adult smartphone owners in the US use their phone for directions or other information based on their current location. The emergence of this local-mobile paradigm is certainly linked to the evolution of technology: according to BI-Intelligence's research, there are over 770 million GPS-enabled smartphones. Consequently, location-data is increasingly present in the entire mobile space (BI-Intelligence, 2013).

The local-mobile paradigm also promises pivotal potential in regards of what has come to be called “bricks & clicks”, integrating both offline and online retail presences in a business model (BM). This combination of virtual and physical stores, of ordering, delivery, and pick-up seems crucial for traditional retailers' survival nowadays (see e.g. The Economist, 2012).

The paradigm concerns physical proximity to stores. But it is especially about providing the right information at the right time and place, “relevant to the specific environment and [with] a sense of immediacy that responds to the unique moment the consumer is in.” (ScreenMediaDaily, 2014, p. 3) As Bob Liodice¹ states, “what I love about digital place-based media is that it's so targeted. The ability to zero-in on your particular audience is a phenomenal advancement.” (in ScreenMediaDaily, 2014, p. 4) Advertisers can indeed be excited about such novel possibilities for profiling and targeting, and do not hesitate to promote the potential utility for consumers.

In fact, users can benefit of such precise and content-rich communication. However, there are also obvious downsides, notably in terms of privacy. Essentially, this is about a crucial trade-off for the user; between derived value on the hand, and control over data on the other. According to Acquisti et al, “individuals want to protect the security of their data and avoid the misuse of information they pass to other entities. However, they also benefit from sharing with peers and third parties information that makes mutually satisfactory interactions possible.” (2010, p. 3) Problematically, even privacy settings -

¹ President and CEO, Association of National Advertisers

the control tool for users over data use – are too often user-unfriendly (Pollach, 2007). Consequently, the work at hand assesses such trade-offs in the context of location data, emphasising the position of the user.

The purpose of this paper is to a) define the value network around LBS as two-sided markets, where the LBS provider intermediates between end-users and Third Parties; and b) extract potential revenue models. Thus doing, the paper focuses on trade-offs between who has control in the ecosystem and how value is created. Finally, the paper assesses how current developments around LBS contribute to changes in the position of the user within the ecosystem.

To do so, the paper tackles the issue from a business modelling perspective. It combines a review of the literature on location-based services (LBS) and location data arising thereof, with actual examples of LBS providers. It thus complements and contributes to existing literature, which is either focused on technical aspects (see e.g. Schiller and Voisard, 2004; Choudhury et al., 2009); or on user implications of LBS, notably in terms of privacy (see e.g. Tang et al., 2010). Within the latter category, a growing literature focuses on costs and benefits of protecting (i.e. control) or giving in privacy (i.e. potential value) for users (see notably Acquisti, 2010).

The remainder of the paper is organised as follows. In Chapter 2, LBS are defined more precisely, and market figures are provided to illustrate their growing economic importance. Chapter 3 describes the conceptual framework. Chapter 4 applies the framework to LBS in order to better analyse the issues raised. At the microeconomic level, the paper describes options in terms of value network and revenue model. The implications on the industry level are then assessed, particularly regarding the relationships between the actors around the LBS providers.

2 LOCATION-BASED SERVICES AND THEIR MARKET

2.1 What Are Location-based Services?

Within the telecommunication industry, operators are widely deploying their mobile networks and looking for new areas of future growth. Besides providing the traditional options, which telephony affords, data services have become another pillar,

and many of these services will be location enhanced (Schiller and Voisard, 2004; Tang et al., 2010). The following paragraphs assess various meanings and business applications of LBS.

Schiller et al., define LBS as a “concept that denotes applications integrating geographic location (i.e. spatial coordinates) with the general notion of services” (2004, p. 1). Spiekermann describes location services as “services that integrate a mobile device’s location or position with other information so as to provide added value to a user” (2004, p. 10). This manifests in the reduction of confusion, improvement of consumption experiences, and the delivery of high-quality service options that derive from the implementation of location-based services. Added value is also created through the merging with existing information and customer databases. “New services can emerge at the interface of the customer and other Third Parties wishing to deliver location-based services” (Rao and Minakakis, 2003, p. 63). These incremental enhancements can then be monetised.

