BRINGING PUBLIC TRANSPORT INTO THE INFORMATION AGE

improving customer service through innovation

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Contents

1. Introduction

Developments in communications technology continue to change the way people access information and interact with one another. Increasingly, public transport operators and agencies are looking at how to integrate the way people get around with the platforms used to access information, consume media and socialise.

Improving the delivery of information through mobile technology has tremendous potential to empower public transport customers with a much greater sense of control over their journey. TTF research indicates that enhanced access to service information, particularly real-time information, is key to overcoming some of the barriers to public transport use and improving customer perceptions.

The boom in mobile communications technology has created new opportunities for operators to improve customer service and a multitude of options for the delivery of information on transport services and way-finding. The implications of this shift in the delivery and consumption of information are significant, to say the very least. This paper discusses some of the opportunities and challenges faced by transport operators and agencies in keeping pace with rapid advancements in technology.

Summary of recommendations

Prioritise the development and delivery of mobile-formatted customer information websites.

Consider the costs and benefits of third party versus in-house software development.

Consider the costs and benefits of third party versus in-house software development and, where possible, reduce the cost to taxpayers by allowing the private sector to develop customer information products.

Devote resources to infrastructure and IT systems for the collection and transmission of real-time transport data for customer information.

Work in partnership with business and local government to provide real-time information displays on-street in areas of high passenger demand.

Examine low cost options such as QR code links to provide access to real-time transport information at low demand transport hubs.

Provide public transport information via Google Transit.

Consider developing integrated transit applications that provide customers trip planning as well as a means of managing an electronic ticketing account, including the ability to pay for travel.

Undertake a program of mobile network coverage black spot elimination in conjunction with mobile phone networks to improve customer service on public transport.

Focus the roll-out of Wi-Fi hotspots on outer-suburban and intercity public transport services.

Expand the range of data sets made available to potential app developers.

2. Mobile communication technology in Australia

Australia now ranks second in the world in the use of smartphones on a per capita basis. Statistics indicate that, approximately 50 per cent of Australians currently use a web-enabled smartphone.[1] The rapid take-up of mobile devices in Australia, illustrated in Graph 1, has exceeded projections and resulted in a faster than expected transformation in the way Australians interact, do business and access vital services – including information about public transport, roads and general way-finding.

Graph 1: Proportion of Australian Internet subscriptions by connection type[2]
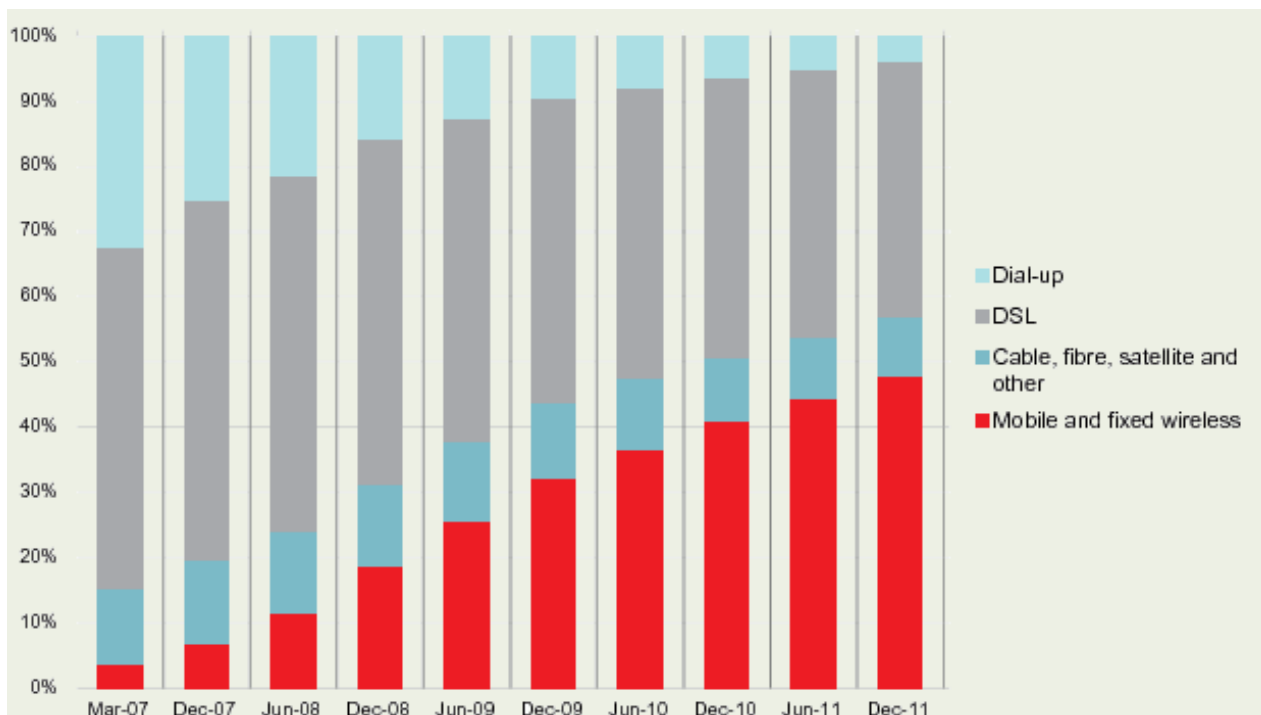
As a result of the growth in mobile connectivity, the delivery of information has diversified from websites to applications (apps) designed to give more direct and user friendly access to information and services. Within the smartphone market, there are numerous devices and a handful of software platforms vying for market share.

