

World Transport Policy and  
Practice  
Volume 26.3  
August 2020



PROFESSOR JOHN WHITELEGG  
SCHOOL OF THE BUILT ENVIRONMENT  
LIVERPOOL JOHN MOORES UNIVERSITY

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#### PUBLISHER

WORLD TRANSPORT POLICY AND PRACTICE,  
6 LONGNER STREET  
SHREWSBURY  
SHROPSHIRE  
SY3 8QS  
Telephone +44 (0) 1743 241955  
E-MAIL:  
[johnwhitelegg@mobilitaetskultur.eu](mailto:johnwhitelegg@mobilitaetskultur.eu)  
WEB:  
<http://worldtransportjournal.com>

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Dr. Joachim und Hanna Schmidt  
Stiftung für Umwelt und Verkehr



“We are grateful for the financial support of the journal  
from the Dr Joachim und Hanna Schmidt Stiftung fuer  
Umwelt und Verkehr, Hamburg, Germany”

<http://www.dr-schmidt-stiftung.de/28-0-Aktuelle+Projekte.html>

This editorial is very unusual. It is with great regret that I must announce the closure of the journal. We have published for almost 26 years and this is the penultimate issue. It has been a pleasure and a privilege to edit this journal and we have had a huge amount of support from readers, authors and those who have funded the publication.

We now have a full complement of material for the final issue (26.4) so we ask that no more articles are sent to us.

The reasons for closure are rooted in an evaluation of what triggers a change in mindset and what works to demolish the current deviant paradigm (more roads, more distance travelled, more subsidy) and what works to promote paradigm shift to child-friendly places and spaces and the 3 zeroes (air pollution, carbon and road deaths). My conclusion is that high quality evidence does not produce paradigm shift. The politics of transport and the mindset of those making decisions is not susceptible to evidence and case studies. Something else is needed<sup>1</sup>.

It is glaringly obvious that we have all the information we need to design, fund and deliver interventions that will result in zero carbon, zero air pollution and zero death and injury in road traffic. It is also clear that the majority of politicians in the majority of countries in the world are not prepared to engage with this vision and prefer to spend billions on roads, high speed rail and airport expansion and reject the alternatives. They accept the supremacy of vehicles and the unimportance of people, children, spaces and streets as locations for human contact, social interaction, trees and tranquillity. 40 years ago Donald Appleyard wrote "Liveable Streets" (Figure 1) and in spite of some excellent applications in a small number of locations this fundamental identification of the links between people, social interaction, community and street life has not been adopted as a principle in traffic or transport planning.

1. <http://www.lancaster.ac.uk/cemore/?publications=mobility-a-new-urban-design-and-transport-planning-philosophy-for-a-sustainable-future>

We have spent 26 years publishing high quality articles that assert the importance of streets, public life and the rights of children to walk and cycle in their own neighbourhoods in complete safety and security and this has had no discernible impact on paradigm shift. I recommend that readers look at volume 1 number 1 in 1995 and carry out their own evaluation of whether or not we have made progress. In my view we have not made progress and a few more years of articles in the journal will not change that. A new approach is needed.

The good news is that there are exciting moves to shift the discussion into transformation of mind sets and re-shaping politics and evidence of this can be found in the work of the Wuppertal Institute in Germany on transformation, the change in direction in Irish politics after the formation of the new national government in June this year and the Stockholm Declaration from February this year. Further information on these 3 examples of real progress can be found in the links below<sup>2</sup>.

There is also a need to identify best practice and concentrate on how we can work to make sure it is adopted in as many places across the globe as possible. This is a very different task to publishing yet more articles on policy in the journal. The question that deserves our attention is "how