2.1.1 Types of LBS

The concept behind LBS is rather straightforward, but applications are manifold, and so are respective classifications in literature. At the most basic level, a distinction is suggested between “location aware” services (see e.g. Levijoki, 2001), such as e.g. Google Maps, and those, which facilitate “location sharing”. Latter is more popular with users, because the sharing of locations with others is socially driven and linked to social networks (Tang et al., 2010). Some applications focus on location sharing with one or a few persons, such as Glympse, which enables to share your location for a user-defined amount of time. Other applications, such as Foursquare or Facebook Check-in, support location sharing with a large group of people (ibid, 2010).

Most studies further categorise LBS according to the type of service delivered to the user. Chen and Lin (2011) conclude five categories, namely entertainment, information, navigation, commerce and security/tracking. Each category has its attached services, e.g. entertainment corresponds to either gaming or community/friend-finder. Other classifications of LBS are based on users’ motivations (Tang et al., 2010), the targeted audience (Vrček et al., 2008), the application sector (Levijoki, 2001), type of delivery mode (Schiller and Voisard, 2004), or the recipient group size (see chapter 2.1.2).

For the topic at hand, another basic categorisation based on the type of delivery mode can be significant. LBS services can be delivered following two modes: *push* and *pull* (Schiller et al., 2004; Xu et al., 2009). While the former supplies location-sensitive content to users based on their location without them requesting it, the latter needs users to request the information or services. The first mode is less popular; the user has less to no control about inbound communication, and fears privacy invasion or potential costs that might emerge (Spiekerman, 2004). Also the second situation presents some downsides, in particular because the pull mode is more cumbersome to handle, requiring more effort on the side of the user.

Although such categorisations can be convenient for assessment, in reality most LBS combine different aspects, such as location awareness and location sharing; or entertainment and information. In fact, most success stories in the field originate from convenient and/or exciting combinations: Runtastic for instance, a company providing popular sports-related applications, combines traditional fitness with location-aware mobile applications, relevant information (e.g. fitness plans), and options for location sharing in groups and communities (Runtastic GmbH, 2013).

2.1.2 Data-Sharing Modes

As mentioned, LBS allow different data sharing modes between the users. They differ in terms of whom the user (if given this control) targets as receiver of provided data to other users. Figure 1 depicts five layers for sharing data. The innermost circle represents the user as data provider him-/herself, because the gathered data can be stored and valuable for him-/herself. The second circle presents the situation of data being valuable when shared with one other person, or – the third circle – a selected group of people. This is usually in the hands of the user to share this data with a friend or a group of friends. Beyond the control of the individual are the last (broadest) two circles, when the service provider shares data of an individual with the community (i.e. the entire user group of that service or application) or even with all (e.g. publicly displayed, without the need to register to the particular service).

2.1.3 Collecting Data for Marketing Purposes

These categorisations take into account factors mainly from the perspective of the user. Currently,

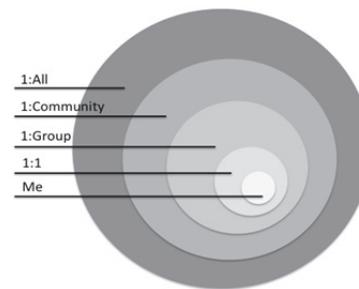


Figure 1: Five layers of data sharing.

many LBS provide the canvasses and maps for the user to facilitate positioning and data logging. They then collect information about them and use it for advertising purposes. This then adheres to two-sided market logics: by letting users benefit from using a service and generating data through the service, the LBS provider holds a valuable asset, also for Third Parties, which can access this data (and thus profit) under agreed terms and conditions.

LBS particularly foster possibilities of Location-based marketing (LBM). LBM presents enormous potential for marketers and advertisers. It has been found out that the simple fact of being physically close to a business raises the click-through-rates (CTR) of its advertisements: location-based ads generate significantly higher CTR (BI-Intelligence, 2013). In comparison, the effectiveness of traditional online advertising has been low ever since the first banner ad was introduced, to an industry average of only 0.4%; with the use of ad-blocking software ever expanding (ScreenMediaDaily, 2014, p. 3). Consequently, mobile location-based advertising is expected to grow 150% by 2020, thus constituting almost 65% of total mobile advertising revenue in 2018 (ibid, 2014, p. 5).