The dominant smartphone platforms are Apple's iOS for iPhone and iPad and Google's Android, used on a wider range of devices. Other platforms include Blackberry OS, Symbian and Windows Mobile. Providing the same product for different operating systems and keeping pace with shifts in consumer preferences is a key challenge faced by organisations when deciding how to deliver information services to their customers. For example, between 2009 and 2010, Android's market share rose a staggering 850 per cent.[3] At the end of 2011, Android held a 51 per cent global market share, however app development for iOS (with a market share of approximately 23 per cent[4]) remains the primary focus of most organisations.

Graph 2 illustrates the shifting global landscape of personal computing. It clearly shows the current transition phase in global consumption where, despite strong growth in the smartphone segment, market share remains strong across a number of platforms. Consequently, products may need to be developed for each format to reach

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[1] Sydney Morning Herald, 8/9/2011: Australia's white hot smartphone revolution. Retrieved 15/11/2011 from: http://www.smh.com.au/digital-life/mobiles/australias-white-hot-smartphone-revolution-20110908-1jz3k.html
[2] Australian Bureau of Statistics: Internet Activity, Australia, June 2011
[3] Gartner Smart Phone Marketshare 2011 Q4. Gartner, Inc. Retrieved 2012-02-15 from: http://www.gartner.com/it/page.jsp?id=1924314
[4] Ibid.

as many customers as possible and picking a winner among competing platforms is problematic – for the time being at least.

Graph 2: Personal computing: units shipped globally ('000, log scale)[5]
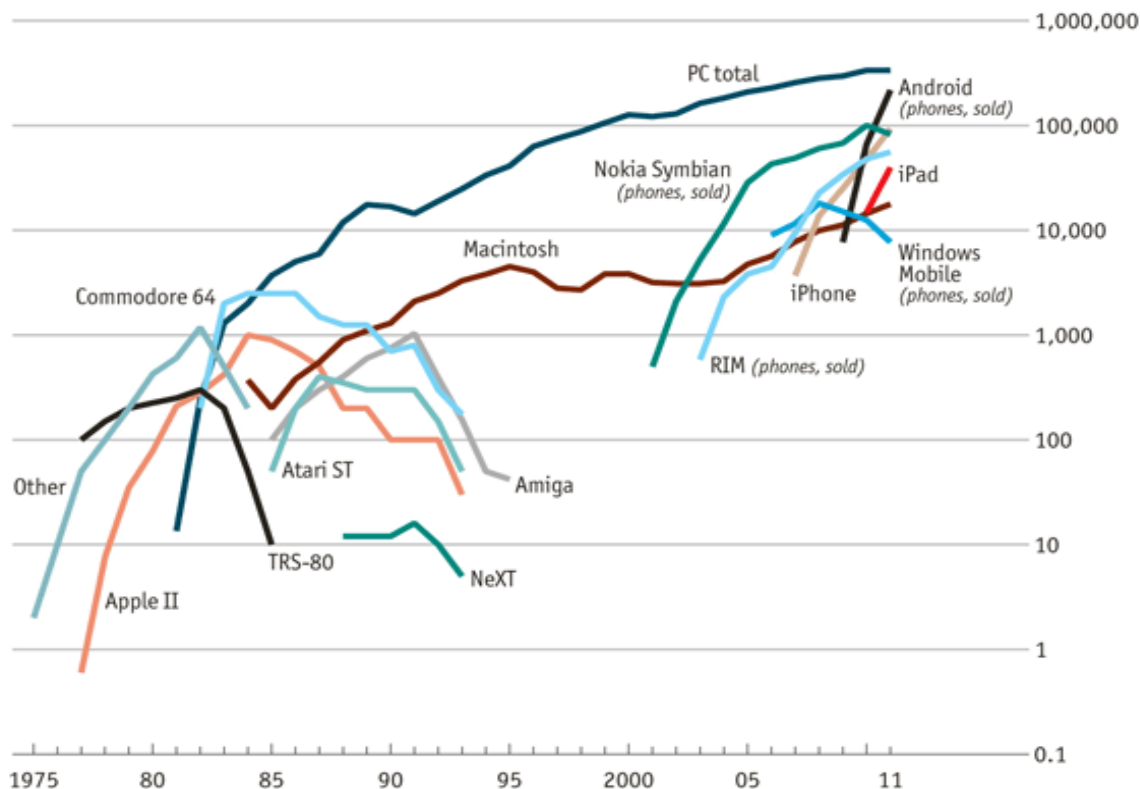
3. Public transport information

