The Market for Mobility Management

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DHC Loop Connections, 2 Dean Path, Edinburgh, EH4 3BA, Tel 0131 524 9610
email info@dhc1.co.uk, web www.dhc1.co.uk

Contents

1.0 Introduction

1.1 This report looks at the emerging market for mobility management and the growing competition for this market. It has been undertaken as part of the research under Work Packages 1 and 3 of the Pandora research project.

1.2 The Pandora team has been brought together and funded with a research grant by Scottish Enterprise to enable partners with complementary skills to identify how they can grow a strong mobility management (MM) capability. The partners are:

- Routemonkey – Specialists in scheduling and optimisation with clients in large retail organisations.
- Envirodigital - Carbon counting plug in
- Loop Connections – customer relationship management services with customer profiling and behavioural analysis, integrated trading platform, mobile ticketing/vouchers, incentives and gamification.
- ESP-Journeycall - Travel support with back office services, smartcard services and billing.
- Astrosat - Sensors and space data, expertise in data licensing models and data analytics
- Dynamically loaded- Services to support real time monitoring and positioning of vehicles.

1.3 The collaboration will help the businesses to develop strategies to navigate the complex and fast changing marketplace for mobility management services:

- Developing their customer base and supply chain - combining expertise and technology and reaching the market quicker.
- Avoiding being blocked by dominant players for whom change is a threat using the support from Scottish Enterprise to improve chances of success.
- Benefitting from new revenue streams.
- Working with new partners to build better international collaboration and raising the commercial profiles of project partners.
- Generating new opportunities from being involved with new partners.

1.4 This report

- Describes key MM concepts and explains how services are currently managed in Section 2
- Reviews trends within the MM market and why these generate large commercial opportunities Section 3
- Identifies some of the emerging players in MM services provision and how they are approaching the new market in Section 4.

2.0 Current Approaches to Mobility Management

2.1 MM is nothing new. The Romans did not just build infrastructure but developed highly optimised business models to manage the value chain for users of the infrastructure. Travel agents, large employers and government have been delivering some MM services, but recent growth in the market has been enabled by new technology and exploited by companies best able to offer:

- User focused services packaging more customer focused offers
- Smart approaches improving resource utilisation with better balancing of supply and demand.
- Dynamic approaches with feedback loops that respond in real time to market fluctuations and price changes
- Integrated approaches that unlock value across transport and the wider economy through co-production on delivery and better optimisation of revenue sharing.

2.2 This section reviews how existing players have been adapting their retailing and distribution systems to make better use of technology, and paving the way towards broader mobility management.

Transport provision

2.3 There are three parallel, interdependent and equally important ways of considering transport markets:

- Services moving people and goods – mobility providers.
- Services organising the movement of people and goods – accessibility providers.
- Manufacturers of vehicles and equipment for moving people and goods.

2.4 Mobility markets view transport as a service to enable people to move easily. Accessibility markets view transport as part of a wider goal to connect people and goods to destinations. Manufacturers sell to both mobility and accessibility providers and directly to consumers.

2.5 As transport is usually an overhead on achieving other things, mobility providers compete by offering low prices and low margins. The competition mainly on price can lead to low quality and low skills.

2.6 Transport is also undertaken for enjoyment of the experience so the manufacturers emphasise these benefits. Once transport is seen as desirable in its own right the margins rise for both providers and consumers.

2.7 Accessibility solution providers such as logistics companies optimise added value through end to end supply chains. However value chain management is often seen as a business critical issue that is retained in house. Third party freight logistics providers have grown rapidly over the last 20 years. If MM services for people and organisations can achieve similar types of benefits as the freight logistics providers have achieved for moving goods, then the new market will be very large. However this growth has been largely stalled for the last 20 years by dominant transport players reluctant to

surrender control of their market to third parties. This is now changing as discussed below.

Retail and Distribution

2.8 Local transport with low value purchases is overwhelmingly still purchased directly from operators including car park, bus, taxi and commuter rail. Larger purchases such as car purchase or long distance trips, particularly flights use highly optimised retail distribution systems.

2.9 Transport purchases, like other retailing, are moving towards more omni-channel approaches. Customers now have a choice of direct online purchasing from operators (e.g. Ryanair flights) and more indirect purchasing, such as buses purchased by education authorities and schools for their pupils.

2.10 Local transport markets are highly integrated with the wider economy and society. Many of the local services are purchased by proxy customers who recognise that the value of non-transport benefits can substantially exceed the cost of paying for transport. Government buys travel concessions on behalf of older people to keep them active; grocers buy shopper bus services to attract them to their stores; and free parking is provided by many leisure and retail developments.