An important aspect is that, in general, the whereabouts of people are revealing information beyond mere location: they are key elements of the type and nature of users' activities. With this information, inferences about needs and the selection of specific products and services can be drawn. If a business "knows the end user's exact location, and is able to target useful (and billable) information at that point in time, the benefits can be mutual" (Rao and Minakakis, 2003, p. 63). Actually services can be adjusted to the user's context, namely his/her location, but also any other relevant information (personal preferences; time; location type; time available; needs; immediate physical neighbourhood, etc.). This is also referred to as contextual offering (Lee, 2005): providing the right information at the right time and place, "relevant to

the specific environment and [with] a sense of immediacy that responds to the unique moment the consumer is in.” (ScreenMediaDaily, 2014, p. 3) Hence, a business profits by delivering relevant, timely, and engaging content.

2.2 The Market for LBS

LBS’ overall economic potential is enormous. In Europe, the market for LBS is only emerging. According to the Location Based Marketing Association EMEA Survey 2011 interpreted by Verhoef (2011), LBS users were checking-in not more than once per day. Also companies were found more reluctant with planning LBS campaigns. Still, although “businesses in Europe have not been picking up on location-based promotions [...] it’s all the more promising that over half of the respondents indicated they check-in more than 3 times per week” (ibid, 2011). The survey focussed on location-based deal services (Foursquare is the most popular example) including especially check-ins and the conduction of deals. Today, LBS applications are much more multi-faceted and encompass multiple purposes and features. They differentiate also in the aspects of one’s whereabouts they emphasise, and the associated context they provide.

Hence, despite the reluctance concerning mobile LBS in this 2011 study, a 2013 forecasts revenues to grow from EUR 325 million in 2012 at a compound annual growth rate of 20.5% to reach EUR 825 million in 2017 (Berg Insight AB, 2013). Berg Insight’s report finds that local search, social networking and navigation services are the top application categories in terms of active users. It further states that also mobile workforce management services aiming to improve operational efficiency are gaining in popularity (ibid, 2011).

3 CONCEPTUAL FRAMEWORK

3.1 Business Modelling: Control & Value in LBS

The perspective presented here is based on the business modelling framework provided by Ballon (2007), which is simplified in the Business Model Matrix below (see Table 1). The origin of this approach to business modelling is arguably the internet-based economy (see e.g. Al-Debei and Avison, 2010; Hawkins, 2001), where innovative business models, i.e. novel ways of interacting with customers and within networks, have become a

source for success. It has been used in various analyses, in particular applied to the media and telecom industries. While there are many business model frameworks proposed in the literature, notably Osterwalder (Osterwalder, 2004) and Chesbrough (Chesbrough, 2006), these are usually more suited for aiding individual firms and less appropriate for guiding collective innovation processes. It is therefore necessary to consider a stream of research that attempts to provide a more coherent treatment of the most relevant business model parameters while at the same time focusing mainly on the relationships between the stakeholders involved. Thus, the business model matrix is particularly applicable for the work at hand, even more so as it enables taking into account the interdependency and trade-offs between control and value.

The business model framework consists of four abstract layers (see Table 1): *value network*, *technology design*, *financial model*, and *value proposition*. We categorise the former two as impacting mainly control-related aspects. The latter two, on the other hand, affect mostly value-related issues. Each layer is built on certain integral parameters.

Table 1: Business model configuration matrix.

Control Parameters	
VALUE NETWORK	TECHNOLOGY DESIGN
Value Parameters	
FINANCIAL MODEL	VALUE PROPOSITION

This paper adheres roughly to those layers and parameters, as they provide convenient means of orientation and structuring. Nonetheless, not all are of equal relevance for the work at hand. Based on the framework, we have focussed on certain key parameters, which determine the control-value trade-off in LBS.

The *Value Network* layer is regarded as most significant for evaluating the interplay of actors (here focused on location data). Its parameters revolve around the architecture of actors (physical persons or corporations mobilizing tangible or intangible resources), roles (business processes fulfilled by one or more actors with according capabilities) and relationships (contractual exchanges of products, services for financial or other

resources). In particular the *User Ownership* parameter constitutes a pillar for the following analysis. In general, it relates to the relationship with the customer, examining, amongst others, the access to key information on the customer, the type of contact (direct or intermediated), the level of intensity and proximity to the customer (Ballon, 2007, p. 11). Therefore, in the context of LBS, it also relates to *data handling and sharing*, i.e. how a LBS treats its users' data regarding data mining. Moreover it takes into consideration data sharing between community members and/or Third Parties and how that affects a business model. *User Ownership* then is about how users (the voluntary or unknowing providers of location data) and their personal information are treated.

