
Scaling up Solutions for Sustainable Mobility

Discussion Document



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Why did we decide to write this report?

The issue of urban mobility in developing countries has emerged over the last decade as one of the world's most pressing development challenges – and it is one that Shell Foundation has been working to address at scale since we were established.

In 2002 we co-founded EMBARQ, a global network of sustainable mobility experts, with the World Resources Institute (WRI). Ten years on – this work has led to many new partnerships with cities and transport practitioners and delivered substantial measurable results.

But more importantly we have gained a realisation of just how difficult it is to deliver successful outcomes on a global level. Today the issue of sustainable mobility remains a critical obstacle to development. Transport is now responsible for 25% of global GHG emissions, and rapid urbanisation has led to increasing levels of congestion and pollution that severely impair the social and economic prospects of cities in emerging markets.

At this year's Rio+20 Summit the world's largest multilateral development banks committed US\$175 billion to support sustainable transport in developing

countries. But, though welcome, this support will only go so far. Our experience suggests that while some innovations in the urban mobility sector do show promise at a local level, rarely do they make an impact on a global scale – and even then only after many decades.

This report draws not only on learnings from our work in sustainable mobility these last 10 years but also from finding and scaling solutions to a range of development challenges in that time. Using this lens we investigate some promising models for scale and consider the missing links that most often prevent pioneers in the sector achieving their full potential.

In writing this report we hope to spur discussion and collaboration amongst practitioners, investors and donors (existing and new) and to discover how collectively we can achieve greater impact at a faster pace during the course of the next decade.



Executive Summary

The issue of sustainable mobility in rapidly growing cities is now beginning to take centre stage as a major obstacle to sustainable economic development. Rapid urbanisation has led to levels of congestion and pollution that severely impair the economic prospects of cities and the health and wellbeing of the people that live there. In addition, transport is responsible for 25% of global greenhouse gas (GHG) emissions.

With developing countries expected to build more new city areas during the next two decades than all of humanity has built throughout history, these problems have rocketed up the political agenda. The world's largest multilateral development banks have made major funding commitments to support sustainable transport in developing countries and increasing numbers of cities, practitioners and funders are turning their attention to how to solve this conundrum.

Shell Foundation has spent much of the last 10 years attempting to tackle this challenge. Over this time we have noted several viable solutions to mobility challenges having a positive impact at a local level or in individual cities.

But we find these examples to be the rare exceptions.

Our experience, and those of our partners and colleagues in the sector, point to a distinct lack of solutions that have achieved significant success on a global scale. We have come to believe that there are crucial missing ingredients preventing the growth and replication of viable solutions between cities and across regions. This report contains our analysis of these gaps – and our recommendations on how to fill them. Above all we seek to answer one fundamental question:

How can we collectively be more efficient at identifying and implementing those mobility solutions with the potential to benefit billions, not millions, of people?

A MOBILITY LAG

Analysing the sector we find it striking that the major obstacle to implementing sustainable mobility solutions at scale in developing world cities does not appear to be a lack of innovation or the right technology. Many of the biggest developments we have seen were available for decades before attaining global recognition and uptake.

Take, for example, the rise of Bus Rapid Transit (BRT) systems – now widely acknowledged to be a very cost-effective way of providing high capacity, and therefore low carbon intensity, transport in cities.

The first such system was implemented in Curitiba in Brazil in 1974. Yet it took over 25 years for BRT systems to be replicated in a significant number of cities. Only now, 40 years on, is it regarded as a mainstream solution in cities across different continents.



Rapid urbanisation causes congestion and pollution that impairs the economic, social and environmental prospects of cities.

So why does it take so long for viable solutions to reach significant scale of impact and be accepted into the mainstream?

In our view this starts with the nature of urban transport provision, where responsibility for mobility services rests principally with individual city administrations. Any lack of capacity at a city level will impact the provision of these services, be it technical, institutional or financial capacity.

More importantly this narrow focus on individual cities means there is a missing driver of replication between cities and across regions – and even across different political administrations within the same city. This is where we see a fundamental institutional gap.

This is reinforced by the nature of support that cities receive for sustainable mobility. Donors and investors typically channel funding on a short-term project basis, where success is defined at a local level. As a result few mechanisms exist to foster wider adoption.

The natural conduits to share best practice from city to city, such as dedicated intermediaries or businesses which operate across multiple regions, are few and far between. As well as this, the type of patient, long-term financial and non-financial support needed to create and grow such institutions is notably lacking.

TWO DISTINCT MODELS FOR SCALE

In this report we discuss how collectively we might tackle these types of structural problems. To approach this from a different angle, we started by identifying current initiatives that show evidence of scale or the potential to deliver it, to see if common features underpin their achievements. We were particularly interested to see what lessons might be learned on how their journeys to scale could be accelerated.

Our first observation is that while evidence of scale is rare – it does exist. Where success has been achieved we note that these examples frequently fall into two main groups:

- **'The Intermediaries'** – organisations that play a catalytic role to develop sustainable solutions, mobilise resources, move others to action and create change. These actors focus towards either public institutions or private business, creating the impetus and the conditions for governments or the private sector to deploy their expertise and funds more effectively towards sustainable mobility solutions.

For example, EMBARQ, a global network of sustainable mobility experts that helps cities to develop and implement effective solutions, has helped make improved transport available to over 3.2 million people around the world each day. It has also leveraged over US\$1.8 billion into sustainable mobility programmes to-date.

SmartWay, a public-private partnership run by the US Environmental Protection Agency (EPA), provides technical support and market-based incentives to encourage emissions reductions and fuel efficiency in the freight transport sector. Businesses in the programme now account for 30% of US truck miles and, since the programme was launched in 2004, emissions reductions will equate to removing three million cars from the road.

- **'The Entrepreneurs'** – businesses that provide sustainable mobility services, often breaking down barriers by using disruptive or innovative models. These businesses form an essential part of the sustainable transport mix by challenging the status quo and innovating and filling gaps in service provision. But they will only make a difference *at scale* if the entrepreneur can deliver a robust business model that can be applied across many cities.

There were a number of highly promising businesses in this group. New car-sharing models such as Zipcar, that has been hugely popular in North America and the UK (with over 730,000 members), has led to widespread replication across developed world cities and offers huge potential for emerging market countries.

Another promising initiative is G-Auto – an auto rickshaw fleet co-operative based in Gujarat, India. G-Auto is working to promote rickshaw usage as a better alternative to private vehicle ownership by helping drivers to improve customer service, benefit from insurance and savings products and expand their markets by offering premium services such as 'dial a rickshaw' or cleaner transport. The social business now operates across Gujarat and has strong potential for nationwide and international replication.

KEY LEARNING

We found that three common lessons can be drawn from successful interventions across these two groups:

Lesson 1: A Disruptive, Entrepreneurial Approach

All the most successful initiatives – both non-profit and for-profit – were tackling entrenched problems that had either resisted previous efforts to solve them or where existing solutions were giving results limited to a local level. In all cases their success was derived from innovative thinkers looking at the situation differently: identifying major market failures and creating new models to provide better, more efficient services to meet customers' needs.

Lesson 2: Core Organisational Capacity

To achieve significant global results it is important to set out with a clear sense of the size of the problem and the ambition to tackle it at scale. The most successful cases we reviewed had invested time and money to build the capacity needed to deliver that vision. This means hiring the right staff and putting efficient operational systems, controls and infrastructure in place from the start (such as IT, management reporting, finance, HR or communications). Without these, operating across complex multiple locations becomes extremely difficult.

Lesson 3:

Performance-Driven Implementation

While there are many dimensions to achieving this, it is clear that organisations that take a disciplined approach to the delivery of measurable outcomes, and who demonstrate that these are delivered through the cost-effective use of investment or donor subsidy, will stand the best chance of achieving ongoing financial support – and hence growing their impact. In addition to building core skills and management capacity, the most effective organisations have clear incentives in place to achieve performance targets, and systems to track progress and enhance efficiency.

They also understand and monitor their key risks on a regular basis and develop mitigation actions to address them.

Demonstrating a performance-driven culture and accountability to supporters attracts further investment and gives them greater resilience against the fluctuating levels of funding or outcome preferences from individual donors. Many promising initiatives never get beyond small scale and into the mainstream because they are not able to demonstrate the effective application of their financial and non-financial resources to achieving verifiable development impact.

CATALYSING SCALE AND SUSTAINABILITY

There were also marked differences in the specific type of support that these pioneers received to build their organisations and sustain achievement. In each case either new 'non-traditional' donors (such as private foundations) took early-stage risk and provided patient, unrestricted funding to build capacity, or support was provided by traditional donors (such as governments, aid agencies or multilateral agencies) but structured in new market-based ways, such as the innovative public-private partnership model adopted by the US EPA in developing their SmartWay programme.

Scale and sustainability are tough things to accomplish for any organisation or business. Trying to achieve this in the challenging environment of developing country cities, run by their own separate city administrations, requires strong

support and coordination from investors, funders and practitioners. The evidence suggests that key stakeholders need to find new opportunities to interact and collaborate in order to more effectively support the creation and growth of solutions that can deliver impact at scale.

It will take a combination of stakeholders with different resources and preferences for risk and longevity to provide the critical blend of financial and non-financial support needed to:

- identify 'intermediary' institutions that can drive the growth and replication of successful approaches, and new business models that can deliver mobility solutions at scale in ways that are financially viable;
- share the start-up risk of proving new concepts, and to provide patient and flexible financial support to allow them to build beyond initial success and become established in new cities and markets;
- to help these pioneers to integrate a disciplined approach to performance evaluation and accountability as they grow – based on tracking measurable progress of both development outcomes and cost-efficiency. This requires critical non-financial support such as business advice, networks and governance support to help them build core capacity.

These characteristics will not be found in the same organisation. As cities and transport provision become more complex and we strive to achieve a much greater scale of impact, a new level of cooperation between a new cast of actors each with their own strengths will be necessary: from those capable of taking early stage risks, to others who bring a wider range of non-financial resources or are able to leverage significant, long-term capital for scale.

Greater syndication between donors, foundations, investors, development institutions, intermediaries and implementing bodies needs to become the norm if we are to succeed.

WIDER CONSULTATION

Problems associated with mobility in developing world cities present major obstacles to sustainable development. With city populations escalating there has never been more urgency to tackle them.

In thinking about how to take this forward we return to the very first observation that came out of this study – solutions to these problems DO exist. Innovation, technology and smart pioneers are out there. The question is HOW to get them to scale and implemented across cities and regions.

We view these findings as a first step towards wider collaboration. Our intention is to examine and challenge our conclusions with industry experts (sustainable mobility practitioners, donors and investors) in London this November, and to find ways to turn them into practical action.

By pooling our experience we hope to learn how we can dramatically accelerate the timeline to bring viable sustainable mobility practices into the mainstream for them to achieve impact at scale.

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We will test our conclusions with experts and ask them to add their perspectives on how what we have learnt can be applied for maximum affect.

The additional ideas, conclusions and recommendations from this exercise will then be captured and used to finalise a complete version of this report.



As cities and transport provision become more complex, a new level of collaboration will be required.

WHY SUSTAINABLE MOBILITY MATTERS

01

At the heart of any thriving and prosperous society is the ability to move efficiently, access essential services and transport goods between locations.

Yet look around many major cities in the developing world today and you will find sprawling low-income neighbourhoods with no access to public transport, and central districts brought to a halt by traffic gridlock. You'll see smog hanging over the city skyline and experience the paralysing nature of urban mobility problems.

More than half the world's population now live in cities¹. In 2007, the 220 largest cities in the developing world accounted for over 10% of global GDP² – yet ironically these engines of economic growth in emerging markets are being strangled as a result of that same growth.