The delivery of public transport service information has evolved significantly over the last 15 years. Timetable information, once available only in print, is now available over the phone, on the internet and on smartphone apps. Customers can also plan door-to-door journeys on websites and apps for travel on all modes. In conjunction with the emergence of information apps, most transport agencies have also developed mobile-formatted websites for public transport service information and journey planning.

> **It is expected that within the next two to three years as much as 80 per cent of access to transport information will happen on mobile devices.**

Websites

These days, finding public transport service information via the web is a fundamental expectation of customers. At least nine out of ten public transport customers have internet access in their home and up to two thirds use the internet from a place of work or study.[6] Research undertaken by Metlink suggests that 61.1 per cent of public transport users are now also accessing the internet via mobile devices, which has almost doubled since 2010.[7] Agencies in other states report similar trends in the use of mobile devices, and it is expected that within the next two to three years as much as 80 per cent of access to transport information will happen on mobile devices.

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[5] Asymco data cited in The Economist (online). Retrieved 23/02/2012 from: http://www.economist.com/blogs/graphicdetail/2012/02/daily-chart-13
[6] Metlink Market Intelligence Fact Sheet, November 2011.
[7] Ibid.

The design and upkeep of mobile-formatted websites is therefore increasingly important to meet the needs of customers, and should not be overlooked in favour of app development. As long as the current 'platform wars' persist, mobile-formatted websites may offer the most comprehensive option for delivering information to all web-enabled mobile devices. While most agencies have launched mobile-formatted websites, as at April 2012, TransLink's was the only mobile site that automatically redirected from the standard website when visited from a smartphone. This is an additional, albeit small, consideration that also must be taken into account.

> **Recommendation: Prioritise the development and delivery of mobile-formatted customer information websites.**

Appropriately, websites are now the top priority for the delivery of customer information by transport agencies. Public transport websites are available for each metropolitan network, and usually include way-finding functions, enabling customers to plan multi-modal door-to-door journeys with considerable precision. In this regard, transport websites have very much moved into planning the entire journey, rather than just the experience on-board the bus, train, tram or ferry. The top ten Australian public transport websites are listed in Table 1 below.

Table 1: Top ten Australian public transport websites ranked by share of total traffic[8]

Website	Market share %
Metlink[9] (Vic)	**31.0**
TransLink (Qld)	18.5
Transport Infoline (NSW)	14.8
CityRail (NSW)	12.7
Metro Trains Melbourne (Vic)	5.8
TransPerth (WA)	5.3
V/Line (Vic)	5.2
Sydney Buses (NSW)	2.4
CountryLink (NSW)	2.4
Queensland Rail (Qld)	1.9

Resources that were formerly invested in call centre staff and the printing and distribution of physical timetables are now more effectively allocated to the design and upkeep of reliable and user friendly websites. Furthermore, the dynamic nature of information technology and consumer behaviour requires investment in market research to ensure that products are targeted to meet the needs of customers.

> **Transport agencies and app developers have been fast to adapt to the rapid take-up of smartphones.**

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[8] Metlink Market Intelligence Fact Sheet, January 2012. It is important to note that the table represents market share in terms of total web traffic, rather than on a per capita basis. It is therefore skewed against smaller public transport markets such as Adelaide and Perth.
[9] TTF notes that Metlink was replaced by Public Transport Victoria (PTV) as of 1 April 2012.

