

Case Study Validation of a Business Model Framework for Smart City Services: FixMyStreet and London Bike App*

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Abstract

Given the volatile nature of the mobile services industry and the recent interest in mobile services from local governments, this article introduces a business model framework that allows the design and analysis of value networks for mobile services in a public context. It finds its foundations in an existing and validated business model framework and expands it to include parameters that come into play when a public body (i.e., part of a city administration) becomes involved in the value network. In the ever-evolving mobile telecommunications industry, this framework offers both an academic and practical tool, enabling the comparison and analysis of complex mobile city service business models that include public actors. This framework is then applied by analysing two cases: FixMyStreet and the London Bike App. The parameters in the new framework are described in detail and compared for the two cases and they are placed on a grid, which can serve as a tool to visualise the differences between mobile service initiatives in an urban context. We conclude that business strategies for the implementation of mobile services in a city can dramatically vary and that there is need for more fundamental research to frame the discussion.

Keywords: mobile services, smart city, business models, governance and public value, public private partnerships

1 Introduction

In a period of less than a decade, the mobile telecommunications industry has undergone some dramatic changes, as commercial and public entities aim to find strategic fits while adapting their business models. This is especially true for the sector of mobile service provision (e.g., mobile applications and websites). New players have entered the sector, actors shifted their business strategies, roles have changed, different types of platforms have emerged and vie for market dominance while technological developments create new threats and opportunities (e.g. NFC and LTE) [2, 3].

These strategic business model changes are occurring while the context of the main target audience of mobile service providers - the consumer - changes as well. Although it is a much more gradual process, it is now accepted that an increased urbanization will be one of the main societal trends in coming years [4]. Since 2007, over half of the world's population lives in cities and the UN predicts this number will only grow, to a predicted 70% by 2050 [5]. As more citizens (and consumers) move to urban areas, actors from the ICT and mobile telecommunications naturally become increasingly interested in offering services that are tailored to life in the urban environment. Cities and local governments are at the same

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time exploring the role that new ICT services and products can play in increasing the quality of life of their citizens.

Both private parties as well as city governments have seen the potential of mobile services, and several, divergent initiatives have been set up and applications or services developed. Mobile services can be particularly attractive in fields such as mobility, cultural activity (discovery), tourism, hotel and catering industry, interactions with government and so on.

However, as these services grow in popularity and importance in the market, questions arise for city governments interested in harnessing the potential of mobile service provision in order to increase the quality of life for citizens in a meaningful way [6]. These questions relate to which roles cities can take up in the value network, how they should interact with emergent players, which data they may leverage in providing services, how they may take up platform roles or how they can create additional public value.

This article takes a first step towards answering these questions by building on the business model matrix, developed and validated in [7, 8]. It is expanded to include business model design parameters that become relevant as soon as a public entity or government actor becomes involved in the value network. Next, we validate it by applying it to two cases related to urban life: FixMyStreet and the London Bike App. The first is a charity-operated service that allows residents of certain cities to report a variety of issues and makes sure the complaints end up with the proper local authorities. The London Bike App is based on datasets opened up by the city of London and provides users with real-time availability of bikes from the city's bike rental system. Section 2 offers a quick reminder of the parameters in the original framework –as they remain important in the newly developed matrix– followed by a brief explanation of the additional parameters. Finally, we use the newly developed parameters and expanded business model matrix to analyse FixMyStreet and London Bike App, and position them in their relation to government and the public value they generate.

2 Extended Business Model Matrix for Smart City Mobile Service Evaluation

In this section, we briefly reiterate the basic concept of the business model framework we will be building on. Since the general adoption of the concept in the literature related to the rise of internet-based e-commerce [9], the focus of business modeling has gradually shifted from the single firm to networks of firms, and from simple concepts of interaction or revenue generation to extensive concepts encompassing the value network, the functional architecture, the financial model, and the eventual value proposition made to the user [10, 11]. In attempt to capture these various elements, one approach has been to consider business modeling as the development of an unambiguous ontology that can serve as the basis for business process modeling and business case simulations (see e.g. [11, 12, 13]). This corresponds with related technology design approaches [14] aimed at the mapping of business roles and interactions onto technical modules, interfaces and information streams. Due to the shifting preoccupation from single-firm revenue generation towards multi-firm control and interface issues, the guiding question of a business model has become “Who controls the value network and the overall system design” just as much as “Is substantial value being produced by this model (or not)” [7].

Based on the tension between these questions, Ballon [7, 15] proposes a holistic business modeling framework that is centered around control on the one hand and creating value on the other. It examines four different aspects of business models: (1) the way in which the value network is constructed or how roles and actors are distributed in the value network, (2) the functional architecture, or how technical elements play a role in the value creation process, (3) the financial model, or how revenue streams run between actors and the existence of revenue sharing deals, and (4) the value proposition parameters that describe the product or service that is being offered to end users. For each of these four business model

CONTROL PARAMETERS				VALUE PARAMETERS			
Value Network Parameters		Functional Architecture Parameters		Financial Model Parameters		Value Configuration Parameters	
Combination of Assets		Modularity		Cost (Sharing) Model		Positioning	
Concentrated	Distributed	Modular	Integrated	Concentrated	Distributed	Complement	Substitute
Vertical Integration		Distribution of Intelligence		Revenue Model		User Involvement	
Integrated	Disintegrated	Centralised	Distributed	Direct	Indirect	High	Low
Customer Ownership		Interoperability		Revenue Sharing Model		Intended Value	
Direct	Intermediated	Yes	No	Yes	No	Price/Quality	Lock-in

Figure 1: Business Model Matrix (Ballon, 2009)

design elements, three underlying factors are important, which are represented in Figure 1. Each of the parameters is explained in more detail in Table 1.