In Lima, Peru, it is estimated that people lose an average of four hours every day in travel – leading to a loss of approximately US\$6.2 billion, 10% of that city's GDP, every year³.

The health impact of local air pollution and road traffic crashes, high levels of greenhouse gas emissions and an inability to move people and goods effectively are making cities 'unliveable' and placing economic growth and productivity in jeopardy. The people feeling this impact most keenly are the urban poor who are separated from employment and exposed to long, hazardous daily commutes.

Each year as many as 50 million people are injured and over 1.27 million die from road accidents. Over 90% of these deaths occur in low and middle income countries⁴.

These problems are a result of rapid population growth, urbanisation and an explosion in vehicle ownership rates in developing country cities – trends that are forecast to continue and accelerate over the coming years.

1 The Population Division of the Department of Economic and Social Affairs at the United Nations Secretariat. March 2012. World Urbanization Prospects - The 2011 Revision.

2 McKinsey. 2011. "Urban World: Mapping the Economic Power of Cities."

3 Replogle, M. and Hughes, C. (2012) "Moving Toward Sustainable Transport" in State of the World 2012 — Moving Toward Sustainable Prosperity. Accessible at <http://www.itdp.org>

4 World Health Organisation 2009. Global Status Report on Road Safety.

Urban Population Increase⁵

3.6
billion people living in cities
2011



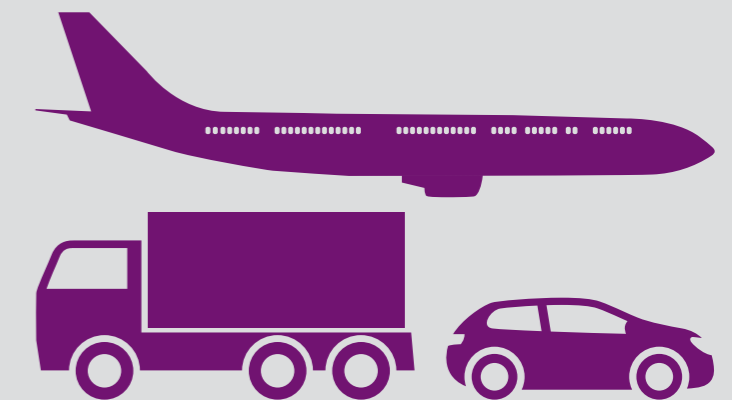
The vast majority of this increase will happen in less developed countries.



6.3
billion in 2050

CO₂ Emissions from the Transport Sector⁶

8.0
gigatonnes of CO₂ in
2009



14.9
gigatonnes in 2050

5 The Population Division of the Department of Economic and Social Affairs at the United Nations Secretariat. March 2012. World Urbanization Prospects - The 2011 Revision.

6 International Energy Agency. 2011. World Energy Outlook. OECD/IEA.

Motorisation Rates^{7 8}

 per 1000  in each country

2009

2030

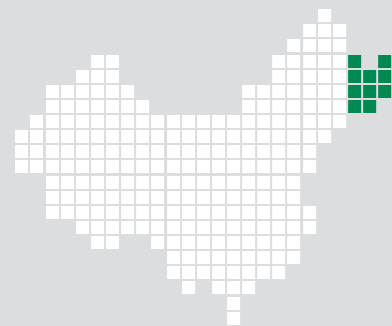


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INDIA

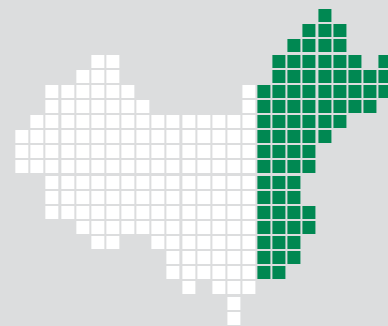


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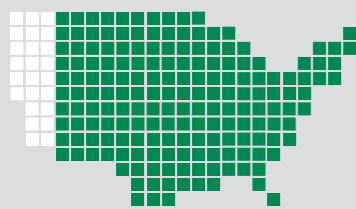


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CHINA

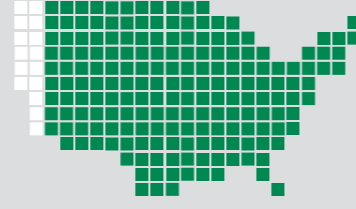


269



802

USA



849

Urban Road Traffic Deaths⁹

1.2
million road traffic
deaths in

2004



2.4
million in

2030

"Soon three quarters of the world will live in cities," observes Susan Zielinski, Managing Director of SMART – a university-wide sustainable transport initiative led by the University of Michigan. "Accelerating urbanisation, population growth and demographic shifts reinforce transport and development patterns that threaten climate, the environment, urban economies and liveability. Action for integrated, sustainable and equitable transportation is critically important. But this will not be a simple task, with the most populous emerging economies aspiring to motorise as their economies grow."

Given the unprecedented scale of the mobility challenge there is an urgent need to act before this projected growth is realised. Vehicle ownership in developing countries is still far below that of the developed world, new cities are yet to be built and existing settlements yet to be expanded. But city policies and urban plans can still be established. Smarter 'integrated' urban transport systems can be installed that provide mobility whilst minimising negative externalities.

The next decade represents a turning point when many of these choices can be made and action taken – so what can be done to create the best chance of success?

⁷ Dargay, J., D. Gately, and M. Sommer. 2007. Vehicle Ownership and Income Growth, Worldwide: 1960-2030.

⁸ <http://data.worldbank.org/indicator/IS.VEH.NVEH.P3>

⁹ World Health Organisation. 2004. The Global Burden of Disease Report.

MAJOR STRUCTURAL FAILURES

When Shell Foundation examined the issue of urban mobility back in 2001, we realised that sustainable transportation solutions did exist, but they were few and isolated. So our starting point in addressing the issue at scale was to try to assess what stopped effective solutions from being more widely applied.

Through our analysis and engagement with city experts, we discovered that one of the root causes of mobility problems was that transport providers were focused on how to move *vehicles* around their cities – rather than *people*. As the number

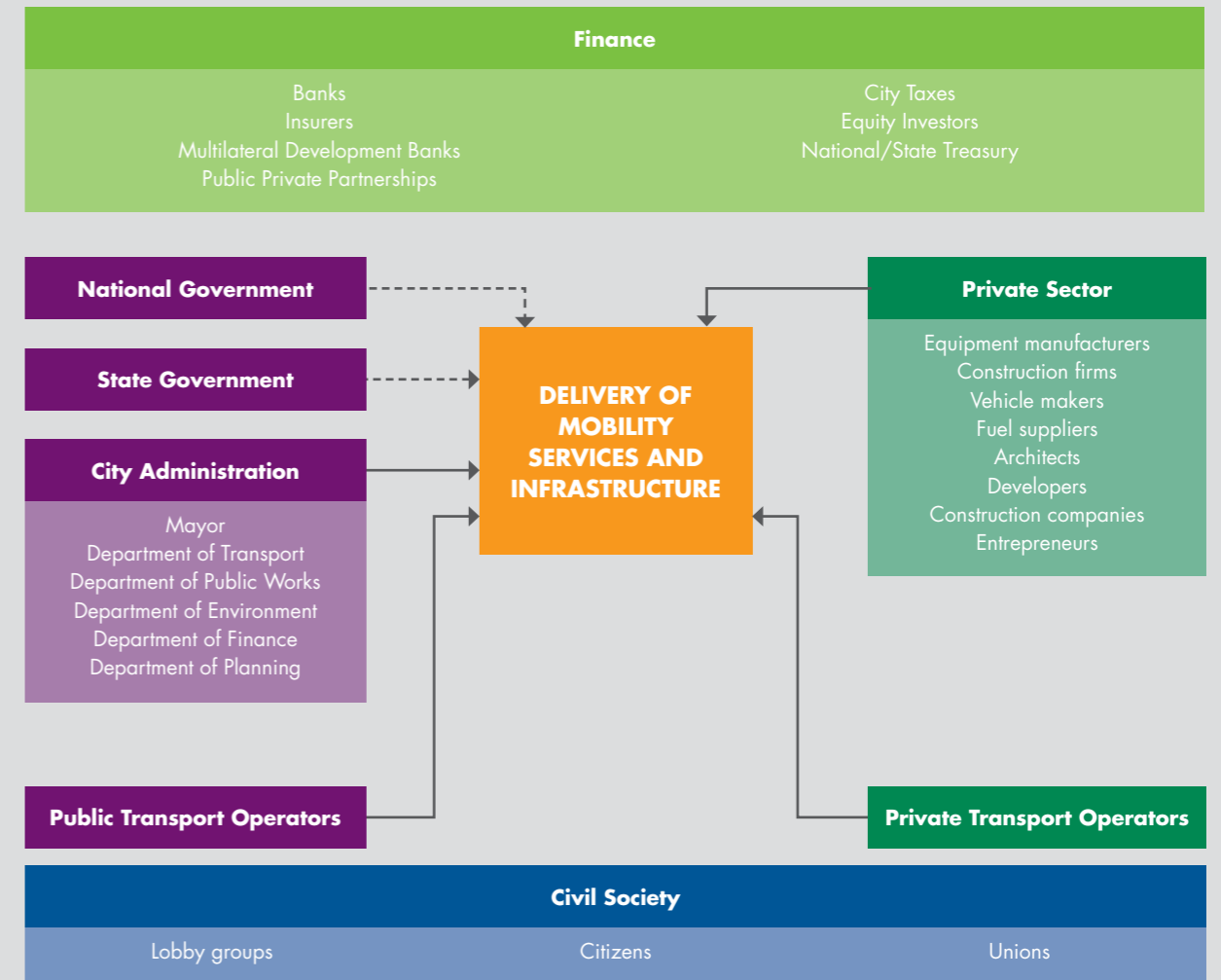
of private vehicles in a city grew to overwhelm existing routes, supply-side thinking led to more road space, but ultimately this made the problem worse not better. Clearly systemic interventions were needed.

The challenge for the city authorities responsible for transport provision was navigating a highly complex political landscape. Designing and financing systemic solutions, and implementing them effectively, requires the commitment of many actors (see Figure 1). Many simply did not have the institutional capacity to foster these collaborations.



Systemic solutions are required to address the complex and chaotic reality of mobility in cities.

Figure 1: Typical Actors Involved in Mobility Provision in Cities



CREATING EMBARQ: A DIFFERENT APPROACH

Our subsequent efforts were all based on our conviction that this lack of institutional capacity constituted a major ‘market failure’ in the mobility sector – and that a different type of systemic intervention at the city level was needed.

Shell Foundation sought a partner with whom we could build a new intermediary that would fill this gap. We ran an extensive search for an organisation with the right blend of expertise, networks and international influence, consulting with a wide range of industry leaders and experts. This led to the selection of the World Resources Institute (WRI) as a long-term strategic partner in 2002.

Crucially, WRI shared our ambition to make a difference on a global scale. They were an ideal fit, with networks and pull as an international thought-leader in environment and climate studies and practical implementation experience through local operations across the globe.

Together we created **EMBARQ** – a global network of sustainable transport experts that would work in partnership with cities and their stakeholders, across public and private sectors as well as civil society, to identify and implement sustainable mobility solutions.

There are several aspects of this experience that we believe have wider relevance when considering the sector as a whole and some of the structural challenges it faces and we dive deeper into the details of EMBARQ's work and its path to scale in the next chapter. But one of the main reflections that we have from our partnership is that, although EMBARQ has delivered substantial measurable impact through city-level projects (see Figure 2) and is now influencing transport policy on a global scale – through regional centres in Mexico, Peru, Brazil, India, Turkey, US and China – this level of success certainly hasn't been easy.