Smartphone apps

The increasing use of smartphone apps makes it easier to provide up to date timetable information and reduces the costs associated with printing and distributing timetables. Transport agencies and app developers have been fast to adapt to the rapid take-up of smartphones, with numerous apps now available to display public transport information in each state.

In most cases, transport information apps deliver publicly available timetable information as well as information on service disruptions and track work. The ease of access to this data has enabled app developers to design and release apps to the public well before officially sanctioned products. For example, rather than expend resources developing its own app, Adelaide Metro simply supplies data for a number of third-party developed timetable apps and lists them on its website, working in partnership with developers to ensure information supplied to customers is accurate and up to date.

The convenient packaging and delivery of service information in apps also provides an interesting case study into the price customers are willing to pay for convenience. TripView, a popular app for Sydney public transport information, is available for download for between $2.00 and $3.00. By creating an appealing and user friendly product, the developers have generated significant revenue from the delivery of what is essentially free information. Notably, TripView developers were able to have a product on the market long before Transport for NSW released its official Transport Info app, which is now available for free.

On the other hand, Metlink had its own free official app on the market for Melbourne commuters early enough to diminish demand for unofficial products. The Metlink iPhone app has been downloaded by 600,000 customers to date making it one of the most popular mobile phone apps in Victoria. The app features service information, trip planning and links users with data from Yarra Trams' real-time information service.

The IT industry is incredibly fast-moving – so much so that public agencies often face the risk of obsolescence when committing to a project with any kind of IT component. When entering the burgeoning smartphone app market, agencies and operators must decide whether to devote resources to in-house product development or to hand over base level data to a third party to design and deliver the customer interface.
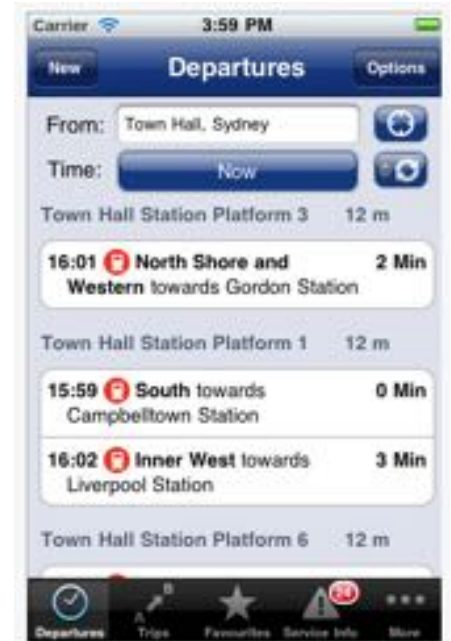

FIGURE 1: NSW TRANSPORT INFO IPHONE APP

FIGURE 2: METLINK ANDROID APP

> **Recommendation: Consider the costs and benefits of third party versus in-house software development and, where possible, reduce the cost to taxpayers by allowing the private sector to develop customer information products.**

The beneficiaries of such a variety of formats and platforms for information delivery are ultimately the end users of public transport. There is therefore a strong case for data to be made available for consumption wherever and

however customers wish to access it. By virtue of owning the source data, public transport agencies have a natural advantage in product development, but also face a considerable onus in ensuring that official products (apps, websites etc.) can offer a satisfactory customer interface in comparison with third party products.

It is difficult to imagine how information will be consumed in the future and history has shown that the market is most effective in responding to changes in consumer behaviour. Providing public transport information free or at cost (in the case of real-time information) to whomever wishes to package and deliver it to customers appears more prudent than maintaining absolute control over data for the purposes of customer service

Social media

Transport agencies are increasingly tapping into the immense and growing popularity of social media to convey messages about services, new initiatives and campaigns. An added benefit of social media is the ability of customers to interact with transport agencies and operators through Facebook or Twitter, providing an instantaneous source of feedback and a powerful marketing tool if used correctly.

> **Twitter offers the most effective social media tool to convey information as it comes to hand.**

The power of social media lies in the sheer volume of web traffic it commands. On a daily basis, more people in the US visit Facebook than Google. Currently, there are more than 10 million Facebook users and close to 2 million regular Twitter users in Australia.[10] Ultimately it must be acknowledged that customers will generally not take to social media to praise their transport providers for what should be a forgettable experience, and are far more likely to use it to register their dissatisfaction. This should not, however, deter transport operators from using social media where it offers an effective low cost mass communication medium.