<p>Value network <i>The combination of assets:</i> Assets include anything tangible or intangible that could be used to help an organisation achieve its goals; this element also focuses on the synergetic effects of combining different assets. <i>The level of vertical integration:</i> Vertical integration is defined as the level of ownership and control over successive stages of the value chain. <i>Customer ownership:</i> This topic looks into the party maintaining the customer relationship and keeping the customer data. Related to customer ownership is the level of openness/lock-in of the case.</p> <p>Functional architecture <i>Modularity/integration:</i> Modularity refers to the design of systems and artefacts as sets of discrete modules that connect to each other via predetermined interfaces. <i>Distribution of intelligence:</i> In ICT systems, this refers to the particular distribution of computing power, control and functionality across the system in order to deliver a specific application or service. <i>Interoperability:</i> Interoperability refers to the ability of systems to directly exchange information and services with other systems, and to the interworking of services and products originating from different sources.</p>	<p>Financial model <i>Investment structure:</i> This topic deals with the necessary investments (both capital expenditures and operational expenditures) and the parties making these investments. <i>Revenue model:</i> This topic deals with the trade-off between direct/indirect revenue models as well as the trade-off between content-based and transport-based revenue models. <i>Revenue sharing model:</i> The revenue sharing model refers to agreements on whether and how to share revenues among the actors involved in the value chain.</p> <p>Value proposition <i>Positioning:</i> Positioning of products and services refers to marketing issues including branding, identifying market segments, establishing consumer trust, identifying competing products or services, and identifying relevant attributes of the product or service in question. <i>User involvement:</i> Refers to the degree to which users are consumers rather than prosumers (referring to people being both producer and consumer of content at the same time) of content and services. <i>Intended value:</i> This item lists the basic attributes that the product or service possesses, or is intended to possess, and that together constitute the intended customer value.</p>
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Table 1: Parameters of the business model matrix (Ballon, 2009)

For each of these four business model design parameters, three underlying factors are at play, which can be summarized in a dichotomous way, but in reality operate on a scale between the proposed extremes. The use of the matrix as a tool for qualitative analysis has been validated through case studies in several sectors and extensively in relation to mobile services (e.g. by looking at mobile platforms such as Windows Mobile, Android, iPhone, Nokia Ovi, LiMo and so on in [8] or the case of FixMyStreet in [5]).

However, the specific nature of mobile city services, and more particularly the addition of a public component into the value network, adds increased complexity to the business model. In order to capture the intricacies of combining commercial and public control and value creation, we propose a reorientation and expansion of the business model matrix.

The main division in the original business model matrix between control and value highlights the two most fundamental aspects of a business model. We propose a similar approach in defining the core principals of a public business model which comes down to the questions “Who governs the value network?” as well as “Is public value being generated by this network?” [16]. We thus propose governance and public value as two fundamental elements in business models that involve public actors.

	Value network	Technical architecture	Financial architecture	Value proposition	
Business design parameters	Control parameters		Value parameters		
	Control over assets	Modularity	Investment structure	User involvement	
	Concentrated vs distributed	Modular vs integrated	Concentrated vs distributed	Enabled, Encouraged, Dissuaded or Blocked	
	Vertical integration	Distribution of intelligence	Revenue model	Intended Value	
	Integrated vs disintegrated	Centralised vs distributed	Direct vs indirect	Price/Quality Lock-in effects	
	Control over customers	Interoperability	Revenue sharing	Positioning	
	Direct vs mediated Profile & identity management	Enabled, Encouraged, Dissuaded or Blocked	Yes or no	Complements vs Substitutes Branding	
		Governance parameters		Public value parameters	
Public design parameters	Good governance	Technology governance	ROPI	Public value creation	
	Policy goals	Harmonising existing policy goals & regulation Accountability & trust	Inclusive vs exclusive Open vs closed data	Expectations on financial returns Multiplier effects	Public value justification Market failure motivation
		Stakeholder management	Public data ownership	Public partnership model	Public value evaluation
Organisational	Choices in (public) stakeholder involvement	Definition of conditions under which and with whom data is shared	PPP, PFI, PC...	Yes or no Public value testing	

Figure 2: Expanded business model framework.

Within these two fundamental building blocks, we again define specific parameters that can be used as tools in analysing and designing public business models. The governance parameters align with the value network and functional architecture, where the public value parameters detail the financial architecture and value proposition. The new parameters we will propose operate on two levels: the first relates to the (Smart City) goals policy makers set out to reach and the second is an organizational level that focuses on how governments organize themselves to reach these goals. These two levels were not present in the original matrix, given its focus on purely commercial ICT services, rather than those cases in which the government or public bodies play an active role and contribute to the value proposition. The expanded matrix is represented in Figure 2.

We note here that all the design parameters important for the business model certainly remain so when a public entity is involved or when certain policy goals are to be achieved. These criteria stay

applicable and are not in need of retooling since they were designed with mobile service provision in mind. In what follows, the new parameters of the matrix will be briefly explained.

2.1 Public Governance Parameters

The following paragraphs will very briefly explain the individual parameters that have been added to the new version of the business model matrix. Their selection is the result of a literature review of which some indicative references are provided.