2.11 For longer distance travel the retail distribution systems have developed to support omni-channel retailing. Global Distribution Systems (GDS) have been widely used for many years to make travel bookings – typically air travel, car rental, and hotels. They hold no inventory, rather act as link between travel/inventory seller and agent selling to end user. Customer-facing online agents, such as Expedia[1], may use GDS, although many online sites work directly through third party inventory "channel" managers[2].

2.12 The 3 main GDS providers are Amadeus, Sabre, and Travelport (including Galileo and Worldspan). Sabre are actively promoting corporate analytics[3]. Travelport are addressing customisation and choice within aviation[4].

2.13 Traditionally aviation was the core of GDS, but airlines increasingly sell direct to travellers - especially budget airlines, due to the fees associated with GDS. GDS providers are also starting to integrate other modes, such as airport transfers by taxi or railway bookings[5], using systems developed by those already providing such services online. However their focus remains on longer distance travel

2.14 Evolvi (part of the Capita Group) offer a system that allows corporate users to make rail bookings[6]. Evolvi sell their system to around 200 Travel Management Companies, who in turn offer it to corporate clients and end users. Evolvi retains the traditional "travel agent" business model for their retaling - they do not deal directly with end

[1] http://www.expedia.com/daily/home/vendor/gds.asp
[2] http://connect.lastminute.com/page/Developers_Currently_Supporting_Travelocity_Connect
[3] http://www.sabretravelnetwork.com/transformation/?utm_source=html&utm_medium=tn_spotlight&utm_campaign=GBTAWhitepaper
[4] http://www.travelportsmartpoint.com/airline/
[5] E.g. Cabforce and Evolvi http://www.cabforce-travel.com/amadeus-selling-platform-smarttab/, https://www.evolvi.co.uk/partners/gds-providers.aspx.
[6] https://www.evolvi.co.uk/ticketing-solutions.aspx

users. In 2013, Evolvi claimed a 59% share of the "corporate agency market" (or 6.8m rail transactions[7]. Evolvi's system is offered through a range of platforms, including touch screen kiosk, operator-driven desktop, and mobile. Evolvi offer several features aimed at corporate buyers, including travel policy compliance and environmental emissions reporting.

2.15 Aviation (and to a lesser extent rail) developed computerised booking systems early in the history of computerisation. While more agile technologies are disrupting traditional GDSs and fixed premises travel agents, the principle of computerised booking is well established.

2.16 More local, smaller scale modes, such as taxis, are now undergoing a similar revolution, largely due to mobile technology. Online consumer-facing services such as Cabforce allow pre-booking of taxis (and similar) based around price comparison.

2.17 New players in the collaborative economy such as Uber are not just opening up new channels for booking demand responsive transport, but are changing the economics of the market.

2.18 These new players are also starting to offer MM services to business. Uber offer time-based policy restrictions for business travelers to reduce travel costs and its reporting systems enable employers to build travel time optimization into wider company management. Lyft is actively promoting collaborative services for commuting[8]. Uber is also providing an event service, to allow a business to offer guests taxi rides to and from events competing with established providers in the collaborative economy such as GoCarshare[9].

Information, marketing and price comparison

2.19 Better informed consumers demanding more choice and better value are changing all retail markets and transport is no exception. Customers seek to identify the best value travel approaches and companies offering services to support better informed choices have grown rapidly.

2.20 Skyscanner is an online consumer facing service offering a similar range of travel (air, hotel, car hire) to GDS, but sources data by scraping providers' websites, and does not sell bookings directly. It thus operates more like a price comparison service than a traditional travel agent. Skyscanner acquired Zoombu, a multi-model journey planner in 2011[10], but is no longer active in this sector. Skyscanner's current focus appears to be on mobile Apps and international expansion of its core business – longer distance travel and associated services.

2.21 Google offer multi-modal journey planning through their mapping platform, both for private vehicles and public transport (where data is made available by operators via Google Transit). Goggle acquired ITA Software in 2014[11] to offer flight and hotel search, based on data from service providers, but do not offer direct bookings. Its

[7] https://www.evolvi.co.uk/ticketing-solutions/tmc-benefits.aspx
[8] https://www.lyft.com/work
[9] https://www.uber.com/business/events
[10] http://techcrunch.com/2011/01/17/travel-search-engine-skyscanner-acquires-zoombu/
[11] https://www.itasoftware.com/about/index.html

pricing, shopping and availability solution (QPX) is used by airlines to optimise the pricing of their own services enabling real time competition between airlines[12].

2.22 Google has historically directed search traffic, rather than attempt to control sales but appears willing to consider product development and retailing of transport for selected mobility services[13].