2. Wuppertal Institute:

<https://wupperinst.org/en/a/wi/a/s/ad/3969/>

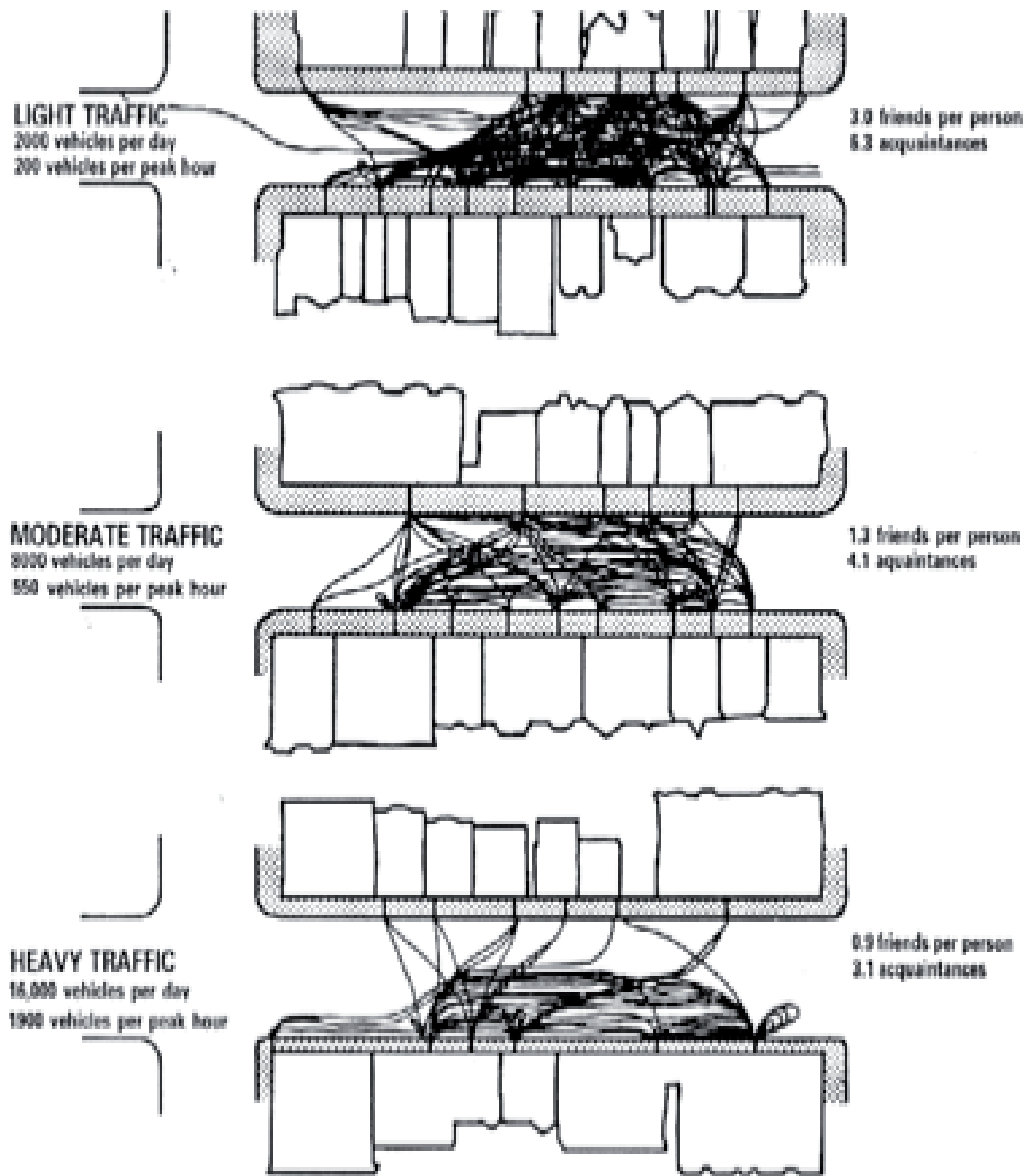
Irish Government:

*The government will commit to an allocation of 10% of the total transport capital budget for cycling projects and an allocation of 10% of the total capital budget for pedestrian infrastructure. The Government's commitment to cycling and pedestrian projects will be set at 20% of the 2020 capital budget (€360 million) per year for the lifetime of the government.*

<https://static.rasset.ie/documents/news/2020/06/draft-programme-for-govt.pdf>

Stockholm Declaration:

<https://www.roadsafetysweden.com/contentassets/b37f0951c837443eb9661668d5be439e/stockholm-declaration-english.pdf>



**Figure 1:** San Francisco. Neighbouring and visiting on three streets; lines show where people said they had friends and acquaintances. Dots show where people are said to gather.

do we make sure this is put into practice". We now have an outstanding example of good practice in the Chennai Mega Streets project<sup>3</sup>. We need to work on how to get this project adopted in every city on the planet and at the moment we do not know how to do that. No UK city has anything as comprehensive and well-designed as Chennai and that has to change.

This issue of the journal has a collection of commissioned articles on the shape of

3. <https://indianexpress.com/article/cities/chennai/chennai-mega-streets-project-6266110/>

<https://www.ashden.org/winners/urban-works-institute-itdp-india>

<https://www.youtube.com/watch?v=jqRnououjKw>

transport and mobility after Covid-19. The 6 authors were asked to produce 'think pieces' looking ahead to what the transport world could and should look like after the extra-ordinary coronavirus experience has subsided. These "think pieces" have also been submitted to the UK Department of Transport to inform its work on 'Decarbonising Transport' and 'The Future of Transport Regulatory Review'.

All the authors have a wealth of experience to bring to bear on the future of transport and mobility and the degree to which the virus crisis has shifted the prevailing deviant paradigm.

Lillian Burns says:

Please, oh please, UK government, don't let us return to what was our 'normal' when we emerge from the coronavirus emergency.