Good governance: Given the relatively vague nature of the different definitions of this concept and the difficulties in operationalizing it, we focus on a recurring factor: a striving towards equilibrium in governing. As existing policies and regulations can in many cases be contradictory, a striving towards consensus and harmonization of interests is deemed essential in good governance [9, 17]. This parameter also captures political motivations at play in offering a service to citizens. Additionally, we emphasize the concepts of accountability and trust, as it is important to consider which public entity can be held accountable if something should go wrong and how the citizen's rights are protected or can be enforced [18, 11, 19].

Stakeholder management: This organizational parameter refers to the choices that are made related to which stakeholders (be they public, semi-public, non-governmental, private etc.) are involved or invited to participate in the process of bringing a service to end-users.

Technology governance: This parameter highlights the importance of transparency, participation and emancipation in making technological choices, especially by public entities [20]. Choices for a particular technology or platform (e.g. by only offering an iPhone application) may exclude certain parts of the population, something a government should be wary of. A second element we link to technology governance is the use of open data and whether government information is made available to citizens through the use of ICTs [21].

Public data ownership: If the decision to open government data to the public is made, the responsible government body should carefully consider the terms under which this data is opened up and to which actors. This is a technological decision in the sense that selecting or limiting the type and amount of formats the data is available in has consequences to which parties can start working with it (e.g. if the data is machine-readable or not, presented in natural language as well, only available in proprietary formats and so on). This also relates to licensing schemes and exclusivity of use of the data.

2.2 Public Value Parameters

Return on public investment: This refers to the question whether the expected value generated by a public investment is purely financial, public, direct, indirect or combinations of these, and - with relation to the earlier governance parameters – how a choice is justified [22]. A method, which is often used in this respect, is the calculation of so-called multiplier effects, i.e. the secondary effects a government investment or certain policy might have, which are not directly related to the original policy goal.

Public partnership model: The organizational parameter to consider in this case is how the financial relationships between the private and public participants in the value network are constructed and under which legal entities they set up cooperation. One example of such a model is the public-private partnership (PPP). In the context of the business model matrix we choose to emphasize the financial implications and risk distribution effects of a PPP-model [23, 24].

Public value creation: This parameter examines public value from the perspective of the end user and refers to the justification a government provides in taking the initiative to deliver a specific service, rather than leaving its deployment to the market [22]. One such motivation could be the use of market failure as a concept and justification for government intervention.

Public value evaluation: The core of this parameter is the question whether or not an evaluation is performed of the public value the government sets out to create and if this evaluation is executed before or after the launch of the service.

The detailed, qualitative description of all the parameters of this expanded matrix allows for the thorough analysis and direct comparison of complex business models that involve public actors in the value network. This inspired us to also create a simplified overview, which finds its basis in the theoretical work of the matrix, but dramatically reduces its complexity. In this overview, it becomes possible to compare divergent cases based on the two central parameter sets of the matrix: control and governance on the one hand and (public) value on the other.

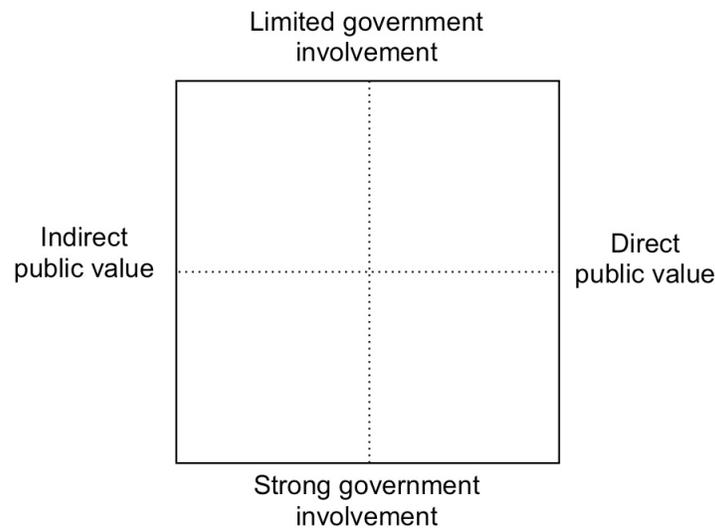


Figure 3: Governance and public value grid.

The grid represented in the figure above allows us to map different cases of (in our case mobile) city services and identify how they compare to one another. The top and bottom extremes refer to the governance parameters described in the business model matrix and provide an indication of the level of control the city government has in providing the service to citizens. The horizontal axis provides insight into the type of value that is generated by the services and whether this is direct or indirect: direct public value refers to the citizen having a more immediate relationship with the government, is a more individual value, short term and relates to “what the public values”; while indirect public value assumes a more indirect relationship, is more collective and long term, and relates to “what adds value to the public sphere”. Further on in this article, we will use this grid to map the cases of FixMyStreet and London Bike App as illustrations, after their detailed analysis based on the expanded business model matrix.

3 Case Study: FixMyStreet

FixMyStreet is a service from the UK and allows citizens to report issues with city infrastructure, such as broken traffic lights, potholes, graffiti and so on. The service started out as a website that allowed anyone

in the UK to register complaints that were then sent to the correct local authority by FixMyStreet. Today, the service offers mobile reporting tools and offers cities the opportunity to integrate FixMyStreet into their local websites as well as the back end systems the city might use in order to efficiently treat issues, by sending them to the correct city service and making sure their resolution is followed up on. FixMyStreet is now the largest service of its kind in the UK, sending over 5.000 reports to local governments each month [11]. In the following sections we will look at the business model parameters and dynamics at play in this case.