For updates on service disruptions, Twitter offers the most effective social media tool to convey information as it comes to hand. For the purposes of customer information, simply having a presence on Twitter is not enough – it should be used proactively to convey useful information in real time, and be monitored for chances to spread useful information through trending topics and 'hashtags' that can be directly replied to. Somewhat ironically, the most effective way to circulate useful service information on Twitter may be through leveraging the short-lived groundswell of negative tweets that will invariably dominate the 'Twittershpere' during a major network failure.

TransLink's Twitter account (@TranslinkSEQ) has over 11,000 interested and vocal twitter followers, as at March 2012. TransLink uses Twitter to provide real-time information to its customers and the community on bus, train and ferry services (for example, network disruptions, service delays etc.), ticketing, promotions and events and infrastructure development. Along with many other transport agencies and operators, TransLink is continuing to grow its social media presence to better communicate with and engage with customers.

Facebook presents a relatively low-cost marketing tool if used appropriately. The ability of users to recommend products or campaigns to their peers is a relatively new phenomenon in marketing, but is nonetheless powerful. This is evident in research findings that suggest only 14 per cent of people trust conventional advertising, while approximately 90 per cent trust peer recommendations.[11] The implications of such findings in terms of message penetration are significant.

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[10] Social Media News, November 2011. Retrieved 21/03/2012 from: http://www.socialmedianews.com.au/social-media-statistics-australia-november-2011
[11] Socialnomics: State of social media marketing in 2012. Retrieved 21/03/2012 from: http://www.socialnomics.net/category/statistics/

Yarra Trams' recent public safety campaign, 'Beware the Rhino', exemplifies the potential for social media (in particular, Facebook) to be used as an effective marketing tool. The 'Beware the Rhino' Facebook page and associated competition attracted 3,051 friends and 3,284 'likes'. Importantly, 84 per cent of these were aged under 34 – the target market of the campaign – and 63 per cent shared the page with friends.

> **Recommendation: Consider the benefits of increasing customer engagement and service by using social media to communicate and listen to customers.**

Real-time information

Real-time information will become a basic expectation of public transport customers, as standards of GPS tracking and data collection improve. Real-time information lets customers know exactly how far away their service is, and plan their journey with much greater certainty, eliminating the anxiety associated with unexpected waiting or services not running to timetables. TTF research suggests this aversion to the unknown is one of the major factors behind negative or unfavourable perceptions of public transport. Real-time information overcomes these concerns by empowering customers with a greater sense of control over their journey and dramatically enhancing their time management.[12]

> **TransLink real-time bus information pilot**
> In mid-2012 TransLink will launch a pilot of real-time information on Logan City buses, involving online, on-street and on-board display of real-time information. The system, developed in partnership with INIT and Clarks buses, relies on GPS tracking devices that allow a bus to compare its actual location to its planned location, communicating this information to an on-board passenger information display (PID) and a central real-time system linked to the TransLink website and kerb-side PIDs at bus stops. The pilot will set a new benchmark for bus services in Australia, and is expected to be rolled out more widely across the TransLink network over the coming years.

Delivery to mobile devices

The delivery of real-time information to web-enabled devices is now a primary focus of transport operators. Yarra Trams' TramTRACKER® is the market leading real-time information product in Australia, providing information on exact arrival times for every stop on the Melbourne tram network. TramTRACKER® caters for all levels of technology – available on phone, SMS, online, for smartphones and widgets for computer desktops. Yarra Trams has also set the national benchmark in on-street real-time information, with other networks set to implement similar initiatives in the near future.

Sydney bus commuters can also access real-time service information via a GPS tracking system linked with the state's traffic management system. The 'Next Bus' SMS service delivers estimated arrival times for State Transit Authority (STA) buses in real-time. Despite the availability of real-time GPS data, SMS remains the only platform for delivery of 'next bus' information.

TTF believes the delivery of a 'Next Bus' smartphone app for Sydney Buses should be a priority in order to make best use of the GPS infrastructure already in place. This could be done on a cost-neutral basis by making the required data available to third party software developers. For example, Transport for London (TfL) has allowed

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[12] PwC for TTF: Improving your commute: lifting customer service in public transport, August 2011. http://ttf.org.au/Content/improvingcommute0711.aspx

its real-time bus data to be used for third party apps, resulting in the creation of a number of apps with features such as alarms to notify customers when they have arrived at their destination bus stop.