The *Financial* layer is also highly relevant. In particular the *Revenue Model* is taken into account, i.e. how revenue is generated. Measures through which money actually streams into the company are depending on decisions such as how the LBS provider addresses Users and Third Parties, or whether the LBS provider relies on hybrid models (e.g. Freemium).

Whereas *Technology Design* of LBS certainly determines their functioning, it is here mainly taken as a given parameter. Also the *Value Proposition* is considered as subordinated to other parameters, although *User Involvement* (referring to the role of users in the creation of value) is particularly important for LBS, as they at least tacitly need to accept to provide their location data.

3.2 Two-sided Markets and Platforms

Technically, an ICT platform may refer to a hardware configuration, an operating system, a software framework or any other common entity on which a number of associated components or services run. Economically, platforms and their providers mediate and coordinate between various stakeholders (Cortade, 2006; Ballon, 2009). There are actually externalities between these stakeholders, which platforms internalise (Armstrong, 2006). Two- (or multi-) sided markets are two markets, which the platform connects, and where the utility that any user A derives from the use of the platform is correlated to the number of users B (and conversely).

In the mobile environment, different stakeholders try to position themselves as mediator and coordinator of various stakeholder groups (Ballon, 2009). In such constellations, *gatekeeper roles* are often what promises most control over the value

network, and thereby most profit. *Gatekeepers* are the entities that control bottlenecks in the network (as derived from media and communication studies), selecting and processing ideas and information (ibid, 2009, p. 10). In the current analysis, LBS provider constitute these gatekeeper roles. In the context of this work, gatekeeper roles are those, which promise *user ownership*.

4 LOCATION DATA BUSINESS MODELS

This section analyses LBS' value network as a two-sided market with the LBS provider being the hub between users and Third Parties. It thus conceptualizes and evaluates the structure of the value network as the first business model parameter. In a second step it analyses the financial flow in the value network revealing different strategies for creating revenue. Finally, several trends are named with potential to impact these parameters opening a discussion for challenges, and issues concerning the use of location data.

4.1 Microeconomic Level

4.1.1 Value Network

The LBS as Platform

LBS providers offer and operate LBS. They collect, gather and edit location and other data about users. They are responsible towards them regarding the use of such data, in particular to whom they make this data available or accessible. In the early years of conceptualising LBS, it was expected that the mobile network operator would constitute the bottleneck of the system by occupying this role and gathering the data (see e.g. Rao and Minakakis, 2003). Instead, specialized location-based service providers (also referred to as applications) have emerged that cover these aspects. LBS business models often revolve around deal services, i.e. view retailers or businesses on the virtual map and receive promotions or special offers when shopping at the actual location. LBS are by far not restricted to those aspects. Also through "check-ins" or location sharing functionalities the location is collected. The integration of LBS in other applications, such as social network applications, can equally boost the generation of location data by users.

Applications – or the platforms that host them – deploy or provide the technology and interfaces for

locating users (Cusumano, 2010; Gohring, 2013; Schechner, 2013). They rely on mobile devices that are continuously connected to the Internet and on the users' interest in sharing information with friends and acquaintances (Schapsis, n.d.). By downloading such applications, users agree to the terms and conditions that either let the application track their location (*push* strategy) or are asked to input their location actively (*pull* strategy), or are facing a combination of *push* and *pull*.

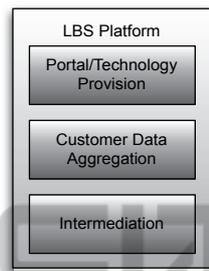


Figure 2: Roles of LBS platform.

The Third Party

Third Parties demand data about – or access to – the users/customers and are willing to pay money to the middlemen who offer/grant such access. Third Parties are manifold, with advertising networks and marketing companies on the forefront, working on behalf of their clients, namely industries selling consumer goods and services. The benefits of having information about customers are obvious for business operations. Third Parties can also be merchants, other service providers, etc.

While market-level information or modelled data was dominant for decades, i.e. generalized characteristics of consumer groups and market segments, ICT enables identification of customers up to the point of individual profiling (Electronic Privacy Information Center, n.d.), including data related to the users' location. Such individual-specific information often also includes sensitive data. The benefits for businesses (and other organisations) are clear: better connection and adjustment of activities to customers or user segments, due to better decision making processes, fewer risk taking, higher profits and generally better marketing (Couts, 2013b).