3.1 Control and Governance Parameters

In its initial conception as a country-wide website a city government only had limited control over the assets required to create the value proposition as it did not have control over the reports or different categories of issues being sent in by citizens. When citizens entered a complaint into the website, an email was automatically generated and sent to a local government organisation based on the location of the report and its categorisation. The response to a particular problem was thus entirely dependent on the government representative receiving these emails. The service covered the entire country, but focused on very local issues while offering little integration or cooperation with local governments. While this did result in interesting cases of other citizens reacting to complaints by their neighbours, recently FixMyStreet also offers a service tailored to the needs of local governments under the name FixMyStreet for Councils. This cloud service allows local governments to integrate FixMyStreet's functionality into their websites and mobile applications, while maintaining their template and branding. This increases the level of control over the customers the municipalities have, since citizens will not have to leave the local website or mobile application to register an issue. There is no charging and billing relationship between the citizens and the city but reports cannot be made anonymously (users need to at least leave an e-mail address).

The London borough of Barnett was one of the first local governments to implement the service via FixMyStreet for Councils and integrate their existing online reporting forms with FixMyStreet's map-based solution. In this case, the implementation of the services built on existing policies within the municipality of allowing people to report issues, but goes further when it comes to transparency and accountability, according to Chris Palmer, the Assistant-Director of Communications of Barnett [25]. He also emphasizes the more positive relationship with citizens created by the service, turning them into "active citizens, rather than passive grumblers". U.S. Chief Information Officer Vivek Kundra refers to these citizen-driven systems for local public service improvement as "we-government", which replaces "e-government", to emphasize the partnership between governments and citizens [26]. It is this philosophy of transparency and creating dialogue between citizens and politicians that is an important part of the FixMyStreet project. However, these ideas still need to mesh with those local governments and some resistance to this increased openness and citizen empowerment should not be unexpected [18]. In the case of FixMyStreet, the critical aspect to the success or failure of the service is the extent of involvement and reaction speed of the local government, making the question of good governance particularly pressing in this instance. There are few interoperability issues related to the website offered by FixMyStreet: reports can be made directly on the webpage and e-mails are sent to both the citizen and the responsible department in the local government. However, FixMyStreet also offers a service to councils that integrates the reports into their existing backend systems. Although some compatibility issues may arise here, FixMyStreet claims they can integrate with any backend system or existing fault reporting service and will work together with councils to ensure the functionality of both systems. If councils opt in to the back-office integration, reports go straight into their CMS or fault management system, making the follow-up process easier. Reports that come into an adapted council's website also appear on the general FixMyStreet site, in an effort to reduce duplication. Although customization is possible, the system takes

an integrated approach in which the intelligence is centralised.

When it comes to technology governance, FixMyStreet attempts to be as inclusive as possible: although it offers a mobile application, the service can be used in a simple browser and via e-mail. This of course still assumes a basic level of digital literacy as well as access to an internet-connected device [26]. In an attempt to alleviate some of these concerns, the platform is also developing a completely SMS-based solution and is cooperating with municipalities in the Philippines to perform trials. The software that is used to create and run FixMyStreet is open source and most of the code is available under the Affero GPL, which is a version of GNU General Public License that goes beyond the standard GPL in making sure network hosted software is freely available to anyone interacting with it. The organisation stresses their commitment to the open and democratic distribution of their software [27]. FixMyStreet seems committed to working together with a diverging range of local governments and adapting to their specific requirements. The data that is generated by the reports is generally not made available to the public in a structured way, although all reports can be found on the website. The source code for all the mySociety websites (see below) are freely available and modifiable to anyone interested.

3.2 Value and Public Value Parameters

FixMyStreet was created by mySociety, a UK charity project by UK Citizens Online Democracy that was founded in 1996. MySociety is an e-democracy project that started in 2003 and received £190,000 in government financing from the Office of the Deputy-Prime Minister in 2004 to develop “socially focused tools with offline impact” [27]. The initial investment in the project was thus carried by the national government, but in June 2012 the service launched FixMyStreet for Councils under a new revenue model. Integration of the web service into a local municipality’s website costs £3500 in the first year and £2000 per year in the following ones. Adding a mobile version of the website as well costs £5500 in year one, followed by £3000 a year, while also offering a dedicated mobile application (for iPhone and Android) costs £9500 in the first year, followed by £4000 per year. All formulas include access to an internal dashboard, training sessions for government staff as well as upgrades, maintenance and support. FixMyStreet charges an additional fee for integration into existing back-office systems city councils may already be using. This costs £5500 in year one, followed by £2000 a year thereafter for integration with Microsoft, Oracle or Lagan CRM systems, and £6500 per year, and £2500 per consecutive year for other CRMs or fault management systems, but this may vary depending on the complexity of the integration [11]. Since the service is offered for free to end users, there are no further revenue sharing deals in place. As the service is an NGO and founded in the context of a charity organisation, these fees supposedly only cover operating costs of the service. Although the organisation still receives funding, this revenue model was set up in order to tackle the difficulties in attracting funds. In an interview, mySociety director and co-founder Tom Steinberg, said the following on the topic:

“When you run an organisation such as mySociety, funding is always tight because you have built yourself a new market. You are doing things that are fundamentally unlike anything people have done before so there are no real pre-existing funding channels so we just sort of muddle by really. ... You have to be motivated not by money, don’t you?” [27]