The rapid uptake of smartphones around the world suggests that real-time information app development should be a primary focus of transport agencies and operators, and not simply approached as a novelty option for the tech-savvy market segment.

> **Recommendation: Devote resources to infrastructure and IT systems for the collection and transmission of real-time transport data for customer information.**

On-street display

Real-time information displays at bus and tram stops and train stations must also be a priority where the volume of passengers warrants the required investment. For example, Yarra Trams has installed PIDs for TramTRACKER® data feeds at the busiest tram stops across Melbourne, in public places and businesses adjacent to tram corridors. Similar information displays have also recently been introduced at Sydney ferry wharves under a project delivered by Thales.

Most busy metropolitan rail stations feature real-time countdowns of train arrival times on platforms and station concourses. TTF believes there are opportunities – particularly in CBD locations – to display this information outside stations in an effort to better manage crowding. In areas with high pedestrian traffic, establishment and operating costs could be offset by advertising revenue, or through partnerships with business and local government as Yarra Trams have with their real-time PIDs.

> **Recommendation: Work in partnership with business and local government to provide real-time information displays on-street in areas of high passenger demand.**

At stops with lower passenger demand, where it may be harder to justify the installation of a physical real-time display, there are opportunities to take advantage of the rapidly growing number of commuters carrying web-enabled smartphones. For example, displaying Quick Response (QR) Codes (pictured below) at stops or on-board services can directly link customers to real-time information feeds, or to download an app that provides this information. QR codes work in a similar fashion to barcodes, using a phone's camera to scan and then link to a website or other function on the device.

QR codes are already widely used in retail marketing and for applications such as digital customer loyalty cards. Public awareness of the codes' functionality is currently limited, but will undoubtedly increase as they applied to more non-marketing purposes such as transport information or airline tickets. By leveraging the capabilities of smartphones, the use of such technology offers a low-cost option of linking customers to real-time information, wherever they are on the network. For example, TransLink uses QR Codes in its marketing material to directly link people to its mobile website and journey planner information.

> **Recommendation: Examine low cost options such as QR code links to provide access to real-time transport information at low demand transport hubs.**

Google Transit

Technology is increasingly enabling people to plan journeys via online mapping services that include information on transport and major landmarks. With the integration of GPS functionality in mobile devices, mapping and navigation software can overcome the anxiety associated with taking unfamiliar journeys.

Google Transit layers public transport information over Google Maps allowing users to get directions by public transport in addition to driving and walking directions.

Google now also integrates public transport service information to its popular maps service. Google Transit layers public transport information over Google Maps allowing users to get directions by public transport in addition to driving and walking directions. It also provides links to timetable information from stations and stops displayed on maps. Users therefore have the ability to locate their whereabouts, their nearest public transport hub and information on how to take public transport to get to their destination. For tourists or less frequent public transport users who may be using Google Maps for way-finding, the availability of information through Google Transit will dramatically increase their propensity to use public transport.