The User

The use of LBS can be two-fold for the customer: on the one hand it can help reduce confusion, advance the consumption experience and



Figure 3: Roles of third party.

provide high-quality service options. It can lead to better customer segmentation and targeted communication from the industry as well as handier processes and less effort. This might actually be in the interest of the end customer. On the other hand, LBS raise multiple concerns, above all on privacy issues. Using LBS may result in unwanted actions such as intrusive marketing activities, discriminating treatment, public exposure, misuse of data, fraud and harm (Dailey, 2013; Phelps et al., 2000).

Customers are thus put in a difficult situation, not least because privacy settings, that claim to protect the information of individuals when they get in contact with businesses, are vague, misleading, lacking transparency or are displayed in a user-unfriendly way (Pollach, 2007). In this context, the so-called privacy paradoxon relates to the discrepancy between a person's intent not to disclose personal information and his/her actual behaviour (Norberg et al., 2007). The phenomena describes that even aware or concerned people willingly disclose personal information for certain benefits or in fear of missing some information and opportunities by non-disclosure. This trade-off is probably even more substantial with LBS than with other services, as users can benefit directly, in terms of convenience, efficiency, special deals, or, more indirectly, social capital.

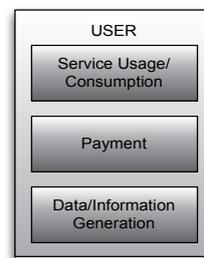


Figure 4: Roles of user.

Inter-actor Relationships

In the interplay of the three actors, the LBS provider positions itself as the intermediate between users and Third Parties, thus creating a picture of a two-sided market (Figure 6). In this position it facilitates the exchange and interplay whilst determining rules, terms and conditions.

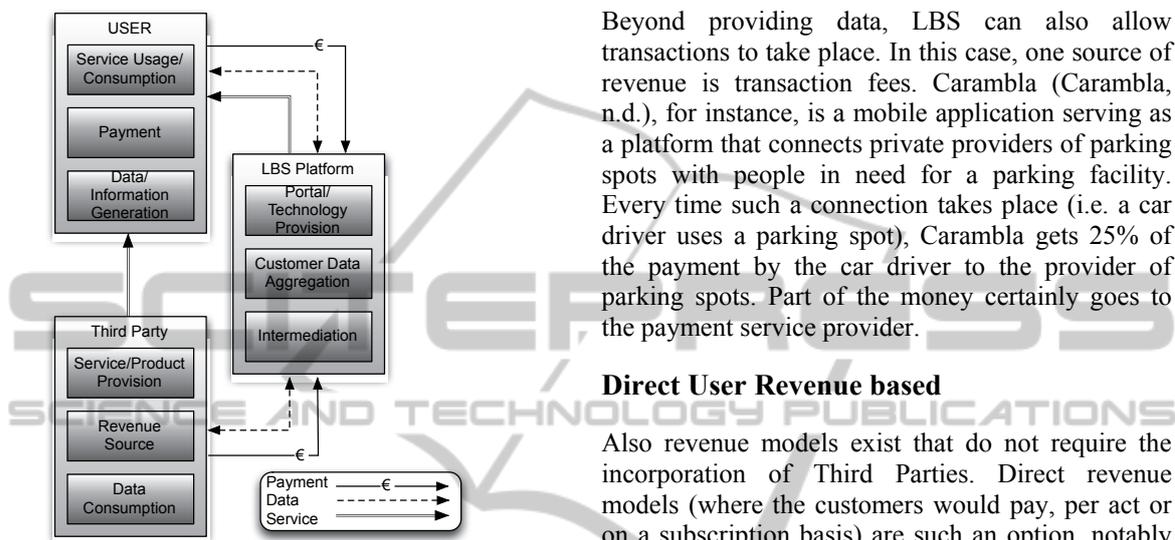


Figure 5: Actors, roles & relationships in the value network.

4.1.2 Revenue Models

As a platform serving two different but interdependent market sides, the LBS provider is also in a position to decide whether to monetize the access to the customer base, and for how much. LBS providers follow different strategies for collecting and sharing user data, and for charging Third Parties.