The main returns on the investment made by the government should be clear: municipalities are alerted to local problems more quickly and can communicate with citizens in a more direct manner. Additionally, councils get more insight into where issues occur more frequently and can adjust policies if needed [25]. The service can reduce potential complexity for citizens in communicating with their local authorities and by outsourcing the technical aspects to mySociety, councils can react more quickly in the fast-moving sector of online and mobile services. A major potential pitfall of the service can

occur when local governments are ill prepared for the number of reports coming in from citizens and are unable to respond to them. In this light, the organisation does encourage to allocate an FTE (full time equivalent) on the municipality's side to follow up on the reports coming in and take care of the day-to-day management of the system. This is an additional potential cost that needs to be taken into account. Since FixMyStreet and mySociety are charity organisations, we do not speak of a public-private partnership per se, but there is a financial transaction between councils and the organisation when they opt for the FixMyStreet for Councils platform.

The level of user involvement in this case is high and a crucial part to the success of the service. Scholars studying FixMyStreet (e.g. [26]) have highlighted this aspect of the service and, rather than calling it user involvement, describe participation to the service as citizen engagement:

“FMS developers do not seem to prioritize (it) in (their) design, but citizen engagement is a core value behind many mySociety projects. Some scholars who have previously studied FMS argue that this new mode of engaging citizens in (local) governance not only holds local councils more accountable but also increases citizen engagement.” [26]

This engagement can refer to several ways of including citizens in the decision-making process, of which the OECD lists three: having access to information, giving feedback in the form of online voting or comments, and an active participation that acknowledges a substantive role for citizens in proposing ideas and shaping society [28]. The service is free for end users and its main intended value lies in improving basic city infrastructure and by extension quality of life in a local neighbourhood for citizens and getting more insight into local issues for city councils. The idea of local governments being held accountable more easily and increasing general transparency of government as added values of the service are also touched upon in the quote above. Depending on the option local governments choose, the service can be either positioned as government-independent, or branded using the municipality's template, style and interface. When opting for FixMyStreet for Councils it is also possible to fairly easily translate the service into different locally spoken languages, should this be a requirement for the area in question.

As was already mentioned above, the main public value generated by the service is increased transparency in government, decreased complexity for citizens, more direct communication with those citizens, gathering data on structural problems with city infrastructure and increasing general quality of life for people reporting issues in their neighbourhoods, while maintaining a positive tone [25]. Depending on the implementation (investing in FixMyStreet for Councils or not), citizens may feel more involved in some decision-making and due to the more direct communication with city officials and the potential of showing direct result, justifying the public investment in the service is relatively easy. This does imply local governments need to be prepared to deal with the reports coming in and should dedicate staff to their follow-up. If issues go untreated, the service will lose its strength and could even have adverse effects on the relationship between government and citizen. In cases where the council is not responsible for a reported issue or it does not have the time or resources to fix it in an acceptable time frame, they can however use the system to communicate the reasons for the delay to citizens [25]. The system allows for the evaluation of reports' resolution rate, but this should be closely monitored by local governments.

This table shows the qualitative description of each of the parameters of the extended business model matrix and extrapolates this breakdown into a position on the governance and public value grid, which will be presented later on.

4 Case Study: London Bike App and London Data Portal

London Bike App allows end users to see the live availability of bikes in the sharing system exploited by Transport for London (TfL), the city's official public transportation organisation. The application is

Control and governance parameters		Control and governance parameters	
Value network	Technical architecture	Financial architecture	Value proposition
Control over assets: dependent on level of integration chosen by city, generally limited, distributed	Modularity: partly modular system, integration of various open source component (e.g. Open Street Map)	Investment structure: FixMyStreet is funded by a charity with national government support	User involvement: strongly encouraged and required for success of the service, citizen engagement
Vertical integration: limited	Distribution of intelligence: distributed	Revenue model: from free to subscription fee depending on implementation	Intended value: improving city infrastructure and quality of life in the long term
Control over customers: dependent on implementation, generally more with FixMyStreet	Interoperability: integration service with existing CMSs available	Revenue sharing: no particular revenue sharing deal is set up	Positioning: depending on implementation, always a free and government-type service, positive and transparency city image
Good governance: importance of transparency and accountability	Technology governance: striving towards inclusive access to the service	ROPI: insight in citizens issues, increased transparency and communication	Public value creation: reducing complexity, increasing quality of life and transparency, indirect public value
Stakeholder management: generally limited to contacting relevant city departments	Public data ownership: software is all open source and freely available, whether data is opened is left to the city	Public partnership model: no typical PPP construction (since mySociety is a charity)	Public value evaluation: allowed by the system, but needs close follow up by the local government.
⇒ Depending on the implementation there can be multiple levels of government involvement. Given that the service is created by a charity and the fact that a local government can always choose not to react to issue reports, we place the service more towards the middle of the grid.		⇒ The value created by the FixMyStreet service is in part direct in nature, as it in some cases solves very individual problems. Generally speaking though, the focus is on improving the quality of life in a city and its infrastructure in a more long-term way and for all citizens.	

Table 2: Business model analysis of the FixMyStreet case.

available for iOS only and costs €0,79 or £0,69. It was developed by an independent developer called Big Ted, Ltd., who made use of the City of London’s open data initiative to create the service and keep its information up to date in near-real time.

