Richard Webber
is a Visiting Professor at the
Department of Geography in
Kings College London and
Managing Director of OriginsInfo
Ltd.

Case Study

Transport for London Countdown

Richard Webber

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Abstract

The subject of this case study is the Transport for London bus Countdown system. It considers how an internal data source, used for payments to contractors, has been developed into a new class of customer service. The article looks at the expansion of the system beyond physical indicators into web and mobile services. It explains how customer service has been improved as a result and also what lessons the commercial sector might learn from the system.

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Introduction

An example of a ‘Countdown’ system is the feature on a microwave that helps us know how long it will be before our food is cooked. Among the most extensively used public Countdown systems are those supported by Transport for London (TfL). The dot matrix displays at underground railway stations indicate not just the destination of the next train, but also how long until it arrives. Selected bus stops provide equivalent information for each bus route. Earlier this year, TfL piloted Countdown at light-controlled crossings so that pedestrians could know how many seconds they had to complete their crossing of a road.

Until 2009, beacons positioned along the length of bus routes supplied the information displayed on dot matrix screens at selected bus stops. When satellite technology replaced beacons as the source of information to track the location of buses, real-time information became available for all routes which could not just improve the quality of information displayed at bus stops, but also provide a data feed to mobile digital devices, thus providing access to bus information way beyond the limited number of dot matrix screens from which it was previously accessed. It became possible to stay at home or work, leaving for the bus stop to arrive just in time for the arrival of the bus.

Though the officials involved in this project would not classify themselves as direct marketers, the project exemplifies many key features of data and digital marketing, namely, the use of data to improve the customer experience, through the provision of better

Richard Webber
Department of Geography
Kings College London
16 Broadlands Road
London N6 4AN, UK
Tel: 44 020 8340 3034
E-mail: richardwebber@blueyonder
.co.uk

quality information, extracted from operational records and accessed through digital channels.

Origination of digital data

Buses are tracked every 30 seconds

TfL contracts out the operation of individual routes to bus operators via competitive tendering. The payment that TfL makes to each operator is dependent, in part, on the number of miles run by buses on their routes. To calculate the payment that should be made to each operator, TfL needs to be able to audit the bus mileage and service quality on each route. Each bus is fitted with a computer system that uses satellite technology — combined with other location services including an electronic ‘gyro’, odometer counter, map service and a dead reckoner — to establish the precise position of the vehicles. This information is transmitted every 30 seconds via GPRS. The signals are collated in a data warehouse and then used to enable service control and also to generate bus arrival predictions.

Informing customers: not the primary purpose of data collection

As with many commercial organizations, the investment in the storage and manipulation of this data is justified by the role it plays in driving financial payment systems and providing service improvements through efficient service control. Although it could be said that the principal use of the information is to update the database driving the payment system, real-time information is displayed on a diagram of each route so that service controllers within contracted bus operators’ offices can see in real time which buses are ahead of and which are behind schedule or even broken down, where there are delays and, in exceptional cases, where a route may have been blocked by an accident or flooding.

The use of the data for informing customers is a secondary benefit of its collection and is made possible as a result of the creation of a database containing the street name and precise location of every bus stop on the TfL network. With information on the location of each bus and the location of each bus stop, the real-time data feed used to drive operator payments enables TfL to determine distances between buses and bus stops more accurately and more comprehensively than the earlier system, which relied on a cabled network of beacons along each route to signal the location of each bus.

Predictive modelling of arrival times

The information on the time at which buses pass each stop is stored in such a way as to enable TfL to convert the distance each bus is from its next stops to a likely arrival time in minutes. Travel time between stops clearly varies by time of day, day of the week and between school terms and holidays. By relating the current time to bus speeds and times during equivalent historical time spots, TfL’s predictive modelling systems can provide a much more accurate estimate of likely arrival times, given the current location of each bus. All this is undertaken in real time.

Use of the data to enhance customer service

SMS requests for arrival times

While the first applications of the satellite-based Countdown system delivered information to dot matrix screens at approximately

Supporting disabled access

10 per cent of the network's 19,000 bus stops, TfL decided that it should anticipate, rather than react to changes in the channels through which customers were likely to want to access the information. To this end, an SMS application was developed whereby a traveller could send an SMS request to TfL using a unique identifier visible at each bus stop and in return get the same Countdown information as would have been visible had a dot matrix screen been installed at that bus stop. Currently, the use of this SMS service costs the mobile subscriber 12p per text of which less than 1.3p passes to TfL, the remainder being the operating costs of the mobile service providers.

In addition to the SMS service, TfL provides the same information via its website and via its mobile version, tfl.gov.uk/buses. The web services are fully functional and provide the flexibility to search for nearby bus stops using area, street name or postcode using a graphical interface and a personalized 'My Sign' feature that allows the user to personalize their enquiry with up to eight stops.

The design and testing of these services has taken into consideration the specific needs of users with disabilities. Particular attention has been paid to the visibility of screens, the availability of the service on both high- and low-specification mobile devices and the ease of use of keyboards. More controversial, perhaps, is the assumption that the majority of customers are likely to have access to personal mobile digital devices and to be willing and able to retrieve relevant information from them within the relatively short period between successive buses on a particular route.