Third-Party based

This revenue model, with the incorporation of Third Parties, is probably the most prominent strategy. Here, Third Parties pay for being visible on the virtual map and promote their information, deals or offers. By processing data over customers, the platform provider has a valuable asset in return for Third Parties' money. And since many of the applications that utilise LBS are free for users, the platforms are dependent on broaching such additional revenue streams. In their role as intermediates between different actors, they welcome the opportunity to cooperate with Third

Parties (Rochet and Tirole, 2002). Foursquare is a good example of how providers execute this engagement (Foursquare, n.d.). Revenues are dependent on the information pushed from Third Parties to users, e.g. proportional to the amount of people who have been in contact with a given ad.

Transaction based

Beyond providing data, LBS can also allow transactions to take place. In this case, one source of revenue is transaction fees. Carambla (Carambla, n.d.), for instance, is a mobile application serving as a platform that connects private providers of parking spots with people in need for a parking facility. Every time such a connection takes place (i.e. a car driver uses a parking spot), Carambla gets 25% of the payment by the car driver to the provider of parking spots. Part of the money certainly goes to the payment service provider.

Direct User Revenue based

Also revenue models exist that do not require the incorporation of Third Parties. Direct revenue models (where the customers would pay, per act or on a subscription basis) are such an option, notably in the form of freemium revenue models. Freemium models are hybrid models that rely on cross-subsidization. Free access is given to a version with limited LBS features. These free LBS offers are financially supported by the subscription of some customers to a premium (see e.g. Anderson, 2009). Versioning (a form of price discrimination) is at the core of such freemium strategies. It consists in different versions of a given content being provided for different prices (Varian, 1989) (thus in the case of freemium, free vs. paying versions). The consumer chooses which version they are going to use, based on preferences (i.e. their willingness-to-pay for the product). Runtastic provides mobile apps that use GPS to map and record routes in terms of distance, time, pace, calorie consumption, and offer individual training plans. Its apps and website-membership are available for free, but it offers up-selling possibilities to upgrade and include additional information, statistics, services, etc. (Gschwandtner, 2013).

4.2 On the Industry Level: Who Owns the LBS-User?

The processes of collecting data happen on one side of a market, the benefits that users gain (such as

social capital, deals, specials etc.) constitute the other side. In order for such markets to function, various actors are involved in respective business models. Users are at the core of LBS, not only as providers of location data, but as being potential buyers. Paradoxically, although they are the actors that generate the key resource, they are usually not treated as a self-determined entity. User ownership, i.e. control over the user and his/her data, is the parameter that applies in this regard. The following section reminds that the user faces a trade-off in terms of benefits and harms of ceding parts of their privacy. On the micro-level, the user can truly and tangibly benefit and therefore agree to such a trade-off. Here, however, the issues go beyond individual trade-offs: user location data is a commodity, an “economic asset class” (vide infra).

4.2.1 A New Economic Asset

Personal data in general and location data in particular have been asserted as valuable economic assets (see Schwab et al., 2011). The World Economic Forum has established personal data as a new economic “asset class” (2011). It further distinguishes between three types of personal data: i) volunteered data is such that is “explicitly shared” by a user, e.g. in a social network, ii) observed data or “captured by recording the actions of individuals”, and iii) inferred data, which means it is “based on analysis of volunteered or observed information” (ibid 2011, p. 7). In this context, location data can be regarded and treated as one category of personal data. It can often be classified as observed data, but it is also more or less “explicitly shared” and voluntarily provided in many cases. The more data, enriched through all kinds of related information and situated in the right contexts, the more patterns and information can be extracted as inferred data; this is obviously valuable for commercial players. Such precise information about consumers is highly sought after (Hildebrandt et al., 2013)

As a consequence, the trend (and arguably a requirement for commercial success) is to combine location-based services with other types of mobile and online services. Location-based features are often not the primary purpose of an app, but function as additional incentives for use, for instance as creative location-based notifications. Facebook, Google, Yelp, Instagram and Groupon are applicable examples in this regard.

From a user perspective, an important purpose of using location-sharing applications is actually often

the socially-driven intention to make one’s whereabouts public via a social network (Tang et al., 2010). In other words, users voluntarily provide information to their network. This combination of the local-mobile paradigm with social networking aspects is prominent among users, but it makes LBS also especially interesting for businesses: the precision of the situation surrounding a user dictates the relevance of corresponding information. Information, for instance shared via a social network, can thus be correlated and used for targeting and relevant communication.