4.1 Control and governance parameters

One of the most important assets in the creation of the value proposition of this application is the actual real time data, which is controlled and offered by TfL and the City of London. In January 2009, TfL launched a so-called Developer Area on its website that gives access to datasets and real-time traffic and public transport information. There are currently 30 feeds available in TfL’s Developer Area that can be accessed after information on how and where they will be used as well as the target audience and the estimated audience is provided [29]. The value network is somewhat integrated as the data is controlled and choices for availability are made by TfL, but it is relatively easily available. Control over the customer does not lie with TfL, nor the City of London, but rather with the application and its developer, as TfL explicitly prohibits app developers that make use of the real time data to use TfL branding, templates or house styles (see below). The bike system is heavily sponsored by international finances firm Barclays and is, as a result, mostly known as the Barclays Cycle Hire system in London. Developers are allowed to use this branding (under certain conditions) and so some of the customer relationship may be shared with Barclays. In this case, the developer does not require a registration from end users, so there is no profile or identity management occurring on this side. Although the city is not directly involved in the creation or distribution of this bike application and has no official link to it, the fact that it was possible to develop is a direct consequence of the city’s open data policy, which aligns with certain good governance principles. At the launch of the London Data Store in January 2010, mayor Boris Johnson emphasised the importance of transparency of government, saying “sunlight is the

best disinfectant” [10]. In a first step, the mayor made all expenditures of the Greater London Authority (GLA) above £100.000 transparent and available online in an effort to give citizens more insight into government spending and reduce it at the same time. This led to the launch of the London Data Store, an initiative by the GLA to open up as much data it holds as possible. In a debate at the launch of the London Data Store, the late Sir Simon Milton (London’s Deputy Mayor for Policy and Planning at the time) highlighted other elements related to good governance, saying the open data initiative was aimed at “bringing significant public benefits” and “improving quality of life” [10]. He spoke about a “post-bureaucratic age in which decision-making is put back into the hands of the public, that can base itself on correct and open information on government” [10]. Additionally, the importance of stimulating the local economy was also highlighted as a potential benefit of opening up data, by encouraging local developers and creative people to exploit any commercial opportunities. These principles are framed in the Freedom of Information Act 2000, enforced by the Information Commissioner and aim to ensure an open government. This legislation addresses public authorities and places two main duties on them:

“to adopt and maintain a publication scheme setting out the classes of information which the authority publishes and how it intends to publish the information, to respond to individual requests for information under the general right of access to information, from January 2005” [30]

This act gives individuals the right to request any government data, unless it is privacy sensitive or a matter of national security. The GLA aims to involve as many public stakeholders as possible in the Data Store initiative and clearly states it “is committed to influencing and cajoling other public sector organisations into releasing their data here too” [31]. Since the TfL started publishing some of their data feeds up to a year before the London Data Store was opened, it was a logical partner and links to the TfL Developer Area are available in the London Data Store as well.

Although the TfL makes an effort to release data that is at least easily machine-readable, the use of interoperable standards varies depending on the type of data. In the case of the Barclays Bicycle Hire, the information is available in an XML-feed since June 2011. This feed allows developers to relatively easily access real-time availability data from the bike sharing locations and includes the name, location, coordinates and maximum number docking points for all operational docking locations, as well as the number of available bikes and available free docking points. Before the feed was made available, the developer of the London Bike App scraped it of the TfL website, using a Google App Engine application [32]. Today’s feed is updated every three minutes and allows for a maximum of 30 minutes between capturing and displaying a feed [33]. The information is free to use, scalable and robust, the source of data for TfL’s own website and comes with a data dictionary that explains the terminology used in the XML-feed, to make the process easier for developers [12]. By making use of the XML-standard and providing documentation to developers, TfL makes an effort towards technology governance by being relatively inclusive in its approach to opening up data: developers with some minor experience should be able to make use of the data. This of course does not naturally imply that the available data is easily accessible or understandable to the general public. It is up to the developer or web designer to take the data and make it easily interpretable to the public, and this is where some issues of inclusivity may arise: although the open data feed is publicly and freely available, developers are free to create commercial applications with them. TfL clearly states:

“Can I charge people to use the app I develop using your feeds? - Yes, you are welcome to charge the public for applications you produce using TfL syndicated data.” [34]

Given this (understandable) policy, developers may be inclined to develop for the largest platforms only, because there may be the most revenue to be made, or simply because they are more skilled in creating software for these platforms. This is the case for the London Bike App, which is only available

on iOS, due to the developer's technical experience with the platform [35]. Although the GLA does not make recommendations or suggestions towards developing for multiple platforms, it does have an internal Accessible Communications Policy that aims at combatting "the effects of racism, social exclusion and the removal of other discriminatory barriers to full participation in society" [36] by providing translations of documents, help with interpretation of documents and ensuring all GLA websites are available in all browsers and are compatible with all systems. The developer of the London Bike App does encourage to create applications for other platforms or cities and has made the source code for the service available to anyone interested [37].