Though this is probably true of most commuters and workers — it is now really possible to make evidence-based choices between routes and modes of transport if you need to get to a meeting in a hurry — it is less likely the case among those who hold a Freedom Pass. Dick Stroud estimates that there are nearly nine million adults in the United Kingdom who are not connected to the internet.¹ The number of people without internet connection via their phone will be considerably higher. Stroud shows that most of this group are the over-60s, a group that constitutes heavy users of London buses as a result of their entitlement to a Freedom Pass.

The journey to smart phone applications

Channels for communicating to customers

Whereas initially it was TfL's policy to develop in-house the principal applications through which real-time information could be displayed, it changed strategy in 2010 and is now advocating 'Data Syndication' — providing raw data feeds to applications developers that deliver the information in whatever formats they believe the market demands, including digital displays and smart phone applications. TfL does not get involved with the pricing of applications which use its data in this way.

In addition to providing raw data and applications via third parties, TfL is also able to offer dedicated feeds of live bus information relating to specific bus stops or clusters of bus stops to hospitals and offices which

generate large amounts of bus passenger traffic. Therefore patients returning from a hospital visit can wait in the warmth and comfort of an indoor seating area close to the entrance to the hospital, venturing to the stop outside only when the relevant bus is approaching. This service is also appreciated by customers who are anxious for their personal safety and who can similarly leave places of work in the knowledge that a bus on the service they are planning to use is about to arrive.

Twitter feed

Twitter users are accustomed to the provision of information on major disruptions to the network and there is a growing list of passenger followers. The @TFLBusAlerts Twitter feed provides details of any major disruption, but does not follow the TfL Underground approach of having a Twitter feed per route, mainly because there are over 700 bus routes in London.

Automatic destination announcements

Corporate coordination of data use

Organizationally, the provision of customer information for different modes of transports is coordinated within TfL online — a department that is responsible for all of TfL's digital output. Within this department cross-transport functions are managed centrally, for example the development of the journey planning application, which enables customers to identify the most timely route from A to B irrespective of mode. By contrast, applications that are mode specific, such as the bus Countdown system, are managed within individual operating divisions. London Buses also uses the information for applications other than Countdown, for example, the on-bus equipment used to provide the location information also generates automatic destination and 'next stop' information displayed on screen and accompanied by an audio announcement.

Modelling to counter GPS canyoning

The roll out of these applications has had to be sensitive to accuracy of the satellite technology, which, as GPS users in London can confirm, can experience problems when the location of a bus is shielded by the height of office buildings in the vicinity of the route as for example around Canary Wharf. To counter this, London Buses and its technology partners use a variety of location tools and some clever mathematics to counter these 'GPS Canyoning' effects in order to provide consistent quality information.

Whereas one might suppose that TfL was solely responsible for these innovations in the provision of customer service information, in practice the suppliers of its technology tend to be suppliers both to other transport authorities in the United Kingdom and, on occasion, to the transport authorities of other world cities. The result is that gatherings at supplier-organized user groups provide a useful forum for evaluating improvements, a process that is facilitated by the monopoly status of most organisations that attend these meetings.

Good practice not uncommon in the public sector

Implications for private sector organizations

Readers of this Journal could be forgiven for supposing that worthwhile developments in direct, data and digital marketing are

Waiting time and customer satisfaction

restricted almost exclusively in the private sector. One hopes that this review of TfL's Countdown system — which receives over 35,000 SMS requests per day, has had over 630 million website hits since October 2007 and is supporting over 30 transport applications — demonstrates that best practice can also occur in publicly funded organizations.

What conclusions can private sector organizations draw from the enhancements to customer service achieved by Countdown, or for that matter real-time traffic information systems relying on satellite technology? The first is that, even if it does not lead to any changes in behaviour, information on the likely length of waiting time is of considerable benefit in terms of customer satisfaction. There are a multitude of situations in which consumers wait in queues, as for example waiting for a phone call to a customer service centre to be answered, at check-in or at security in an airport, in a retail outlet such as a Post Office, or at a ferry terminal. Only occasionally is the consumer provided with the information, which it would be very easy to estimate, on how long it will take to reach the head of the queue. Having a reliable estimate of the length of the wait is a great source of reassurance.

Proving better estimates of delivery times

The second is that applications for visually tracking consignments or vehicles can be of great value in enabling consumers to optimize use of their time. This has already been recognized by courier services, but could equally well be applied to the multiplicity of services delivered to the home, such as mail order merchandise, the servicing of home equipment or attendance to breakdowns, many of which involve consumers waiting at home longer than they would need to if they could track delivery online or, worse still, taking unnecessary lengths of time off work because organizations are unable to advise the arrival times more accurately than am or pm.

Reference

1. Stroud, D. (2012) 'The digitally excluded consumer — Options for marketers', *Journal of Direct, Data and Digital Marketing Practice*, Vol. 14, No. 1, pp. 5–17.