It has required persistent, dedicated and flexible support over a long period of time to build an organisation with the capacity to deal with complex problems across different geographies. Shell Foundation needed to take a risk on EMBARQ successfully solving a market failure and, as

Figure 2 shows, this required significant initial investment before any social or environmental impact was generated. EMBARQ's first flagship project – a Bus Rapid Transit (BRT) system in Mexico City – proved the model could work and demonstrated its potential. This helped secure sizeable long-term commitments from early movers such as Caterpillar Foundation, Fedex and Bloomberg Philanthropies which accelerated the growth of the network.

EMBARQ now works in 58 cities around the world on range of mobility solutions such as integrated transport systems, non-motorised transport, urban planning and road safety – but there are still big challenges ahead to break into new geographies like China and to move beyond a model focused on deep engagement with each city to influence national and international policy. EMBARQ have achieved a lot but there is still a long way to go given the size of the problem.

RECOGNISING THE MOBILITY LAG

This experience prompted us to consolidate our learning but also, recognising the limitation of generalisations from a single partnership, to review and engage with partners and colleagues in the sector to see what conclusions we could draw about tackling the sustainable mobility challenge at scale.

We found remarkably few sustainable mobility initiatives in operation across large numbers of developing country cities or that drove the transfer of best practice solutions from region to region. It was also striking that the major obstacle to implementing sustainable mobility solutions at scale in developing world cities does not appear to be a lack of innovation or the right technology – many of the biggest positive developments we see today were available for decades before attaining global recognition and uptake.

One example of this would be BRT systems – essentially high capacity buses running on dedicated lanes to provide a cost-effective, low-carbon intensity way of transporting large volumes of passengers. Now regarded as a core component of sustainable mobility in many developing world cities, it took over 25 years from the first proven example in Curitiba, Brazil (championed by Mayor Jaime Lerner) before indications of a real growth in uptake was seen. Only now, almost 40 years on from that first project, is BRT being regarded as a mainstream solution.

Figure 2: EMBARQ Path to Scale

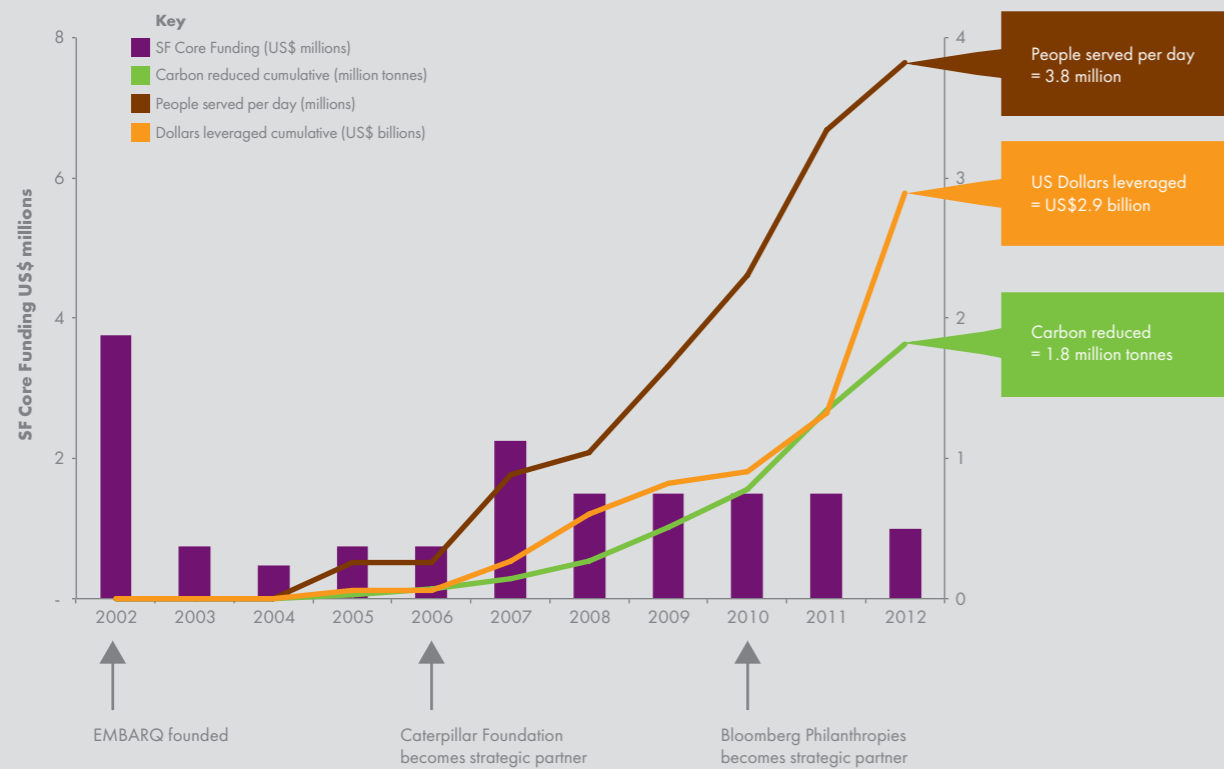
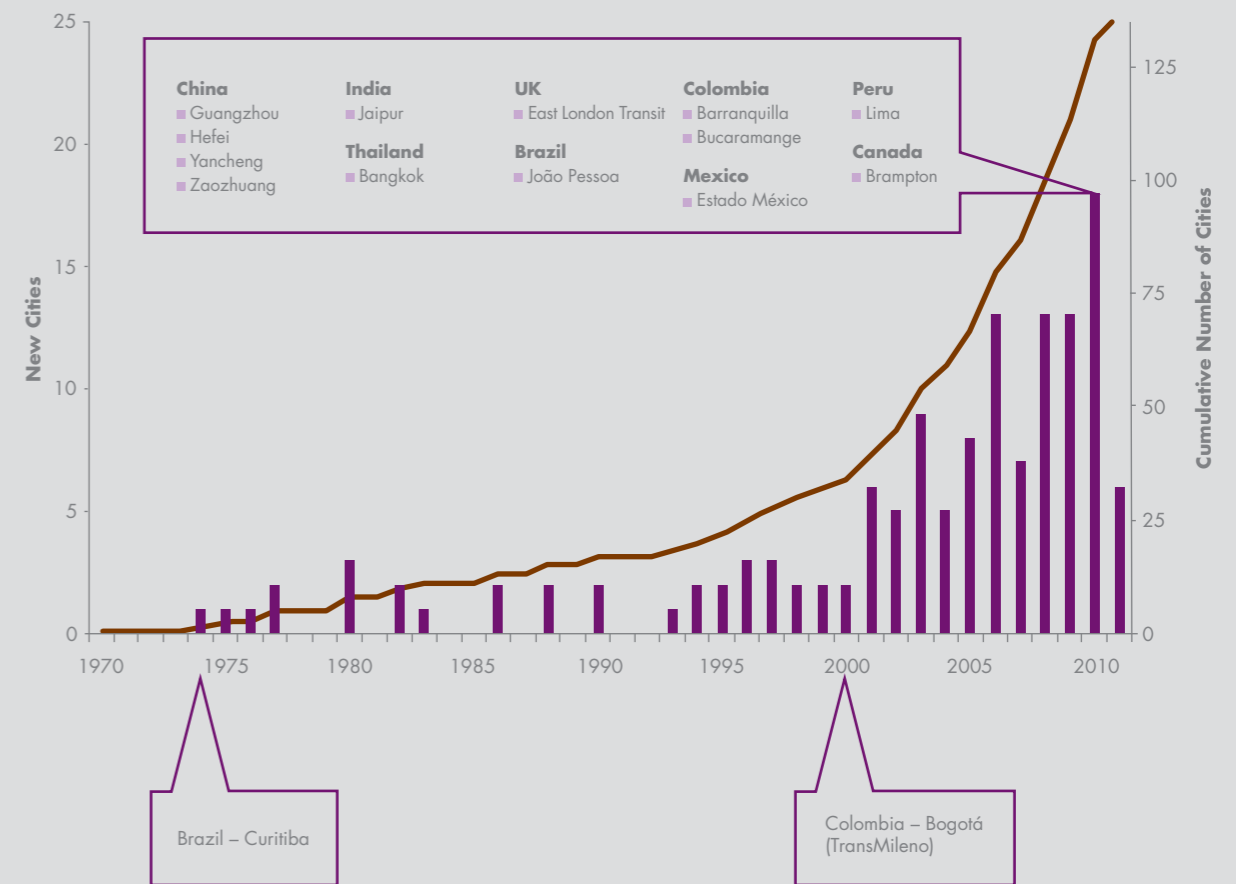


Figure 3: Cities with BRT/Bus Corridors



So why does it take so long for viable solutions to reach significant scale of impact and be accepted into the mainstream?

In our view this starts with the nature of urban transport provision, where responsibility for mobility services rests principally with individual city administrations. Any lack of capacity at a city level will impact the provision of these services, be it technical, institutional or financial capacity.

More importantly this narrow focus on individual cities means there is a missing driver of replication between cities and across regions – and even across different political administrations within the same city. This is where we see a fundamental institutional gap. It is reinforced by the nature of support that cities receive for sustainable mobility. Donors and investors typically channel funding on a short-term project basis, where success is defined at a local level. As a result few mechanisms exist to foster wider adoption.

Natural conduits to share best practice from city to city, such as dedicated intermediaries or sustainable mobility businesses which operate across multiple regions, are few and far between, and the type of patient, long-term financial and non-financial support needed to create and grow such institutions is notably lacking.

Beyond cities, we observe a similar phenomenon in industry. Take freight transport, for example. The movement of goods required to support the resource needs of growing urban centres account for a significant proportion of total GHG emissions from the entire transport sector. While efforts are made by individual carriers and logistics companies to improve their environmental performance, and regional and sectoral initiatives are making progress in selected parts of the industry, there is a lack of a coordinated response that could ensure industry-wide change.

Known strategies and technical solutions which could make a clear difference are not being deployed effectively by a critical mass of businesses, across different countries or different modes of transport such as road, rail and marine transport.

LOOKING FORWARD

To try and identify how we can change this situation, we now identify a small number of promising solutions and models that are starting to achieve impact at scale or show promise to do so in the near future.

In the next section we present four example case studies from which new models, patterns and common themes have emerged. Our intention is that this draft report and its conclusions be the starting point for a debate on ‘Scaling Solutions for Sustainable Mobility’ which Shell Foundation will host in November 2012. We will test what we have learnt with a carefully selected and representative group of key stakeholders from the sector, solicit feedback and together establish:

- What interventions can significantly increase the scale of impact of sustainable mobility solutions in the future?
- What actions can be taken to shorten the timeframe to get ideas from the drawing board to mainstream application in cities across the world?