4.2 Value and public value parameters

The investment in the London Data Portal is carried by the GLA and the platform does not have a direct revenue model, but is rather aimed at stimulating a developer economy in the city. Initially, the GLA also partnered with Channel 4's 4iP investment fund that made £100.000 available for innovative applications that make use of public data[38]. The program was however stopped after a Channel 4 restructuring at the end of 2010 [4]. The London Bike App however does have a direct revenue model, charging £0,69 or €0,79 for the software via Apple's iTunes App Store. 30% of the revenues of the application are thus shared with Apple to provide hosting, distribution and promotion of the service. To be profitable a developer would need to sell a relatively high number of downloads at such a low price, but in this case the developer does not provide insight into the financial situation surrounding the app. This leads us to assume the main expected return of the London Bike App itself is only partly financial, but rather about increasing accessibility to the bike sharing service. The return on public investment expected by the GLA for its open data initiative was already highlighted above and is mainly focused on indirect financial return in the form of an active London-based developer community that attempts to capitalise on the commercial opportunities created by opening up datasets. Next to this multiplier effect, there is also a strong focus in the rhetoric on improving the quality of life of the public and increasing transparency in government (see above). The London Bike App could be seen as a successful product of both these goals. The data is licensed and provided to anyone interested and no particular public-private cooperation model is set up.

There is potential for user involvement, dependent on their level of app development skills or education in understanding and interpreting the data made available by the government. Otherwise, this aspect is less present both in the open data initiative or the specific app in question. The intended value of the cheap application (apart from offering an app for free, €0,79 is the lowest amount developers can charge in the iTunes App Store) is providing better access to the Barclays Bicycle Hire system that consists of 6000 bikes in 400 docking stations across central London [33]. The app can provide a list of bike availability at the 20 docking stations closest to the user's location as well as a map view that offers a real-time overview. Since the Barclays system uses a variable pricing scheme based on the time of day, the app also provides a timer that shows the user when prices will increase, together with a price estimate of the user's current trip. TfL is very clear in its materials that developers cannot position the services and applications they develop as being officially endorsed by or affiliated with the transport company. To this end TfL have composed clear and detailed guidelines for developers on the use of TfL logo's, brands or house styles (e.g. [39, 40]). These guidelines deal with the use of logos, fonts, lettering, colours and so on in developers' promotional materials, but also in the applications' user interface.

The above paragraphs have already provided an overview of the types of public value the city wants to create as a result of this initiative. The London Bike App is an example of how both goals of stimulating developers to create innovative apps and improving ease-of-use of public services can be achieved by open data initiatives. While no particular market justification motivation is used by the city and commercial organisations are also welcome to share data in the London Data Store, given the already public

Please don't:

- Use our brands - the roundel, unless it's part of a map interface
- Remove or change any filepaths to logos or the official colour scheme within feeds. Please use them just as they are
- Use the 'Oyster' logo
- Use the word 'official' or say things like 'in partnership with TfL.' If you want to become a partner with us, let us know
- Use our map without a license
- Use our trademarks



Please do:

- Include any branding supplied with feeds
- Follow our design standards if using our logos in a map. Read the [design standards](#)
- Use pictograms to give your apps some flair
- Use the words 'London Underground', 'Tube' and 'London bus'
- Call the cycle hire scheme 'Barclays Cycle Hire' - they're the sponsor, so its part of the deal. Read the [Barclays Cycle Hire design standards](#)



Figure 4: General overview of TfL approved branding [33]

nature of the data, no such motivation is really required or expected. The developer does not provide adequate data to determine whether the app can be evaluated as a success, nor is it clear in which ways the GLA evaluates the London Data Store or has developed metrics or KPIs that identify whether the initiative has successfully or sufficiently reached its goals.

The case of the London Bike App is summarised in the table above. Given the description of the 20 parameters we draw some conclusions on this applications place in the governance and public value grid. The role of the government in the creation of the service remains rather limited, while the public value that is generated is mostly direct in nature. Both the FixMyStreet service and the London Bike App will be mapped on the grid in what follows.

5 Mapping on the Governance and Public Value Grid

After the description of each of the parameters of this case, we can map it onto the governance and public value grid, developed in Section 4. This is represented in the Figure below.

Given that the government did not take the initiative to set up the FixMyStreet service, but rather a charity, and that depending on the formula chosen by a city government, its involvement can vary, the service is placed more towards the top of the grid, signifying less direct government involvement in the service. The value that FixMyStreet generates leans more to being indirect, as it mostly concerns long term and structural issues that are being tackled, which have a negative effect on the quality of life of larger groups of people, rather than individuals. However, in some cases, the reported problems are entirely of a personal nature, explaining the position of the service (not completely to the left of the grid).

London Bike App is positioned more to the top of the grid, since there was no direct government involvement in the creation of the service. However, its creation would not have been possible without the open data provided by TfL and the GLA, so there some indirect impact of the government's involvement. The public value generated by the service is almost entirely direct as it targets individual users who are

Control and governance parameters		Value and public value parameters	
Value network	Technical architecture	Financial architecture	Value proposition
Control over assets: control over real-time datasets with TfL and City of London, control over service creation with app developers	Modularity: not a particularly modular system	Investment structure: some private investment in open data portal, personal investment of €99 by developer for Apple Developer Account	User involvement: not present
Vertical integration: dis-integrated	Distribution of intelligence: distributed between developers and TfL	Revenue model: €0.79 via iTunes App Store	Intended value: better individual information and access to the bike sharing system in real time
Control over customers: with application developers using the data, also Barclays in this case	Interoperability: data made available in open format	Revenue sharing: 30% held by Apple for publishing in App Store	Positioning: apps cannot be positioned as official and thus have strong own branding and no required government involvement
Good governance: strong focus on open data and transparency	Technology governance: app only available for iOS but source code available, limited inclusivity, beyond control of government	ROPI: indirect returns and multiplier effects, improving quality of life	Public value creation: individual and “in the moment” value generated
Stakeholder management: important presence of commercial player in this case	Public data ownership: data is owned by TfL but freely made available as open data	Public partnership model: no specific PPP model set up	Public value evaluation: no particular evaluation of the app or data sets present at this time
⇒ The datasets provided by TfL and the city government are clearly required and essential to the existence of the service. However, the city government itself was not involved in the actual creation of the app, thus it placed more towards the limited involvement side of the framework.		⇒ The public value created by the app is very individual as it provides information on a specific moment in time for one specific user. The service itself does not have any long term or collective goals.	