Google Transit is available in over 400 cities, including Perth and Adelaide, and for Sydney's privately operated light rail and monorail services. It is now also starting to integrate real-time data feeds in selected cities, a key development required for Google Transit to be considered on par with other dedicated apps and websites.
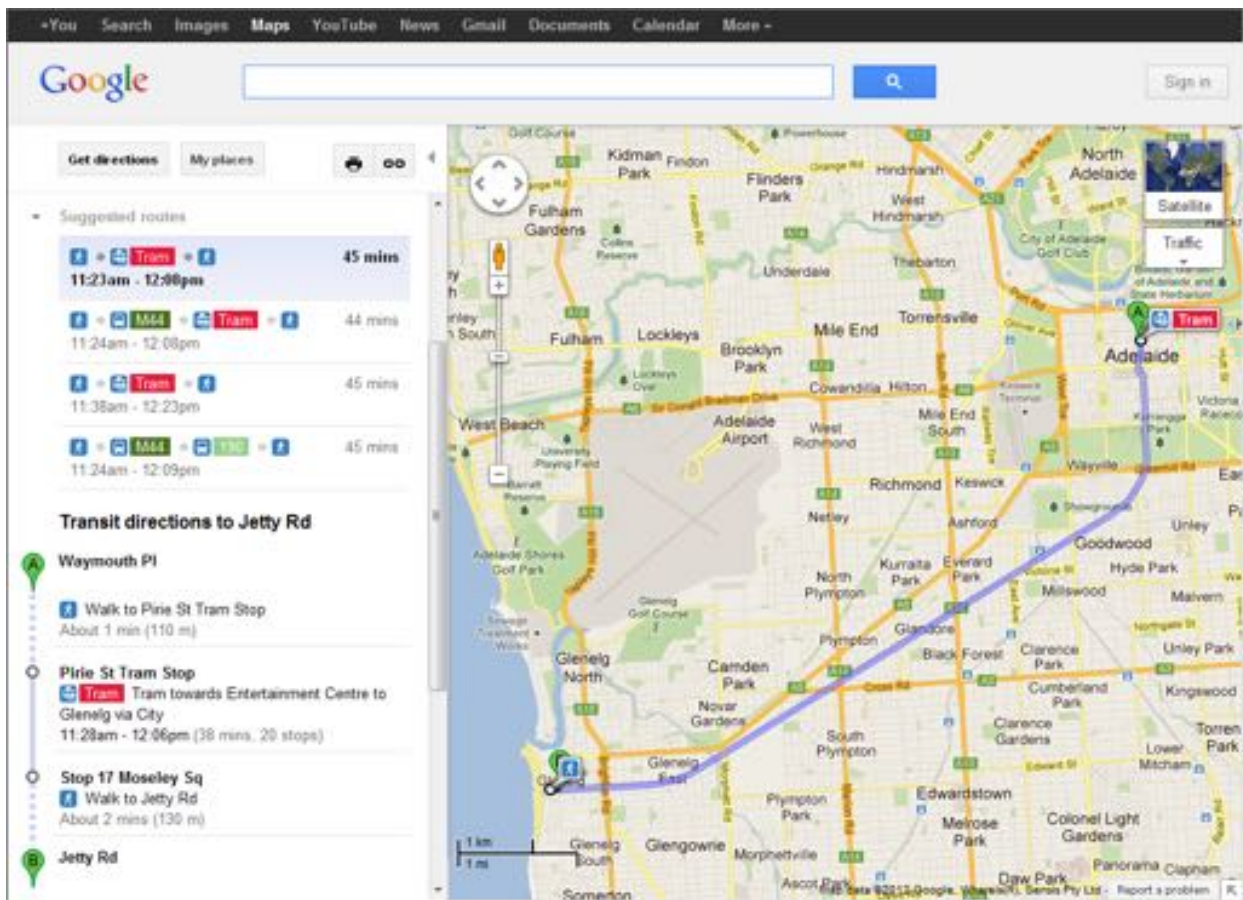

FIGURE 3: ADELAIDE PUBLIC TRANSPORT INFORMATION ON GOOGLE TRANSIT

Feeding information into a proven user-friendly customer interface such as Google Transit may be equally effective and considerably less resource intensive than in-house product development. Adelaide Metro reports

that approximately 35 per cent of information requests are made via Google. It is therefore sensible to leverage this trend in customer behaviour by integrating information to Google, which consistently ranks among the world's most visited websites and is by far the most popular search engine.

> **Recommendation: Provide public transport information via Google Transit.**

4. Ticketing

Many smartphones are now being manufactured with embedded near field communication (NFC) chips, such as those contained in smartcards and other 'tap and go' payment cards. As this feature becomes increasingly standardised, phones will be used for cashless transactions – including public transport fares – with apps installed to manage customer's accounts. E-wallet applications are already being developed by Google, major banks and credit card companies, and are part of a broader shift towards a cashless economy.

For public transport operators and agencies, the likely long-term implications of this trend in technology will be a convergence of customer service applications such as information, ticketing and account management. Smartphone payments will not necessarily replace physical tickets, but promise to reduce the cost associated with ticket production and distribution.

For customers, this convergence can enhance the delivery of public transport service information, which can be tailored and delivered to the same device used for previous or regular fare payments on that service. Where customers can already access and manage their smartcard account information via the web, the integration of these functions into an all-encompassing customer service app or mobile website appears to be an obvious technological progression.

> **Recommendation: Consider developing integrated transit applications that provide customers trip planning as well as a means of managing an electronic ticketing account, including the ability to pay for travel.**

5. Keeping customers connected

Fundamental to the implementation of the measures outlined in this paper is ensuring public transport customers, and their mobile devices, have adequate connectivity. In addition to the enhancement of service information, internet access on public transport has the potential to transform the idea of commuting as 'lost time' to an opportunity for social interaction or workplace productivity. Providing quality and continuous access is now an integral component of the customer experience on public transport.