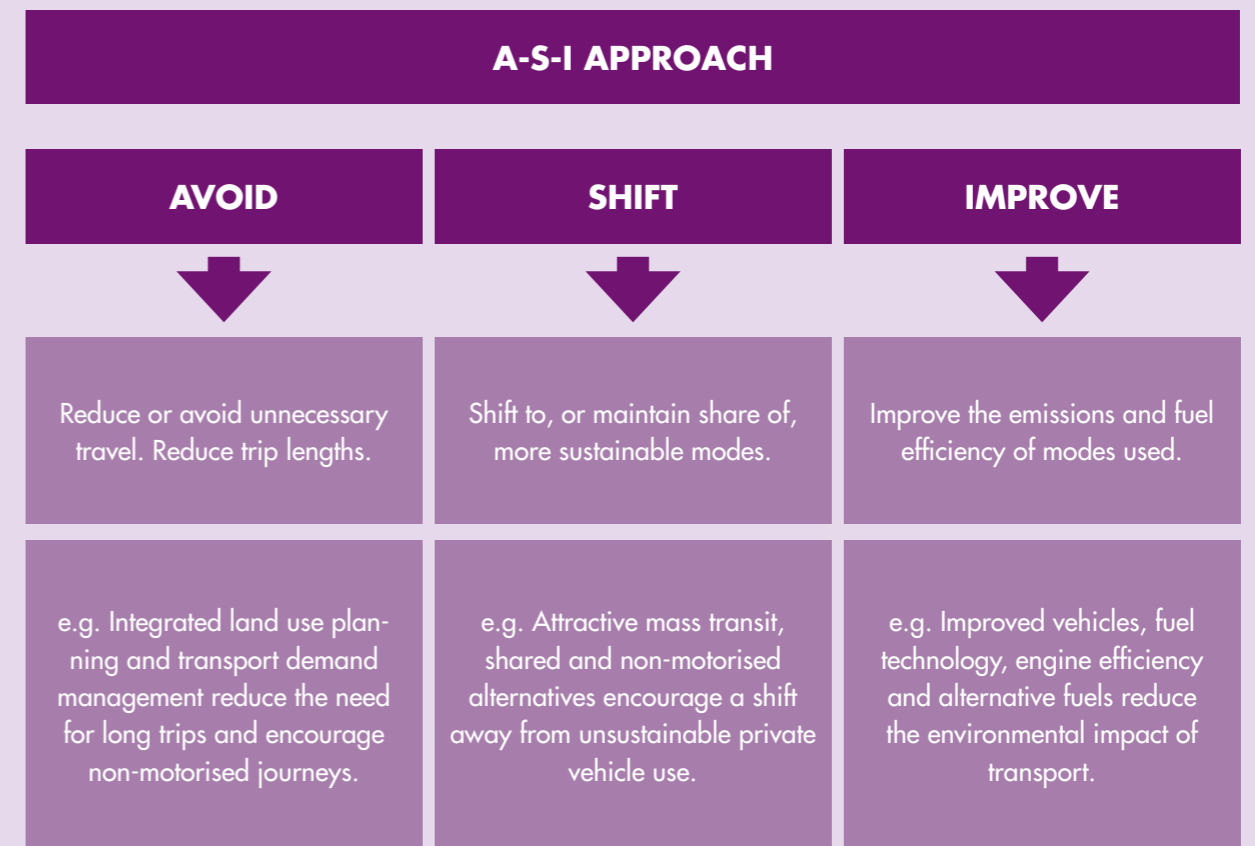
Additional findings and output from that event will then be added to produce a final report.

WHAT IS SUSTAINABLE MOBILITY?

Sustainable mobility is about giving people the means to move around a city and to transport goods and services in ways that:

- a) limit negative externalities on the environment and society; and
- b) are sustainable both financially and in terms of resource use now and in the future.

The approach which underpins all the solutions referenced in this report is the widely adopted **Avoid-Shift-Improve framework**¹⁰. The primary aim of this approach is to promote mobility solutions which significantly reduce greenhouse gas emissions, improve energy efficiency and reduce traffic congestion, creating safer, healthier, more liveable cities and environments. The ASI framework is comprised of three core strategies.



¹⁰ Richard Dobbs. "Megacities". Foreign Policy, Sept/Oct 2010. Last accessed January 2, 2011 at http://www.foreignpolicy.com/articles/2010/08/16/prime_numbers_megacities?page=full

TARGETING SCALE AND SUSTAINABILITY

02

For the purposes of this review we have considered the key lessons over the last 10 years from our partnership with EMBARQ and have also examined the achievements of others over the same time period with a view to asking a simple question: **what have been the successes and the key factors that led to those successes?**

Mobility is a large and complex area – and there are many actors involved – so we do not claim to have done an exhaustive analysis. But with the benefit of hindsight we have looked for examples of solutions and approaches showing *evidence* of impact at scale or the *potential* for scale.

From these we have picked out models from both the developed and developing world that seek to explain the replication of effective sustainable mobility practices or the acceleration of the timeline for their application in the mainstream.

OUR FOCUS: SCALE AND SUSTAINABILITY

Shell Foundation strongly believes that individual project-based solutions will never significantly impact large-scale development challenges such as sustainable mobility. For that reason we decided in 2002 not to fund a series of short-term transport ‘projects’ but to look for a partner with whom we could build an intermediary organisation – ultimately EMBARQ – that would offer a systemic ongoing approach to achieving sustainable mobility in cities.

Similarly, as we have looked for examples of other initiatives showing the potential for impact at scale we focused on entities that are building long-term business models to deliver scaleable solutions. We looked at for-profit, non-profit and hybrid organisations, but our key focus was to find those with the potential to deliver sustainable and significant impact.

Our experience in applying enterprise-based solutions to a range of development areas over the last 10 years has emphasised to us that the greatest success in achieving scale of impact and sustainability is often associated with *new* types of entities being created or new approaches being applied. Simply put, where development problems are proving intractable and tried and tested solutions have not generated significant impact we recognise the need to think and act differently. We therefore also paid particular attention to *disruptive solutions* or evidence of new approaches, to see if this was a factor for success in sustainable mobility.

DEFINING SCALE

When targeting impact at scale and looking to find examples with the potential for scale it is important to articulate exactly what we mean. In Shell Foundation we assess this using the following criteria:

- delivering measurable development outcomes that benefit large numbers of people;
- operating across multiple countries and/or regions; and
- a management team and organisation with the capacity to deliver scale-up.

For the purposes of this review, that meant looking for initiatives that had already delivered, or had the potential to deliver, significant and measurable outcomes in sustainable mobility – either through their own growth or through replication by others. It also meant looking for organisations that were building the human capital and organisational capacity necessary for further regional expansion.

KEY LEARNING

So what did we find? Interestingly, the organisations, enterprises and initiatives that caught our attention all fell into two broad groups: **‘Intermediaries’** and **‘Entrepreneurs’**.

We believe each group can play a critical role in creating sustainable mobility solutions with the capacity to go to scale. First, let’s look at the characteristics of organisations within these groups and consider four examples of the solutions they provide:

- **The Intermediaries:** *organisations that play a catalytic role to develop sustainable solutions, convene stakeholders, mobilise resources and motivate others to create change.*

The provision of mobility services can be exceptionally fragmented between city, state and national level, between public and private sectors, and between different transport modes.

Throughout our research, ‘intermediary’ organisations stood out for their ability to straddle these borders and to drive the application of best practice solutions across different geographies – despite institutional boundaries. In fact, the best examples perform a critical function of building institutional capacity and knowledge in the organisations and city authorities with whom they work.

Intermediaries typically have a primary focus towards either public institutions or private business, creating the conditions for either government or the private sector to deploy their expertise and funds more effectively towards sustainable mobility solutions.

Organisations such as EMBARQ and the Institute for Transport and Development Policy (ITDP)¹¹ work with city authorities to diagnose and design sustainable integrated transport solutions. They ensure that the institutional capacity is built and that public and private money is deployed effectively to deliver these. We have included a short case study on EMBARQ by way of illustration.

On the other hand intermediaries focusing on the private sector provide the tools and incentives for businesses to collectively take action towards more sustainable mobility solutions – where the barriers and risks for a single business to step out and bear the costs of change ‘ahead of the market’ have previously proved too high. They then create the conditions for viable solutions to be taken up at scale by the private sector.

One example would be the US EPA’s SmartWay Transport Partnership. SmartWay enables businesses in the US to act towards reducing emissions from freight transportation at a scale that would not have been achieved by individual companies acting in isolation. It has given rise to the industry initiatives based on the same principles – Green Freight Europe and Green Freight Asia Network.

Each type of intermediary organisation has the potential to influence funds far beyond its own scale and therefore to drive large scale impact – it is this that makes them especially interesting to us.

¹¹ www.itdp.org

■ **The Entrepreneurs:** *new businesses that provide sustainable mobility services, often breaking down barriers by using disruptive or innovative models.*

These businesses form an essential part of the sustainable transport mix by challenging the status quo, innovating and filling gaps in service provision. We have focused here on examples where significant impact could be achieved by replication or scaling up through organic expansion.

The transport landscape has evolved dramatically over the last decade in both the developed and developing world. Factors such as a lack

of service provision, a desire for low-carbon alternatives and technological innovation have led to the emergence of many new services and non-traditional business models. Now more than ever it seems there are opportunities for entrepreneurs to be a significant force in the mix of mobility providers.

Starting a new enterprise with a new business model in difficult operating environments is a difficult and risky process in any sector. These pioneers require significant support to create robust businesses, develop crucial market linkages and expand sustainably across regions and countries – let alone to encourage others to replicate success

elsewhere. It is support that is all too often lacking in the private sector (more on this in the next chapter).

We have chosen two examples to illustrate entrepreneurial solutions. Zipcar, is a pioneer in the rapidly expanding business of shared use vehicles. With many car-sharing and bike-sharing schemes now springing up in cities of the developed world, Zipcar provides an excellent example of a business that was innovative in its approach and which has overcome challenges to reach significant scale. Car-sharing has yet to take off in the cities of emerging economies and in considering Zipcar's pathway to scale, we aim to uncover learnings that might be applied successfully in these countries.

G-Auto, is an auto rickshaw service provider based in Gujarat, India. G-Auto improves the existing shared use service of auto rickshaws in India to provide a cleaner, safer, more customer-focused service. It is a very early stage business but is of particular interest given the size and importance of the auto rickshaw sector as a part of the transport mix in Indian cities, and the potential for an improved service to retain ridership in this resource-efficient form of transport.



The auto rickshaw sector is an important part of the transport mix in Indian cities.

Case Study: EMBARQ

An established intermediary working to catalyse sustainable mobility solutions in cities across Latin America and SE Asia



Established in 2002
www.embarq.org

THE CHALLENGE

Shell Foundation (SF) and the World Resources Institute (WRI) aimed to make a substantial difference in the way cities addressed their mobility needs. We were confronted with the messy reality of developing country cities: under-resourced public transit systems, bicycles, pedestrians, colectivos, tuk-tuks and burgeoning numbers of private cars fighting for road space. City authorities often did not have the power, finances or capacity to design and implement sustainable solutions to these challenges. Those projects that were being implemented were led by what the industry could easily offer a city and focused on moving vehicles rather than people.

THE MARKET FAILURE

The partners discovered an institutional weakness at the heart of the planning and provision of city transport. Responsibility for this was often split across multiple departments, with financing constraints at city, state and national level and disparate external stakeholder groups wielding influence. Only through working deeply with cities and convening all the relevant stakeholders could they help cities to design and implement sustainable solutions to meet their mobility needs.

THE SOLUTION

SF and WRI established EMBARQ in 2002 as an expert intermediary to work with developing country cities. EMBARQ acts as an independent and honest adviser to cities, focusing on diagnosing the key mobility problems a city faces, designing

a sustainable solution and convening stakeholders across government, business and civil society to ensure that solutions can come together. They then work with the city to build knowledge and relationships and to ensure high-quality implementation of the resulting projects.

EMBARQ's first action was to establish a locally-run Centre for Sustainable Transport in Mexico City – one of the most polluted and congested megacities in the world – to deliver substantial results that would showcase their model to other cities. Within three years they had helped to deliver the first line of Metrobus, a world-class BRT system that runs through the heart of the city – and by 2012 EMBARQ had grown into an international organisation with headquarters in Washington, DC, five regional centres – in Mexico, Peru, Brazil, Turkey and India – and start-up operations in China.