Table 3: Business model analysis of the London Bike App case.

looking for an available bike or an open space to return their rented bike to at a specific point in time.

This illustrates how the grid can be used to compare cases, based on a thorough analysis using the public and business model design parameters from the updated matrix.

6 Conclusion

The goal of this work was to test a framework that could generate a better insight into mobile service business models when public entities are active participants in the value network. We found the basis for this framework in the business model matrix, proposed by [7], and expanded it to include public design parameters. Parallel to the distinction [7] makes between control and value parameters, we propose a division between parameters related to public governance on the one hand and public value on the other. Within this division, we identified eight new parameters to take into account. After making this distinction, we detailed the new parameters and explained their origins. Each of them can be linked up to the original business model matrix, of which the parameters remain applicable. We consider all these parameters to be of importance when analysing a business model in which a public entity (i.e., a city government) is part of the value network.

This framework was in this case used as a tool for qualitative analysis (a posteriori), but could also be put to work to design (a priori) the business model of new service initiatives. The parameters allow

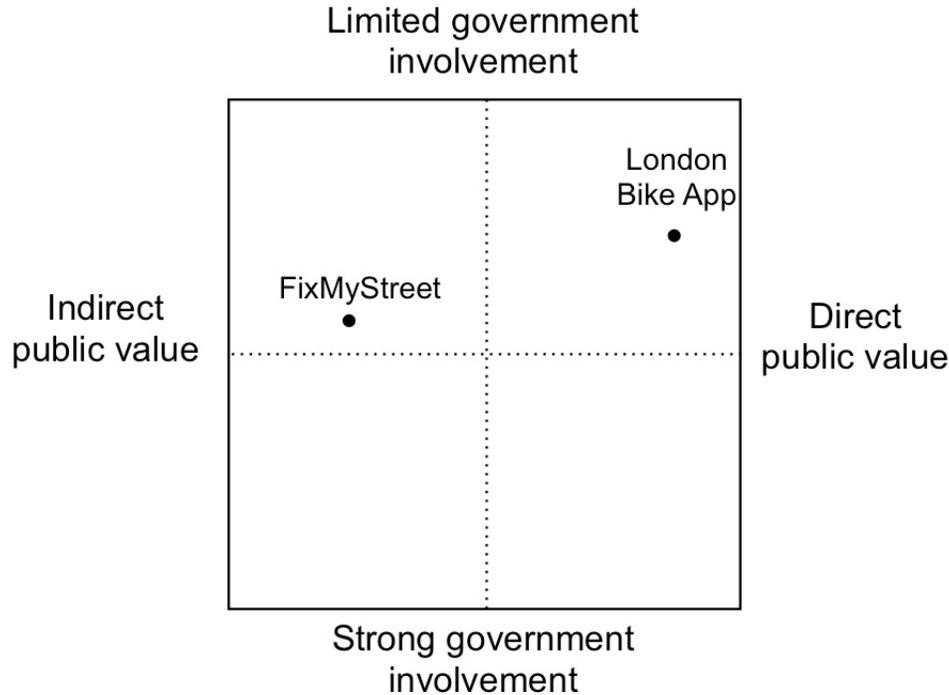


Figure 5: FixMyStreet and London Bike App mapped on the governance and public value grid

us to perform a structural analysis of the complex value network of public services and help to identify important aspects that would have been less likely to come to light when only using the business parameters. This was then tested out, using the case of the FixMyStreet service, available in large parts of the UK and some other cities, as well as the London Bike App, based on real-time open data provided by the city and public transport organisation. The services were thoroughly described, using the updated matrix, and then mapped onto the governance and public value grid, allowing their comparison. The addition of the public parameters to the business model matrix adds an interesting and useful layer that allows a more detailed analysis of complex mobile service business models in which public actors play a value-adding role.

This grid and the mapping provided in this article form a first step towards a new way of thinking about mobile service strategies from the perspective of the city. Local governments can use this qualitative method as an initial step in thinking about their position in the value network and the mobile service ecosystem, which is very dynamic and volatile. This framework can ground some of the debate and hopefully inspire new strategic decisions related to mobile business in the public sector.

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Author Biography



Nils Walravens has been active as a researcher at iMinds-SMIT since August of 2007, working on the MePaper and Video QSAC projects, looking into the implications of personalised news and user reaction to video compression respectively. After that he joined the Media, Market and Innovation cluster within iMinds-SMIT and worked on the European funded FP6 project SPICE, exploring business model implications of high bandwidth mobile services. Since then, he has built up expertise on mobile services and platform business models in the quickly changing mobile telecommunications market by participating in various national and European projects. Currently, Nils is working on a Prospective Research for Brussels project, funded by Innoviris and the Brussels Capital Region, researching the role of cities and public bodies in current and future mobile service business models. Nils graduated cum laude as Master in Communication Sciences at the Free University of Brussels in July 2007 with a thesis on the introduction of High Definition Television in Flanders. He did two internships during these studies: one in TV research/production for the public broadcaster VRT and one for the press department of Alfacam/Euro1080, HDTV pioneer in Europe.