Practices of collecting user location data, of tracking and targeting have however raised certain concerns. This is the case especially because data generated by the user might be processed further by the service provider, without the knowledge and/or against the interest of the user: he/she does not know how his/her information is processed, with whom it is shared (and if he/she knows, may not approve it). In fact, business models around personal data are often based at least to some degree on a lack of transparency and privacy.

4.2.2 Data Brokers

In the multi-sided market around location data, on the industry level, new profitable roles have evolved. Alongside the service provider, data brokers have consolidated a position in the ecosystem, building business models on trading, combining and recombining data and datasets. In the US alone, business with personal data generates millions of revenue for companies such as Acxiom, Experian, and Epsilon (Tanner, 2013).

The brokers’ interference and trading activity is mostly intransparent, adding confusion and uncertainty to the market (Couts, 2013a). Data brokers work with data from public records and information provided by users. Former is the data that the state and public authorities gather (e.g., name, gender, age, ethnicity, education level, social security number, driver’s license number or voter registration to name just a few). Latter is the data that people provide or generate e.g. in social networks, via sweepstake or warranty cards, mail rebate forms, forum posts, Web browser cookies, loyalty reward cards, mobile applications and more. The data types can be divergent and situated e.g. in the context of work and education (employment history) personal life (sexual preferences, religion, relationship status, etc.) and much more.

Despite several contradicting examples, one of the reasons why data aggregators have not yet

changed their data collection methods and implemented privacy-friendly technologies in a large-scale is due to the commercial value of customer datasets (Schwab et al., 2011). The aggregating actor (i.e. LBS provider) might use the data itself, or sell it to other entities interested in information about (potential) customers. Such reselling of data is an option for businesses to open new, profitable revenue sources. Data aggregation and processing patterns are often not transparent, communicated in a reader-unfriendly way, difficult to understand for the user, and based on the presumption that the provision of a privacy-policy alone already eliminates users' concerns (Milne and Culnan, 2004; Pollach, 2007). Consequently, the user can exert little control about who can access and process his/her data, commercially or for other purposes.

Even though there may be potential mutual benefits for all actors involved in the value network, existing asymmetries of knowledge, however, "make the functioning of such a market inefficient" (Schwartz in Hildebrandt et al., 2013, p. 15). Kashmir Hill reported for instance that the company MEDbase200, selling medical industry related information, offered lists including rape victims, alcoholism sufferers and AIDS/HIV sufferers (Hill, 2013). The secrecy and non-transparency of these actors in the value network evoked attention in the public. Practices of MEDbase200 were exposed at a hearing in the US congressional hearing, aimed to "examine the data broker industry and how industry practices may impact consumers" (U.S. Senate Committee, 2013).

4.2.3 User Ownership

Even though the user is a significant actor in the value network, generating data and thereby value, he/she is often treated as non-autonomous. Location data is being commoditised, and little control is given to users. These issues have evoked a debate about whether and how a person can retain some degree of control over personal data, ultimately about the question of who owns users' location data.

Upon this, new approaches arose that aim to reinvest control in the user, often termed Personal Data Management (PDM). PDM is about inverting that relationship, about establishing the user as a self-determined actor. Data is not being used and/or shared without a person's consent, or at least without being transparent about how it is used and with whom it is shared (Hildebrandt et al., 2013, p. 6). Some LBS already put at the core of their service the

fact that only a restricted group of clearly identified persons have access to the location data. Glympse, for instance, is an application that enables to share location, prioritising that "[w]ith Glympse, you are in complete control – you choose WHO you want to see your location, WHEN they can see it and for HOW LONG the recipient is allowed to see it." (Glympse Inc, 2012).

Other LBS providers choose different approaches. Trip Advisor then illustrates that users can be willing to provide some personal data when they are aware and get useful or desired information or other benefits in return. The service shares user-generated content by default (ratings, reviews of locations where their users have been) with anyone using an Internet browser. In this case, the user knows he/she makes content available, i.e. rates locations, writes reviews about places, etc. Also special deals and discounts could be a sufficient incentive for a user to provide location data, as well as being visible in a social community, or simply being able to get meaningful information in return. The strong social component certainly plays a role in this regard: "The more one's friends (as well as other consumers) get comfortable with disclosing data online, the higher is the opportunity costs for those individuals who do not join a service in order to protect their data" (Acquisti, 2010, p. 11).