With US\$16m of core funding from SF and significant multi-year commitments from other donors such as Caterpillar Foundation, FedEx and Bloomberg Philanthropies, they have built strong institutional capacity and specialist knowledge in areas as diverse as transport engineering, urban planning, climate change, communications, finance and policy.

This allows them to offer a comprehensive set of mobility solutions to a city including: BRT, optimising bus operations, cycling and walking infrastructure, improved city spaces and urban planning, road safety and air quality measures.

IMPACT/SUCCESS

Since 2002 the transportation projects EMBARQ has worked on:

- have saved **1.8 million tonnes** of carbon emissions from entering the atmosphere;
- now serve **3.8 million** passengers per day; and
- have attracted **US\$2.9 billion** in investment.

The network's six regional centres have run projects in 58 cities across the world – and are now gradually effecting change at national and regional levels. Key successes include:

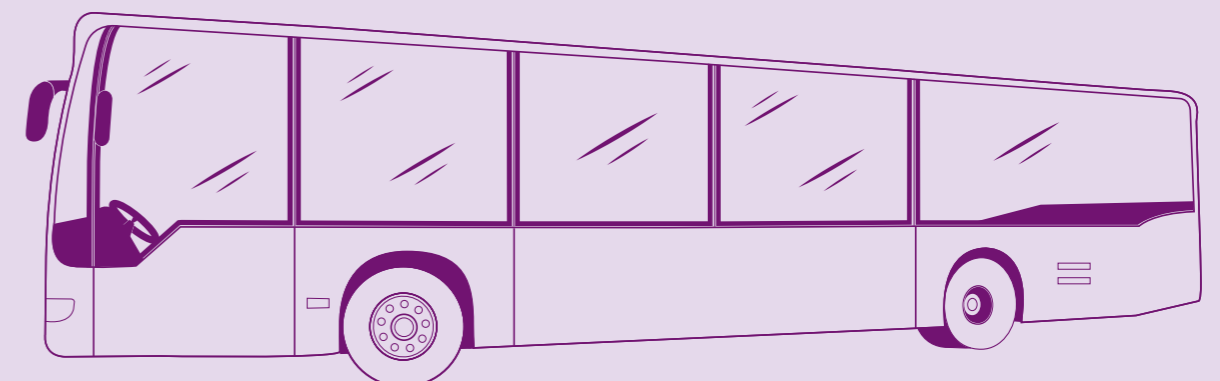
- **Mexico City**, where EMBARQ has helped to replace old, owner-operated minibuses with a full BRT system operated under a new commercial model. Working hand-in-hand with the local government the project delivered a 20-km bus corridor that serves more than 500,000 per day, cutting travel times by 50% and reducing CO₂ by 80,000 tonnes per year. This success fostered more projects, with four new Metrobus lines now operational in Mexico City, six more committed, and further BRT systems installed in Guadalajara and Leon with plans underway in other Mexican cities. The momentum for sustainable transport created by these successes has led to the Mexican national government establishing the first national fund for mass transport, PROTRAM, to which EMBARQ was invited to act as a technical adviser.
- **India**, where EMBARQ and Atal Indore City Transport Services Ltd (AICTSL) have established an innovative, long-term public-private partnership to set up an integrated transit agency that operates and manages Indore's public transport system. This has resulted in doubling of the system's capacity to 220,000 daily trips.

- **Brazil**, where EMBARQ's technical advice in demonstrating a doubling in design capacity for the proposed BRT contributed to Rio being selected as the host city for the 2016 Olympic Games. EMBARQ are now acting as technical adviser to Rio and three other Brazilian cities – Recife, Belo Horizonte and Porto Alegre – with a combined population of 25.1 million people as they install BRT systems which represent the first stage of a national transport policy favouring sustainable urban mobility.

The network's six regional centres have run projects in 58 cities across the world – and are now gradually effecting change at national and regional levels.

FUTURE PLANS

EMBARQ are now scaling further with entry into China – a country which is forecast to add 400 million more urban residents by 2030. They also plan to expand the impact of their work to a much larger scale by developing key relationships to influence policy at a national and regional level – based on the results they have already delivered – and by setting an ambitious target to encourage over 200 cities to replicate examples of best practice in the next decade.



Case Study: SmartWay

An innovative public-private partnership tackling emissions from freight in the US

SmartWay is the US Environmental Protection Agency (EPA) flagship programme for improving fuel efficiency and reducing greenhouse gases and air pollution from the transportation supply chain industry.



Established 2004

www.epa.gov/smartway

THE CHALLENGE

Freight movements are critical to a thriving economy in the US. But within the transport sector the trucking industry contributes disproportionately to fuel use and pollution – emitting 22% of all transportation GHG emissions in that country. Despite the availability of cost-effective technology solutions, the fuel economy and emissions from heavy duty vehicles remained static for many years. Increased pressure from society and consumers for companies to reduce their environmental footprint was not translating into any measurable change in the freight industry.

THE MARKET FAILURE

When the EPA came to look at this issue in 2003 they identified a number of market failures that blocked attempts to tackle the problem at scale. There was a notable lack of fuel efficiency and emissions performance data for trucks, and shipper customers had no reliable or credible way to benchmark the performance of their chosen carriers. What was not measured was unlikely to be improved. The market was particularly fragmented with shippers, whose goods were being transported, having different incentives to carriers, third-party logistics providers and the manufacturers of the actual trucks. There was little reliable information from credible, neutral third-parties on the performance of available technologies, and a fair degree of confusion and lack of confidence in new and unproven technologies.

In addition the industry was dominated by a high proportion of small trucking companies (the individual 'mom and pop' operators). Operating in a very competitive landscape with thin margins they had a low risk tolerance toward trying new technologies, and little capital to invest in improvements. Even if fuel savings promised to cover the capital outlay,

any breakdown or failure of a new, unproven technology would simply cost too much or risk failed delivery commitments. The larger carriers who could afford to innovate had no means of influencing a wider uptake of these solutions once they had been tested.

As a government body, the EPA had regulatory options for emissions standards that could be applied to new vehicles but the majority of trucks in use are 'legacy vehicles' with very long lives.

THE SOLUTION

The EPA decided on a voluntary approach – but realised that it was crucial to build market mechanisms into their programme to create an incentive for businesses to participate. The resulting **SmartWay Transport Partnership** model is an innovative, public-private collaboration where:

- **carriers** commit to providing data on their own fleets and to incorporating fuel/emissions reductions technologies and strategies into their operations;
- **shippers** commit to moving the majority of their goods with SmartWay carriers and are incentivised to select carriers with the best environmental performance; and
- **logistics providers and transporters** commit to improving the performance of their (subcontracted) fleet and to recruiting more carriers to the programme.

The EPA provide the tools to capture data from participant 'Partners', helping them benchmark, track and improve their own fuel efficiency and ranking operators into environmental performance bands. They provide a platform for Partners to share best practices and profile Partners' achievements. They also manage complementary programmes to verify new cost-effective technologies for emissions reductions and facilitate financing to companies for the uptake of these. The SmartWay brand is used as a mark of excellence for qualifying partners and helps provide further market incentive as an indicator of cleaner, more sustainable transportation options for business and consumers.

This integrated approach has created strong self-reinforcing value in the programme. Being a SmartWay Partner has recognised brand value and for some companies – such as IKEA – it is a pre-requisite for becoming one of their carriers.

IMPACT/SUCCESS

To date, about 10% of the truck fleet in the US is enrolled in the SmartWay programme – with SmartWay Partners representing 30% of US truck miles as this is weighted towards large carriers. Since 2004, SmartWay Partners have saved 23.6 million metric tons of CO₂, 478,000 tons of NO_x 22,000 tonnes of PM emissions and 55 million barrels of oil – the equivalent of removing over three million cars from the road for a year.

FUTURE PLANS

Whilst the EPA's remit is limited to the US, SmartWay has begun to advise other countries wishing to replicate similar freight sustainability programmes. SmartWay has been adopted by Canada, which is now using the same performance benchmarking tools, methods and metrics. The success of the SmartWay programme has also contributed to the recent establishment of two other regional green freight programmes – Green Freight Europe and the Green Freight Asia Network. These are both voluntary membership programmes based on the SmartWay model, but are run by independent non-governmental secretariats.

Although the SmartWay model is very promising there will still be significant challenges ahead to drive a higher proportion of the US trucking industry to adopt SmartWay practices, to achieve cross-border consistency and co-operation with other regional initiatives impacting wider geographies, and to achieve co-operation with other freight modes such as marine and air freight shipping which will allow shippers to reduce the carbon footprint of end-to-end freight journeys.



Case Study: Zipcar

A pioneering car-sharing company in the developed world with strong potential model for replication in developing countries



Established 2000
www.zipcar.com

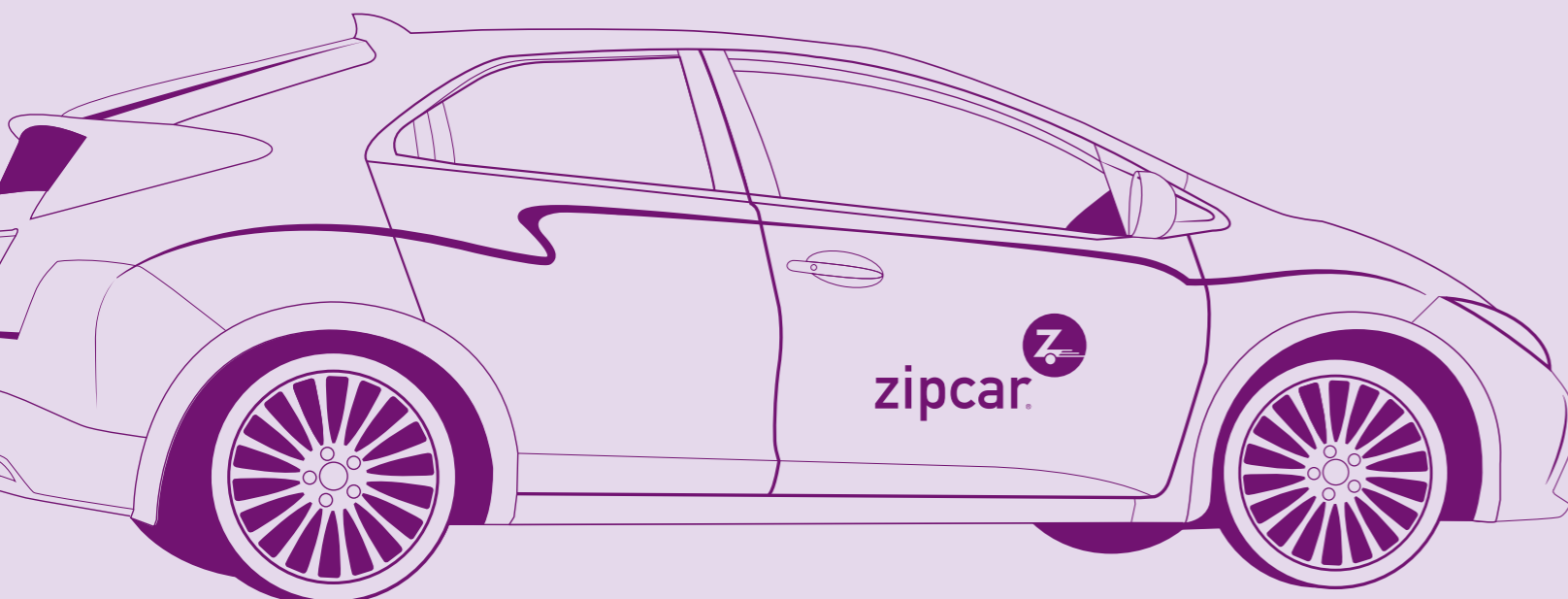
THE CHALLENGE

Cities are increasingly choked by the large number of vehicles on their roads, leading to congestion and parking problems. Yet people are still caught between the choice of owning a car (and therefore access to its convenient on-demand availability) and not owning one (relying on public transport for the majority of their mobility needs).