> **Mobile reception is now a basic expectation for almost everywhere people live and work.**

Mobile phone reception

Mobile phones have forever changed the way people interact, to the point where mobile reception is now a basic expectation for almost everywhere people live and work. With most people now using some type of mobile device, ensuring the adequacy of mobile phone reception on public transport services is certainly not a trivial

concern, as it may have once been. TTF believes enhancing network coverage for public transport users can substantially improve the customer experience.

Passenger rail networks traverse long distances through developed and non-developed areas, often at high speed. As a result, most networks have 'black spots' where mobile phone signals are weak or non-existent. These are particularly evident in underground sections such as Melbourne's City Loop or Sydney's City Circle, where as many as 200,000 customers can pass through each weekday.[13] Eliminating black spots requires a joint effort between government agencies and the major mobile networks, who would invariably gain from providing seamless network access to their customers.

Recommendation: Undertake a program of mobile network coverage black spot elimination in conjunction with mobile phone networks to improve customer service on public transport.

Wi-Fi

In line with advancements in mobile communications technology, wireless internet access (Wi-Fi) has become a prevalent component of the customer experience in places such as cafés, tourist accommodation and retail outlets. Wi-Fi on board public transport services has been widely used overseas to enhance the customer experience and now is starting to be rolled out in a number of Australian cities.

Research conducted as part of TTF's 2011 major research project *Improving Your Commute: lifting customer service standards on public transport* confirmed that most customers found the idea of Wi-Fi on public transport services and at train stations and bus stops appealing. The vast majority of survey respondents were not willing to pay for Wi-Fi, but would use a free service funded through advertising.

As a result of the trend in technology consumption illustrated in Graphs 1 and 2, mobile networks have dramatically expanded capacity to accommodate the increasing uptake of smartphones. Investing in the widespread roll out of Wi-Fi on public transport may be duplicating existing or planned mobile network expansions. Notwithstanding the benefit to customers, the priority for government should therefore be to provide Wi-Fi for journeys greater than one hour – for example on intercity or outer-suburban rail services – rather than for customers on shorter urban services.

Due to the prohibitive cost of international data roaming for visitors to Australia, international tourists are heavily dependent on Wi-Fi hot spots for transport information and general way-finding. Notwithstanding the unjustified cost burden imposed on tourists by telecommunications companies, the roll out of Wi-Fi hot spots should target major tourist hubs such as Sydney's Circular Quay and Central Station precincts or Flinders Street and Southern Cross Stations in Melbourne.

Recommendation: Focus the roll-out of Wi-Fi hotspots on outer-suburban and intercity public transport services as well as major tourist hubs.

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[13] Compendium of CityRail Travel Statistics, Seventh Edition, June 2010.

6. Data sharing

In line with commitments to open government and a transparent and responsive public service, the Commonwealth government has established a central data portal for public access to data sets from all levels of government. Data.gov.au provides access to a wide range of data for public reference and app development. It follows the lead of the UK government's highly successful data portal.

State governments have also initiated app development competitions to explore ways in which the IT sector can complement and enhance the delivery of public information and services. The "Apps for NSW" and "App My State" (Victoria) competitions resulted in a range of innovative apps, some of which were released for download. However many were not, including a real-time information app for Sydney buses.[14]

In effect, these data sharing programs and innovation competitions let the market decide how data can be packaged and delivered to best serve the public interest and, ideally, improve the daily lives of citizens. Beyond transport and way-finding, increased access to such data can enhance public information across a wide range of areas, including education, health and public amenities. Where there is no real risk to privacy or public security, TTF advocates the expanded publication of public sector data sets to third party software developers.

> **Recommendation: Expand the range of data sets made available to potential app developers.**

7. Concluding remarks

The revolution in mobile communication technology has some profound implications for the delivery of information to public transport customers by operators and agencies. For customers, it has resulted in unprecedented access to information. Ultimately, the adoption of new technology for these purposes is overwhelmingly positive for the customer experience on public transport. In the coming years, the delivery of real-time information will become more prevalent, promising to eliminate the uncertainty often associated with public transport use.

Investments in innovative information delivery do not negate the need for network expansions or improvements in reliability and frequency, however they are nonetheless crucial to meet the needs and expectations of an increasingly connected customer base. Given the pace of advancements in technology and the take-up of new technology by Australians, TTF believes government investments in the delivery of public information via new technology are not only important, but imperative.

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[14] Sydney Morning Herald, June 18 2011: Plug pulled on bus app by NSW government.