For the user, the trade-off between what they are asked to disclose and what benefits they get in return can be significant. Thus, the weighting of privacy concerns and abandoning of data ownership can shift on the side of the user. Nonetheless, intransparent practices and unaccountable actors, such as data brokers, infringe the set-up of the two-sided market model (i.e. the balance) and thus impact the constitution of the value network, eventually causing redistribution of the user ownership. Treating location information as an economic asset directly affects the revenue model, and most actors are interested in selling location data they have collected. However, by doing so, they might ultimately even undermine the users' willingness to use the services and thus to share such data. This means that the weighting of control and value affects not only the user. Also the generation of revenue for LBS providers, data-demanding Third Parties, and data brokers depends on this trade-off.

5 CONCLUSION

The paper has analysed location-based services from a business point of view, with a focus on their value

network and financial model. It has set out with a definition and background on location-based services and the market on which such services are operating. While several typologies of LBS exist in the literature, we have proposed a typology of the data that are at the core of LBS. This typology depends on whom the user targets as receiver of his/her location data. Value can emerge when data is used/shared with i) the user him-/herself; ii) one other receiver; iii) a group of receivers; iv) the community of the LBS provider; v) open to browsing traffic on the Internet. Which model/s is/are facilitated falls under the control of the LBS provider.

For the LBS provider, location data of the user is mainly relevant as a means to facilitate location-based marketing (LBM) for Third parties. While promising enormous economic potential, the market in Europe for LBS (and in consequence LBM) has only just started to. Location-based deal services are thereby at the forefront. Third Parties such as merchants or retailers are addressing the customer via the LBS provider with deals, offers and promotions at the point of sale.

The paper has addressed LBS providers as entities with a certain configuration of business model parameters. It has shown the value network of LBS, where the provider acts as a platform on multi-sided markets that connects data generating users and data demanding parties. The platform balances interests of its stakeholders: Third Parties wish to reduce marketing spending by individual, pointed targeting Users fear misuse and harm related to the sharing of their location data. Beyond this balancing act, the platform as a business entity needs to create revenues in this market, so far it has done so by charging Third Parties while including end-users for free. However, new emerging trends in this field have the potential to change the strategies and configurations of these variables.

Data Brokers and other entities, entering the network as new intermediary actors, can cause reconfiguration of the value network and the gatekeeper position and consequently customer ownership. A new classification of data as an economic asset can lead to new assessment of the value of data and thus impact the financial streams in the network.

The configuration of these parameters are directly linked to decisions of granting control and/or creating value in the network. In this context, the paper has discussed the fact that the user is not integrated as a self-determined actor in the value-creating ecosystem. Although user-generated data is

the most valuable asset in the value network, other interrelated actors do not treat him/her as on equal terms.

From a business modelling perspective, an interesting question is how a trade-off between all actors' interests can be facilitated, which is actually profitable for all actors involved. After all, the LBS provider can make choices concerning which entity is granted information control, and to what extent. Today, user-centric data management is debated, where "the user has the full control over his/her identity and consistent user experience during all transaction when accessing his/her services" (Bhaskar and Kapoor, 2013, p. 462). This is about reinvesting control over data into the user. From a commercial perspective, the idea of user-centric personal data management could be interesting; at the least appropriate infrastructure is required. Since such management needs to be usable and simple, also new services and business roles could arise, supporting the user in handling the data. Indeed, it has been argued before that the entity asserting user ownership is in a strong position in the multi-sided market around location-based services.

More research is however needed to assess how user-centric data management is or can be implemented, and the real impact on users. Also the question of how business models can be created in this context remains to be answered. Despite the limited scope of this paper, its aim of establishing the trade-off between control and value as an essential element of corresponding economic activity functions as a stepping stone: for future research and for determining innovative and successful strategies, which can lead to sustainable business, and perhaps even a consolidation of the user's position.

ACKNOWLEDGEMENTS

SoLoMIDEM is an R&D project co-funded by IWT (Agentschap voor Innovatie door Wetenschap en Technologie), the government agency for innovation by science and technology founded by the Flemish Government. Companies and organizations involved in the project are VUB/SMIT, K.U.Leuven/COSIC, UGent/MICT, K.U.Leuven/ICRI, iMinds/iLab.o, CityLive – MobileVikings, NGData nv, Lin.K nv, Cultuurnet Vlaanderen, iRail

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