The latter rarely meets their full needs – failing to cover journeys end-to-end or provide flexibility to transport goods, or to allow people to take the occasional journeys that are not well-served by public transport. But buying a vehicle is an expensive alternative and means paying to own a resource that you will only use for a small proportion of the time. Car hire, as the next best alternative,

means travelling to a central location to pick up and drop off a vehicle, and hiring for daily periods is not a cost-efficient option for the urban user.

Car-sharing models did try to offer a solution – such as the car clubs started in Europe in the 1980s – but never took off at scale as access to vehicles at convenient locations and the problems of picking up and dropping off keys meant that the service was not sufficiently convenient or flexible. The concept itself was branded as a cheaper make-do solution to the preferred option of car ownership.



THE MARKET FAILURE

The market lacked a model where the convenience and flexibility desired by the user could be provided to them in a way that was coupled with secure access to shared vehicles and sufficiently high utilisation rates to make the service viable.

THE SOLUTION

Robin Chase, the co-founder of Zipcar, says her Eureka moment was “realising that there was a huge demand for car-sharing without the constraints of the car rental companies and that wireless internet could send information to cars to allow remote access.”

That spark led to Zipcar, a membership-based, car-sharing company where members use an online website to find and book cars parked in their own neighbourhood for increments as short as an hour – in as little as 30 seconds. Members walk to the reserved vehicle and unlock it at the booked time with an electronic card. The entire transaction is complete within a short time and is done autonomously taking the ‘transaction hassle’ out of car-sharing and making it almost as easy as using your own car.

Technological developments meant Zipcar could monitor and invoice the use of their cars remotely and online booking systems meant the need for staff was low. With a model that was viable and scaleable, investment was secured and pilot operations began in 2000 with a fleet of three cars in Boston, Massachusetts.

Significant challenges still had to be worked out to get the business off the ground, particularly around insurance, access to personal data such as proof of driving license from users, and optimising utilisation rates and vehicle placement to allow financial viability. But these were worked out and Zipcar continues to grow as a viable and successful business.

IMPACT/SUCCESS

In its 12 years of operations Zipcar has grown to a company of 730,000 members sharing 11,000 vehicles in the USA, Canada and the UK. It is now a publicly listed company with revenues of US\$242 million in 2011 and has reached profitability.

As for the initial neighbourhood in Boston that was home to the first three Zipcars, the same two city blocks are now home to 18 shared cars provided by three different companies. Recent studies show that each of those shared vehicles will displace between nine and 13 privately owned-vehicles.

FUTURE PLANS

Zipcar is at the forefront of a new breed of car-sharing companies. Today over 1.2 million individuals share nearly 32,000 vehicles as part of organised services provided by both for-profit and not-for-profit schemes. Car-sharing is well established in approximately 1100 cities around the world, in 26 nations and on five continents.

Analysts are predicting exponential growth, with Frost & Sullivan projecting that global car-sharing membership will hit 20 million by 2020¹². New innovations like peer-to-peer services promise more convenient, affordable forms of shared mobility, particularly in less dense urban and suburban locales.

In addition, multinational companies are increasingly entering the field. Hertz, Enterprise, Daimler, and BMW all have invested heavily to launch new car-sharing brands and Volkswagen recently announced plans to re-enter the market.

¹² Frost & Sullivan. “Car sharing – Driving the Way to a Greener Future”, February 18, 2010. Accessible at <http://www.frost.com/>.

Case Study: G-Auto

An early-stage auto rickshaw co-operative improving service and retaining ridership in the Indian shared transport sector

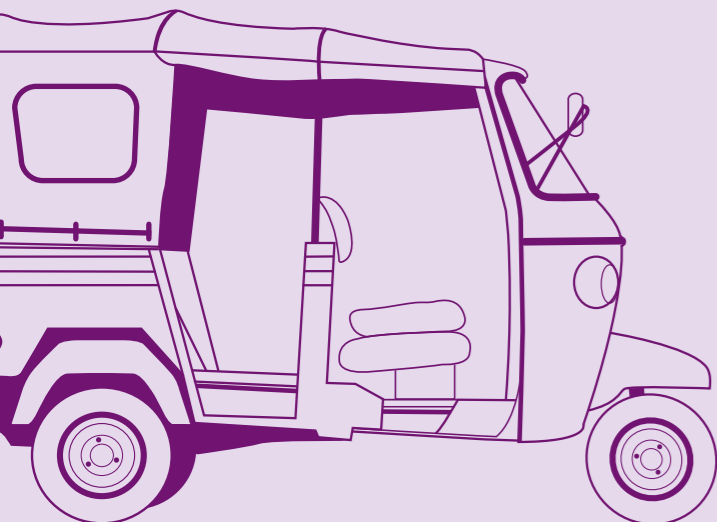


Established 2009
www.g-auto.org

THE CHALLENGE

Auto rickshaws, or tuk-tuks, form a vital part of the mobility mix in many south east Asian cities and especially in India. They serve key roles in providing last-mile connectivity, ensuring people can connect to public transport hubs and providing door-to-door transport services – ensuring people’s mobility needs can be met without a reliance on private vehicles.

The sharply increasing demand for urban mobility led to a doubling in production of these motorised three-wheelers between 2003 and 2010. However, negative perceptions abound of the auto rickshaw sector – with safety of vehicles, personal security and emissions all key concerns. In addition, the disorganised nature of a sector dominated by individual owner-drivers means that services are not optimised and large numbers of kilometres are driven by drivers searching for fares – deadheading, as it is known.



The opportunity exists for the auto rickshaw sector to be upgraded, providing a safer, cleaner more convenient form of transport and enhancing its role in providing a vital intermediate transport service – connecting people to mass transit systems and giving them accessible, point-to-point mobility without the need for private cars.

THE MARKET FAILURE

The nature of the auto rickshaw market in Indian cities, where the vast majority of vehicles are run by individual owner-drivers making thin margins, means that neither the needs of the customers nor the drivers are best served. Economies of scale cannot be enjoyed and there is no effective mechanism to introduce widespread vehicle or service improvements.

Drivers’ income is typically unreliable and they have no source of social benefits, access to finance or opportunity to provide a more professional service. Customers are reliant on hailing a vehicle at the side of the road and negotiating a fair price with the driver if he is willing to take them to their desired destination. Reports of disagreements and assaults are rife, while vehicles have no safety improvements and are often old and polluting.

THE SOLUTION

G-Auto was started by Nirmal Kumar and the Nirmal Foundation in 2009 to provide a collective-based fleet auto rickshaw service with its first operations in Ahmedabad. Under the brand G-Auto, drivers are provided with professional customer service training, access to social benefits such as death and accident insurance, and loan facilities to purchase and upgrade vehicles.

In return they provide customers with a courteous, professional service on an approved meter-based fare. Disputes over fares and destinations drop rapidly as a result. The collective approach also allows G-Auto to steadily introduce improvements to the fleet service to the benefit of passengers and the city environment. An innovative dial-up service where auto rickshaws can be booked has been introduced and options for vehicle upgrades are being assessed. In Rajkot, in partnership with EMBARQ and the Rajkot Municipal Corporation, G-Auto is providing the city’s first fleet auto rickshaw services whilst the city itself is providing dedicated infrastructure for auto rickshaw stands at key transport hubs and for vehicle maintenance facilities.

IMPACT/SUCCESS

Since its inception in 2009 G-Auto has grown to employ more than 10,000 auto rickshaw drivers and has operations in Ahmedabad, Baroda, Gandhi Nagar and Rajkot – cities in Gujarat state with combined populations of over 7.5 million.

They have aggressive growth plans with ambitions to scale to all ‘A class’ cities in Gujarat, followed by country-wide expansion.

FUTURE PLANS

Although G-Auto is a young enterprise they have shown impressive growth and continued expansion plans. The key to achieving this will be developing a financially viable model to support it. The Nirmal Foundation currently contributes grant funding to subsidise the model – but some city funding has been secured and value-added services such as advertising on rickshaws are being developed.

Building a more business-based approach and organisational capacity to deliver at scale will give G-Auto the potential to significantly multiply its impact and to incorporate more sophisticated technologies into their services. Like Zipcar, the G-Auto model shows sizeable potential for replication by others in addition to the growth of their own operations.



G-Auto drivers gain from training and access to social benefits and loan facilities.

LESSONS FOR THE FUTURE

03

When looking for successful sustainable mobility solutions it isn't hard to identify individual projects or cities that have had success or single businesses that have an impact in their local neighbourhood. But to find instances where solutions are scaled to benefit many cities either through the catalytic effect of an intermediary or through the growth and/or replication of an entrepreneurial social business is much rarer, particularly in developing countries. So we attempt here to distil some common lessons from the successful and promising examples we have found.

Intermediaries and entrepreneurs are quite different in nature – but both groups share three common factors which appear to underpin their ability to achieve scale of impact across many cities and contribute to the mainstreaming of sustainable mobility practices.

■ A Disruptive, Entrepreneurial Approach

All the most successful initiatives – both non-profit and for-profit – tackled entrenched problems that had either resisted previous efforts to solve them or where existing solutions were giving results limited to a local level. In all cases their success was derived from innovative thinkers looking at the situation differently: identifying major market failures and creating new models to provide better, more efficient services to meet customers' needs.

■ Core Organisational Capacity

To achieve significant global results it is important to set out with a clear sense of the size of the problem and the ambition to tackle it at scale. The most successful cases we reviewed had invested time and money to build the capacity needed to deliver that vision.

This means hiring the right staff and putting efficient operational systems, controls and infrastructure (such as IT, management reporting, finance, HR or communications) in place from the start. Without these, operating across complex multiple locations becomes extremely difficult.

■ Performance-Driven Implementation

Organisations that take a disciplined approach to the delivery of measurable outcomes, and who demonstrate that these are delivered through the cost-effective use of investment or donor subsidy, will stand the best chance of achieving ongoing financial support and hence growing their impact. In addition to building core skills and management capacity, the most effective organisations have clear incentives in place to achieve performance targets, and systems to track progress and enhance efficiency. They also understand and monitor their key risks on a regular basis and develop mitigation actions to address them.

Let's consider each of these points in more detail.

Lesson 1:

A Disruptive, Entrepreneurial Approach

Earlier we discussed that our experience as a foundation tackling a variety of global development challenges had shown us the importance of new or disruptive approaches to achieving success. This emerged again as a significant factor in the sustainable mobility arena. Simply doing 'more of the same' will not lead to the step change needed to achieve greater impact.

The successful initiatives we found had chosen to take on problems that had resisted previous attempts at solutions, or where existing solutions were yielding results limited to individual local instances. In all cases their success followed from applying a new approach to the problem or setting up a new type of organisational model to address it. The key to developing these 'disruptive' innovations was a clear understanding of the failure or gap that prevented earlier progress and effective identification of key stakeholders or 'customers' for the new service. A new approach then stemmed from addressing the gaps and meeting the needs of the target customer base.

In the case of intermediaries such as EMBARQ and ITDP it was critical to recognise that the market failure was not in providing technical solutions – but in the lack of institutional capacity at city level to conceive and deliver sustainable solutions. This was an area that was not being addressed by others. Both organisations developed intermediary models to address this weakness with city authorities as their main clients. Each has developed a practice of close partnership with cities through which they deliver flagship projects and, in so doing, work hand-in-hand to develop capacity within city organisations.