2.23 Google's travel service may indicate a change in focus from neutral third party to a retailer of transport. They may even wish to become a mobility provider and are actively developing a fully automated driverless car[14].

2.24 The current market is therefore evolving, and new MM providers could emerge from technology, retail, transport, marketing, or other sectors.

[12] https://www.itasoftware.com/solutions/qpx/index.html
[13] http://techcrunch.com/2010/07/04/google-shift-strategy-travel-search/
[14] http://www.google.com/selfdrivingcar/

3.0 The Changing Marketplace for Travel

3.1 Transport and the built environment are changing to systems that adapt in real time to users' needs. MM systems have found ways to overcome the barriers that have delayed their disruptive impact by enabling:

- Connected technologies - Reducing inherent complexities to avert cascade failures, such as by relying on networked free-standing systems with bottom up community networks framed within global networks. The integrated information disrupts established markets by offering new opportunities for market entry[15].
- Systems thinking – With an emphasis on resilience and adaptability to address increasingly rapid changes to complex systems. This requires a whole journey approach, seamless understanding of all options, and rapid navigation of transport systems.
- Sustainable services - A shift away from project thinking (starting and finishing), to service delivery securing life-long benefits that continually evolve and adapt. Customers do not just make journeys but receive support with other aspects of their lives and there are opportunities to help customer try new things.
- Access over ownership – New options for market entry are not predicated on ownership. Ownership is increasingly used to drive value rather than determine function with consumer protection being based on rights of access rather than ownership.

3.2 This section scopes out some of the challenges involved in delivering these new services.

Connected technologies

3.3 The connection of not just information but things using sensors for personal travel may be about to benefit from the scale of change previously experienced in freight. Personal travel was little changed by electronics has fallen behind supply chain logistics where optimisation became possible with electronics. Delivery of new transport technologies should finally meet expectations due to:

- Manufacturers seeing the changes as more on an opportunity than a threat - Peugeot, Ford, BMW, Daimler Benz and others are planning more automation in vehicles towards “driver-less” cars - automated, assisting but not entirely replacing the driver, but potentially fully autonomous in the more distant future. This changes the economics of public and private demand responsive transport in cars with less time and effort being devoted to the driving function. With this vision of the future Personalised Rapid Transit-like technological ideas merge with traditional personal vehicles and infrastructure.
- Lower reliance on the leadership coming from cautious consumers and companies - Sensors and related communication systems being built into business and consumer products reduces the reliance on consumers to use

[15] Atkins 2015 - Journeys of the Future - Introducing Mobility as a Service

electronic information. Sensors help to make things work and reduce the need for human input. From self-powering, illuminating, street lights to buildings that are aware of employees and able to automatically adjust room temperature, the scope is limited only by the economics of the costs and benefits – so that human behaviour can follow the technology.

- Affordable building blocks by replacing components of the system on manageable timescales - The lifespan of a car is much shorter than a building. Fixed elements will increasingly lag behind technological development so transport becomes more of a leader than a follower from those deploying technology.
- Collaboration supports innovation - The collaborative economy is becoming increasingly mainstream offering business models for new more integrated ways of working (via internet and technology), crowdsourcing of data (using low-cost sensors), collective intelligence (involvement in policymaking through digital tools), and crowdfunding (collaborative funding of community projects).
- The time has come - Concepts such as the Internet of Things have, over the last 5-10 years, moved through the "hype cycle" of expectation[16] through the "Plateau of Productivity" to the point at which expectations now start to match practical applications.

3.4 However some important barriers to delivery remain that will determine the rate of change:

- The continued focus on technology rather than people - The tendency to be concerned with hardware rather than with people[17] will lead to opposition from unexpected places. By emphasising market benefits are the expense of evidence of benefits for people delivery remains stronger on technology than people.
- Demographics – Democracy of the ballot box and of the marketplace will be dominated by technology averse population bulges, particularly baby boomers who will put barriers in the way of change creating social tensions.
- Legislative environments will constrain application – Complexity causality will constrain or delay mainstream applications. Sorting out even small issues such as liability requires major changes in legislation[18]. If an information provider sends incorrect information about road conditions to an automated system and a problem emerges such as a road traffic accident, who is liable? Uber's well-funded services have already been banned or restricted in many jurisdictions[19].

Systems Thinking

3.5 There is growing "intersection and overlap"[20] between transport and other sectors. Consumers are not just expecting "seamless, omni-channel and customized travel-related experiences", but the transport industry's control over its entire system is

[16] Gartner 2014 - Hype Cycle for Emerging Technologies
[17] NESTA - Rethinking Smart Cities from the Ground Up
[18] Pinsent Masons - The Connected World
[19] http://www.businessinsider.com/heres-everywhere-uber-is-banned-around-the-world-2015-4
[20] Automotive 2025: Industry without borders

now under threat as personal mobility expectations grow and new players move into the market.