The US EPA applied the same entrepreneurial thinking to create an innovative public-private partnership for the SmartWay Transport Partnership, by recognising and responding to the limitations of a more traditional regulatory approach in the sector. Regulation could only effectively target new vehicles in the truck fleet but would be unable to deal with the large amount of existing trucks

with a long lifespan to run. They also realised that businesses would not buy-in to a regulatory solution that they felt was being imposed on them – but could be more effective as active partners in helping EPA achieve fuel saving and emissions reduction goals. The SmartWay design therefore incorporated market incentives into a new model creating buy-in and mutual wins for their core customer groups of freight shippers, carriers and logistics providers. This has led to a strong partnership where industry and the EPA are both benefitting from reduced emissions, fuel usage and operational costs.

The importance of new approaches was again apparent when we looked at entrepreneurs.

Zipcar's model was technology driven, with wireless internet allowing remote access to cars and enabling them to bring a new car-share service to market. The market need was there, but innovation was required to provide convenient, flexible access to shared vehicles for users in a way that was almost as 'hassle-free' as owning their own vehicle. It was a major departure from previous car club models and much more financially viable and scaleable – and for that reason it has now been widely replicated.

Developing country entrepreneurs such as G-Auto are already demonstrating the potential of thinking differently. G-Auto's offering delivered a new service to a key part of the Indian transport mix that had seen little change over many years. Auto rickshaws were operated by individual owner-drivers with no clear incentive to make service improvements or access to finance to do so. Using the co-operative model, Nirmal Kumar of G-Auto is able to deliver both social and environmental benefits to auto rickshaw drivers and also take advantage of 'fleet scale' to introduce service improvements for their passengers. Seeing the potential to manage auto rickshaws in this way has enormous potential to modernise this service and retain ridership in an existing shared transport mode.

ENTREPRENEURS: ADDITIONAL FEATURES

For entrepreneurs two additional characteristics stand out as being important in creating and scaling new 'disruptive' models:

Approaching Innovation from a Business and Customer Perspective

Bringing new services to a new market means that a business has to sell a solution that its customers have little experience of. For this to be successful the business model has to do more than just work for the entrepreneur – it has to bring the service to the customer in a way that is appealing and meets their needs. Considering this challenge from both the perspective of the business and the customer is critical to models that show success.

For Zipcar this meant offering shared car services that their members could book quickly and seamlessly online and placing vehicles in locations convenient to their homes that could be unlocked and driven with the touch of a card – making it almost as simple and convenient as owning your own vehicle.

For G-Auto, it meant working for the benefit of both passengers and drivers. Drivers see the benefits of insurance, savings schemes and access to shared facilities such as maintenance yards for their rickshaws in return for providing improved service to passengers. Currently these are services such as dial-up reservations and metered fares but that could grow to include green vehicles in future years.



Risk Tolerance and the Patience to Make Markets

All start-up entrepreneurs have to overcome significant challenges. They need to step out and take risks, working persistently to remove barriers to viable growth. In a sector such as urban transport there are long-standing structures and regulatory frameworks in place largely geared towards the traditional models of public transit systems or private car ownership – making it particularly difficult for anyone trying to innovate. The examples we have chosen not only highlight this appetite for risk and necessary persistence in their early years, but also point to a continued need for these qualities at all stages of expansion.

For Zipcar, initial success in the US and UK was hard won, particularly with respect to finding affordable, accessible insurance for their car-sharing model and the right access to personal data. Obstacles preventing widespread expansion into new markets remain for both the car-sharing model espoused by Zipcar and the newer Peer-to-Peer (P2P) models offered by companies such as Buzzcar and Whipcar.

For G-Auto, Nirmal Kumar had to establish high quality 'fleet services' using drivers who previously had little incentive to offer quality customer services and who were their own bosses – in cities where organised fleets are seen as a threat to drivers' livelihoods and thought of as wielding too much power for political comfort.

Having overcome these obstacles, Nirmal's business is still forced to run as a co-operative of individual owner-drivers because local regulation prevents actual fleet ownership of auto rickshaws. This is a barrier still to be conquered – as it was for taxi fleets in Mumbai – before the full benefits of upgraded auto rickshaw services can be realised at a larger scale.

Lesson 2: Core Organisational Capacity

The organisations that had already delivered significant outcomes across many regions, or showed the greatest potential to do so, all set out from the start with the intention to achieve impact at scale.

It can be especially difficult in the early days to find funding and time to enhance the performance of an organisation as a whole, as opposed to focusing all resources on short-term initiatives or single projects. Yet without the right blend of skills, management capability, financial processes and risk controls to optimise the efficient use of resources it is extremely hard to operate effectively across a wide and diverse geography.

As Nancy Kete, the former director of EMBARQ, observed, "You have to use initial grant finance to build capacity. Only once we had a credible, established business model and were recognised in a number of key markets could we really deliver a customer value proposition".

Shell Foundation's long-term unrestricted financial support to EMBARQ allowed them to establish their 'network' model. This meant identifying and attracting expert staff in a number of specialist fields, and developing sound governance and business decision-making processes supported by global IT, financial and management reporting systems. This provided a model which could easily be rolled out and localised – a foundation for expansion into new markets that dramatically increases their reach and impact. It required patience and understanding from supporters that there would be a time-lag between the up-front investment in capacity and the full results in terms of social and environmental impact.

For entrepreneurs, building a strong organisational capacity was also core to establishing their reputation for delivery and enabling growth. Zipcar's expansion to 17 major metropolitan areas, offering car-share services to over 730,000 members, would not have been possible without best-in-class business processes, IT systems, superb customer interfaces and customer management processes – all of which continue to form the basis of Zipcar's ability to expand to new cities and

markets quickly and reduce the incremental effort to do this. This core capacity also underpins a high quality experience for their users, enabling them to attract and retain customers.

For G-Auto, their ability to offer a high quality service to auto rickshaw passengers is entirely dependent on people, i.e. the drivers in the fleet collective. Their ability to attract, train and manage their human resources is crucial to the service they are offering. They have developed the capacity to do this for their current operations – but as they target greater scale through expansion to more cities it will be increasingly important to develop the management team and systems to manage large numbers of drivers effectively across multiple locations. Fit-for-purpose business systems and processes will also be required to manage this growth and to start to introduce higher grade technology offerings – like their dial-up service – at scale.



Shell Foundation's support enabled EMBARQ to provide a model which could be easily rolled-out and localised.

INTERMEDIARIES: ADDITIONAL FEATURES

Devoting scarce resources to build core capacity can pose a risk when an organisation is establishing a new business model or testing a new market. We discovered that the intermediaries we spoke to had developed two specific additional characteristics to ensure such steps translate into effective delivery.

Neutrality and Credibility

To play the role of expert adviser and convener of relevant stakeholders effectively an intermediary needs to gain the trust of all the parties involved. Being seen as a neutral party not beholden to any one set of interests and having credibility is critical.

When EMBARQ started their first Centre for Sustainable Transport in Mexico City and began work on plans for a new BRT system they were able to make progress on key elements – such as establishing a new commercial model for BRT operations and roles for the owners of the 350 old minibuses which would be retired – precisely because they sat neither on the side of government nor the private sector.

For the development of the SmartWay programme, the EPA knew that they had strong technical credibility in environmental matters but recognised the need to establish a distinct identity for SmartWay, separate from their other regulatory enforcement programmes. Neutrality and credibility were key. SmartWay achieved this by working in conjunction with the American Trucking Association and the Business for Social Responsibility group, representing their core constituents of freight carriers and shippers.

Both organisations have built into their working practices ways of ensuring that the core values of neutrality and credibility are protected as integral to their brand and continuing success.

Taking the Global Local

Transport interventions will succeed or fail depending on whether they take account of the local context, physical conditions, cultural norms and institutional environment. For intermediaries working for scale across many regions it is crucial not only to be able to bring technical expertise and best practices but to apply them appropriately in the local context. This requires a strong organisation set-up to hire not only staff with the best technical expertise but also with strong local knowledge – and to foster development and integration of both these skillsets.

In Guangzhou, China, a world-class BRT was recently developed with the capacity to carry 800,000 passengers per day. One of the unique features of the system was its integration with a new bike-sharing scheme comprising 5,000 bikes and 113 stations. Sustainable transport intermediary ITDP brought experience of international best practice in bike sharing, cycling infrastructure and BRT systems to this project coupled with local staff and partners to create this first of its kind project in China.

Like EMBARQ, ITDP is structured as a network organisation with local staff based at in-country centres but able to share best practices and knowledge across its entire network.

Lesson 3: Performance-Driven Implementation

Demonstrating a performance-driven culture and financial accountability to supporters attracts further investment and gives them greater resilience against fluctuating levels of funding or outcome preferences from individual donors. Many promising initiatives never get beyond small-scale and into the mainstream because they are not able to demonstrate the effective application of their financial and non-financial resources to achieving verifiable development impact.

This is easy to say but very tough to achieve. It was clear from the examples we chose that their continued and growing success was dependent on their ability to attract ongoing investment and/or donor funding – and this required disciplined monitoring and evaluation of the right performance targets, a system of incentives to achieve them and robust feedback loops based on this data to inform decision-making, enhance efficiency and mitigate risk.

For SmartWay, which is government funded, the continued success and expansion of the programme's impact is strongly linked to delivering value that can be monetised for their business partners. The underlying model of government subsidy carries the risk of funding being reduced or withdrawn – but the more robust the value that can be realised directly by participating businesses through fuel savings and monetising environmental improvements, the more able the programme will be to create sustainable long-term impact. To ensure this value, SmartWay made it a priority to include robust measurement tools and targets against which its partners' performance can be tracked.

SmartWay then used this measured impact to grow its membership base – rewarding the successes of its members, both shippers and carriers, in adopting SmartWay practices by highlighting their reductions in fuel consumption and emissions (which also promote the financial benefits to other members) through an 'excellence' awards programme backed by their rigorous capture of data.

Buddy Polovick of the SmartWay Transport Partnership at the EPA explains: "The success of the public-private partnership is enhanced significantly through high-profile awards and recognition programmes rewarding measured performance – increasing the visibility of the partnership and the partners' achievements. These efforts create even more incentive for ongoing improvement and drives competition in the industry."

For EMBARQ, which is a network of not-for-profit centres, increasing financial support to scale up their operations and ensure a robust future is an ongoing task. It is made possible by the large-scale, measurable impact they continue to create in cities that funders value and the capacity they have built to deliver this in a cost-efficient, targeted way.

To do this they established and tracked robust Key Performance Indicators to monitor their impact, for example CO₂ emissions reduced, people served and travel time saved. As well as monitoring the outcomes they deliver, EMBARQ use these metrics to set ambitious, yet realistic targets for future growth. This rigour and attention to verifiable results have given added credibility to EMBARQ's work and enabled them to secure long-term, multi-year funding such as a US\$30 million, five-year commitment from Bloomberg Philanthropies.

For entrepreneurs, long-term sustainability means achieving viability and finding suitable investors to help them grow their businesses. For an entrepreneur tackling a social and environmental challenge such as sustainable mobility this means ensuring that value delivered in those areas is balanced with a lean and cost-effective business model that can reach profitability – and finding investors that support this blended value.

The examples of Zipcar and G-Auto illustrate very different stages of this journey to financial independence, but both have a keen focus on financial viability as an important component of delivering impact at scale and a strong understanding of the need for a disciplined, cost-effective use of resources.

Since its launch in 2000, Zipcar has achieved both substantial scale and profitability, and has been the subject of a successful IPO in 2011. This has required persistence and patience support as they grew from a start-up to a point where they could access commercial debt and capital. Their data-led approach allowed them to track the profitability and viability of all their vehicles and establish key parameters (such as utilisation rates) that would drive a successful scalable business – giving confidence to potential investors.