3.6 Personal mobility is not necessarily within the vehicle itself, so this change in focus logically represents more of a challenge to the industry than vehicle-centric technologies.

3.7 New revenue-generating models of personal mobility have the potential to extend brands which are already powerful in the sector. BMW's Drive Now scheme[21] currently drives value through the brand rather than the operation and value chain management and growth will present a challenge to an industry currently geared for manufacture.

3.8 The implied shift of ownership from person to provider implies a parallel shift in the weight of interest about the topic from person to provider.

3.9 With all systems development accountability issues require particular attention.

Sustainable services

3.10 Ticketing has become a burden for the transport system and passengers seek better use of their time when travelling that purchasing tickets. Travel accounts that allow people to pay as they go have struggled due to the price sensitivity of customers who demand the cheapest ticket, combined with the complexity of transport pricing and offers.

3.11 If transport comes to be popularly regarded as a service like water or electricity, popular understanding may be reduced down to basic measures (such as pure monetary cost), while subtleties such as the environmental cost of a mode choice may become abstract (and thus decisions for the provider, not the user). In practice the approach may be as much about using data to assist understanding, as to automate actions - two slightly different ways of reducing complexity.

3.12 Personal mobility accounts to pay for sustainable services will be less about purchasing and fulfilment than the chance to connect providers and users – rather than simply announcing delays, adding personality to the interaction with travelers.

3.13 Leading a new market requires a balance of marketing, technology and business changes to deliver the future. The success of disruptive approaches, no matter how good they are is far from certain. People spend 15% of their income on transport so something so highly valued is not easily changed. Existing players will not go quietly and there is often an element of protectionism. Public expectations about how transport is regulated can be manipulated to resist change.

3.14 Analysis tends to assume consumer (and market) rationality, yet transport behaviour is often more driven by other factors. Brands, status, convenience and cost will all be important and transport has many top global brands such as Harley Davidson and Ferrari that are used in wider retail marketing as much as travel.

[21] https://uk.drive-now.com/

3.15 Technological automation that assumes normative economic rationality will give way to technologies that deliver status and convenience. Catering for subtle behavioral preferences is vital in design.

Access over ownership

3.16 In the collaborative economy it matters less who owns the car than what value can be derived from its use. Debates about ownership of shared spaces such as roads and streets will dominate the rate of change. Issues that will determine the growth of the access economy include:

3.17 The adoption of effective strategies by cities designating parts of roads and parking spaces for shared use vehicles. Formalised processes for assigning on-street parking spaces could include auctioning spaces to the providers delivering the greatest community benefit.

4.0 Products and Services

4.1 Mobility management systems already being used in practice include technology, management and information systems designed to improve efficiency and add value[22]. A few of the main products and product categories emerging are as follows.

4.2 Information and marketing systems:

- Price planners (e.g. Skyscanner)
- Real time parking information and car park information (e.g. Parkopedia)
- Augmented reality services to nudge customers to purchase added value services
- On-street parking availability guidance application
- Navigation systems and location systems
- Door to door traveller information systems
- Route planners
- Real time information
- Social media feedback systems
- Seat allocation systems as premium services

4.3 Payment systems and accounts:

- Car parking companies (e.g. NCP account customer)
- Congestion charging systems and toll roads/bridges
- ANPR access control to roads or parking places.
- Smartcard holder accounts (e.g. Young scot)
- Biometric personal access control
- Mobile phone accounts and pay systems

4.4 Sensors and detection systems

- Driver and passenger assist systems
- Automatic parking and vehicle control systems
- Autonomous vehicle management systems
- Inter vehicle interaction management
- Vehicle occupancy detection systems
- Service management and optimisation

[22] McKinsey 2015 – Competing for the Connected Consumer, EC Compass project 2014, New Zealand Government 2015 – Transport and Society - Trends and Projections, VTPI 2015 – The Future is not what it used to be,

4.5 Travel management services

- Vehicle tracking, dispatch and positioning
- Shared vehicles (e.g. city car club, Hertz connect, caruso)
- Shared networks for personal transport (e.g. Ultra rapid transit, bike2go and car2go)
- Shared parking and road space management and prioritization (e.g. smart park, Just Park)
- Lift sharing (e.g. Uber, Gocarshare, Lyft)

4.6 Travel retail and distribution services

- Omni-channel retail providers
- Public transport accounts (e.g. Trainline)
- Travel agents