All of these examples illustrate the importance of focusing early on a disciplined use of both financial and non-financial resources. The ability to demonstrate and measure financial prudence as well as impact helps attract the vital support needed to deliver sustainable development outcomes at scale.



Fleet auto rickshaw services are a promising model for providing last-mile connectivity in cities.

WHAT DOES THIS MEAN FOR INVESTORS AND DONORS?

Having established these three common factors to success at scale, and accepting that none is easy to achieve with the limited resources of a new endeavour, we turn our attention to a critical follow-up question: how can investors, donors and supporters best contribute to these key areas to increase an initiative's chances of success and eventual scale-up?

Support for sustainable mobility as a development area has historically been very limited. But this is changing fast, with cities in emerging markets becoming an increasing focus for investors and the issue of urban mobility increasingly recognised as a key development challenge. The world's largest multilateral development banks, for example, committed US\$175 billion at Rio+20 to support sustainable transport in developing countries.

The challenge now is how to spend that money well – and how to leverage new types of support so that best practices can be mainstreamed in cities across the developing world.

With this in mind, we have drawn three considerations from our research that may be relevant to investors and donors who seek to catalyse large-scale sustainable mobility outcomes through intermediaries and entrepreneurs:

- i) It may sound obvious but choice of partner really is critical to achieve the biggest impact for your investment. Identifying a partner who shares the same vision for scale from the outset, who has the ability to spot underlying market failures and opportunities, and who has (or can develop) the leadership competencies necessary to build an international organisation, significantly increases the chances of achieving impact at a global level.

- ii) Providing patient support and sharing early-stage risk with that partner are necessary to support any start-up entity or bring a new solution to market. Often these solutions need to be 'sold in' to cities or customers who have not considered them before so it is vital to persist through the market-building phase. There will also be barriers along the way, not just in reaching an initial level of success but also at different stages of growth such as entering new markets or developing new services.

Many investors and donors will exit from a partnership once the initial 'proof of concept' stages of a model are done and once the interesting and 'sexy' work is finished. But patient and persistent funding is required for an initiative to deliver large-scale outcomes to allow the organisation to build for the long-term.

As Holger Dalkmann, Director of EMBARQ says: "For us, having funding partners, emphasis on 'partner,' has been catalytic. It has enabled us to advance sustainable mobility solutions that improve the quality of life in cities. Those funders who spend the time to work with us and get to know our issues and opportunities provide the best advice and the right skills and resources at the right time – and that has resulted in improved performance."

The world's largest multilateral development banks committed US\$175 billion at Rio+20 to support sustainable transport in developing countries.

iii) Innovators and pioneers require significant non-financial support such as business advice, networks and governance support to integrate a disciplined approach to performance evaluation and accountability into their organisation as they grow – based on tracking measurable progress of both development outcomes and cost-efficiency and using these measures to help guide future plans.

Buddy Polovick recognises the value not only in demonstrating benefits to partners at the outset of the programme but also in the partners' role in helping EPA understand key drivers through aspects of the model that they most valued: "We learned early on from our Charter Partners that we needed to identify freight sustainability solutions and demonstrate that they get at the bottom line. Companies needed to understand the win/win value proposition of fuel and cost savings, in addition to the quantifiable environmental benefits.

For us, having funding partners, emphasis on 'partner,' has been catalytic. It has enabled us to advance sustainable mobility solutions that improve the quality of life in cities.

Holger Dalkmann, Director of EMBARQ

EMBARQ has been instrumental in the development of Metrobus, which now moves 690,000 passengers per day in Mexico City.



LOOKING FORWARD... WHAT COMES NEXT?

04

In the course of this report we have examined some of the major challenges to delivering impact at scale in the sustainable mobility sector, identified some rare examples of innovation with the potential to go to scale and considered different types of investment and support that are needed to catalyse and replicate further solutions.

To complete this review, we now consider how these solutions might come together over the next decade.



THE CHALLENGE REMAINS

First we recognise that during the 10 years we have been working in the area of sustainable mobility the challenge of moving people and goods has become much bigger and more pressing. We are very much in at the start of addressing the problem.

Developing countries alone are expected to build more new city areas during the two decades leading up to 2030 than all of humanity has built throughout history¹³. China and India, leading the trend, are expected to add at least 600 million new urban residents by 2030,¹⁴ more than the current populations of the US and Brazil. And the number of cities with populations of over 10 million, known as megacities, is expected to jump from 23 today to 37 by 2025.

As city sizes grow, the challenge of congestion and the distance that people need to travel grows with them. The problem of providing larger concentrated populations with the goods they need from an increasingly global resource base increases, and the combination of decentralisation of vital services and low-density sprawl at city limits make accessible mobility solutions more difficult to provide.

These trends will present different challenges for existing yet growing cities and megacities compared to new cities and satellite towns facing explosive growth rates.

Existing cities, particularly those in emerging economies will continue to struggle to provide high quality mass transit and accommodate burgeoning numbers of cars, bikes and pedestrians on their streets unless new approaches are found. Their challenge will be exacerbated by rapid geographic expansion and new migrant populations.

New modes and technologies such as car-sharing, Personal Rapid Transit,¹⁵ electric cars and bicycles are springing up in other parts of the world. Smart card systems and IT options are providing users with transit information at their fingertips (or mobiles) and allowing them to make smarter choices, saving time and money. But these types of promising new models need to be widely implemented – and fast. Waiting decades, such as the 40 years it took before BRT systems became a mainstream solution – will risk missing the potential to benefit billions, not millions, of people.

The world is on the cusp of explosive urban growth. In just a few years time hundreds of millions of people will be living in cities that have yet to be built – and large new sectors will be annexed to existing cities. Urbanisation rates and vehicle ownership in countries such as India and China are still significantly lower than the developed world. There is still time to shift away from the ills of low-density sprawl and high private vehicle ownership by designing more sustainable urban patterns and mobility systems from scratch.

Taking this opportunity will require a wide range of stakeholders thinking, behaving and acting differently. We will need to build the right institutional capacity and new models for delivery, to set urban plans and incorporate transport systems that will lead to better land use and low-carbon intensity and sustainable mobility in these new city areas.

¹³ Eco² Cities: Ecological Cities as Economic Cities. The World Bank, 2010. Accessed March 30, 2011

¹⁴ Richard Dobbs. "Megacities". Foreign Policy. Sept/Oct 2010. Last accessed January 2, 2011 at http://www.foreignpolicy.com/articles/2010/08/16/prime_numbers_megacities?page=full

¹⁵ Personal Rapid Transit is a mode of transport that involves small automated vehicles (pods) operating on a network of purpose-built guide ways. Its applications to-date have mainly been in confined areas such as university campuses, industrial parks or airport complexes.

INTEGRATED SOLUTIONS

Clearly we need a step-change in the scale at which we deliver sustainable mobility outcomes. We stand a better chance if these solutions are well-integrated within individual cities to maximise their collective impact. For example, the benefits of a carsharing scheme will be much greater if it provides good integration to mass transit options in a city. This means that existing and emerging actors will need to forge deeper alliances and interact with each other in new ways.

“Recognising that no single solution will save the day for transportation in this rapidly urbanising and increasingly complex world, a panoply of sustainable transportation solutions is arising worldwide,” says Sue Zielinski from SMART.

“However, these innovations are rarely linked and optimised in ways that can provide a convenient, practical, affordable and sustainable door-to-door

trip for the user. The next generation of urban transportation is about connecting transportation modes, services, technologies and infrastructures, bringing diverse innovators together in ways that work significantly better for people, economies, and the planet.”

Which leads us to arguably the most important questions of this report:

How can we identify the right integrators and innovators?

Which organisations new and old can support them in overcoming the obstacles ahead and help them deliver on a global scale?

How can these organisations work together to best leverage their resources... ?

WIDER COLLABORATION AND NEXT STEPS

Shell Foundation’s review suggests that both intermediaries and entrepreneurs will be important actors in delivering substantial impact in the area of sustainable mobility. Key characteristics of organisations most likely to succeed in achieving large scale impact are:

- entrepreneurial, disruptive approaches to existing challenges;
- core institutional capacity to deliver impact; and
- disciplined performance-driven implementation.

For the best chances of success, these organisations will benefit from patient, long-term support from investors and donors willing to take risks with them, willing to invest in building organisational capacity and able to provide business advice and support as well as financial resources.

The resulting new sustainable mobility services will need to be integrated with each other and into the existing fabric of the cities where they are deployed. This will require the different actors involved to form alliances and relationships in new ways: donors and development banks will need to work with the new intermediaries and innovators but also with city authorities; private, public and concessional finance will need to work with each other and service provision may come from a host of players, not just the traditional operators but new platforms such as the peer-to-peer sharing companies or IT providers.

But this is just our analysis.

We view this report as a work in progress. Rather than simply disseminating it and moving on, we will now test these findings with sustainable mobility

practitioners, investors and experts from around the world to discuss how we can achieve far greater impact in the next decade.

The aim will be to challenge the conclusions of this report, solicit the views and opinions of others and establish its validity. We will then share these wider contributions as part of the final study.

By learning from each other – and establishing practical connections – we hope to identify ways to dramatically accelerate the time needed for scalable interventions to move from an idea to mainstream practice.

THREE FOCUS AREAS

In addition to seeing how these broad lessons resonate with our colleagues in the field, we will also seek insight and opinion on three of the high-potential areas of innovation we have identified in this report – to see how others view the challenges that pioneers in these markets face and to identify specific paths that they might take to overcome them and achieve scale...



Can car-sharing services be replicated successfully in emerging economies?

Shaping the City for Sustainable Mobility – Transit Oriented Urban Development

Key mobility indicators such as ‘distance travelled’ or the number of journeys accessible by walking, cycling and mass transit in a city are most fundamentally influenced by urban planning, both at a city and neighbourhood level. The location of businesses, residential areas and critical services lays the template for people’s mobility needs. Designing streets to prioritise non-motorised and mass transit journeys over private vehicles facilitates sustainable mobility. Planning a city’s growth by concentrating urban development around high capacity transit corridors can prevent the sprawl that leads to high private vehicle use.

At the intersection of transport and urban planning, these ‘transit-oriented development’ practices will play a crucial role in keeping future cities moving – minimising their environmental footprint and creating liveable neighbourhoods. Yet uptake of these practices is still in its infancy in developing country cities.

KEY QUESTIONS:

- What will it take to mainstream Transit-Oriented Development practices in emerging economies?
- Which actors and models will drive this change?



Shared Transport Services

Shared transport services play a key role as part of the mobility mix in cities. They provide last-mile connectivity and ensure people can reach public transport hubs and make door-to-door journeys without the need for individual private vehicles. But in developing countries, traditional shared modes such as auto rickshaw and para-transit services are increasingly perceived as polluting unsafe and undesirable, threatening their ridership.

KEY QUESTIONS:

- What future models will preserve or increase the use of shared transport in developing cities whilst offering a high-quality, modern service?
- What will it take to modernise and improve existing shared services to achieve this goal?
- Could new models such as car-sharing and bike-sharing services that are reaching a significant scale in the developed world be replicated successfully in emerging economies?



Moving Goods – Green Freight and Logistics

The movement of goods by road, air, rail and sea is a growing global business and a major source of both pollution and GHGs. Cargo owners are under increasing pressure from customers and investors to address their carbon footprint. Yet to-date the uptake of even simple and available technologies and strategies to address this has been limited.

KEY QUESTIONS:

- What interventions are needed to mainstream emissions reduction measures in the freight industry?
- How can these be aligned with the needs and incentives of businesses supply chains to create the greatest chance for impact at scale?

NOTES