*DON'T*

- Return to the contradictory transport policies we have seen so far in the 21st century which, on the one hand, call for reduced/zero carbon emissions but, on the other, fail to factor into greenhouse gas calculations emissions from international flights and promote aviation and the provision of more highway capacity that leads to more road trips and poor air quality

Keith Buchan says:

This is not a time for business as usual. And this brings me to carbon. No other element illustrates the total failure of our appraisal system. Leaving to one side its valuation, the current measurement unit is wrong. We have a target date by which change must be achieved – 2050. Carbon dioxide persists in the atmosphere for about 100 years. We know that what counts is the total warming impact between now and 2050. The measurement should, therefore, not be tonnes emitted (as now) but tonne years. This would make the reduction of carbon dioxide now much more important – as it should and must be.

Lisa Hopkinson and Lynn Sloman say:

The first step is to cancel the £27 billion RIS2 roads programme (2020-2025), now subject to a legal challenge on climate grounds, as well as the £3.5 billion for schemes on local authority roads. These are totally anachronistic in a post-covid climate emergency.

The second step is to urgently reallocate government road building money to local authorities for long term 15-year investment deals (capital and revenue) for local public transport, walking and cycling. This would stimulate much needed green growth and jobs. We propose reallocation of the £6-7 billion/year currently ring-

fenced for road building to provide an additional £4 billion a year for local public transport (trams and buses) and £2 billion a year for walking and cycling to cover all local authorities in England. To provide additional leadership and support to councils we recommend new national bodies on Walking/Cycling and Public Transport.

Thirdly to encourage people to get back on and stay on local public transport we should make it free. Local public transport is already free in more than 100 towns across the world, including Dunkerque in France. One year on, bus trips there were up 85%, half of new bus users previously drove, and one in ten new bus users had sold their second car.

Alastair Kirkbride says:

No-one would have chosen it, but the lockdown is a big social experiment. The cries for post-lockdown economic reconstruction are already getting louder. The risk will be the headlong rush to rebuild the shattered economy in the same way that it existed before, and with it reversion to (or worse) pre-lockdown congestion. This doesn't have to be the case. Putting resources and effort into understanding how to capture the economic benefits of a low travel demand mobility system could lead to prosperity and better-quality places, lives and significantly reduced emissions – as suggested by Milan's mayor. These ideas aren't new, but never has there been a better opportunity to realise them.

Part of the uniqueness of these times is that we have time to reflect, discuss, consider and test ideas about what could happen as life opens up again. As "decide and provide" was (thankfully) elbowing out "predict and provide" in transport policy, it's time to decide what sort of mobility landscapes we really want.

John Whitelegg says:

The Covid-19 experience has been very unpleasant for many people and cannot in itself justify a new direction in thinking and spending in transport and mobility. Equally it is not smart to ignore some of the things we have seen in recent weeks and ask "could we hang on to these". The reduction in air pollution is well documented

and is of great benefit to the many 100s of thousands who suffer from respiratory problems and the likelihood of severe asthma attacks requiring hospitalisation. At a time of great distress about fatalities as a result of Covid-19 it is appropriate to reflect on the 42,000 deaths as a result of air pollution in Britain. Why are 42,000 deaths every year not a crisis?

It is also appropriate to reflect on the public health advantages of more cycling and the evidence that increased levels physical activity reduces obesity, cardio-vascular disease and diabetes (World Health Organisation, 2018). Cardio-vascular disease kills 170,000 people every year. 500 people with diabetes die every week. All 3 diseases are emergencies that trigger no emergency response.

Over the past 26 years we have tried very hard to live up to the first word in the title of this journal (World) and in this issue we have an article by 5 authors, two of which are from Africa, looking at access to small scale rural farms in Kenya and Tanzania. We are also delighted to be able to publish a paper by 4 authors from the Department of Transportation, Engineering and Management, University of Engineering and Technology, Lahore, Pakistan and one based at Leeds University, Institute of Transport Studies. The subject, a study on Ridesharing regulatory framework of Pakistan, has a great deal of relevance to shared mobility and the shift away from the hugely inefficient one person in one car consuming vast amounts of precious urban space.

John Whitelegg  
Editor

### **Impact of First Mile Access Improvements on Small-Scale Farming in Kenya and Tanzania**

*Robin Workman, John Hine, Andrew Otto, Wynand Bezuidenhout, Peter Njenga*

#### **Abstract**

The “First Mile” the primary segment of transport that links farmers to the nearest collection point, or local market. Means of transport on the first mile vary from human portage, animal carts, bicycles and motorcycles, to tractors, pick-ups and small trucks. These modes of transport and the condition of the road can have a significant influence on the quality of crops being transported by the time they reach their destination.

This research in Kenya and Tanzania was designed to better understand transport on the first mile and its effect on farmer’s livelihoods. This paper found that motorised access to farms was not possible, so more expensive transport from farm to collection point such as headloading was prevalent, crop damage and wastage was high, and that these factors have a significant impact on farmer’s livelihoods. A cost benefit analysis was undertaken in one region in Tanzania to determine whether it was economically beneficial to extend motorable roads closer to farms by improving the road surface for motorised vehicles in all seasons. The results showed that for a 15-year time horizon and with a discount rate of 12%, a discounted cost/benefit ratio of 2.65 could be expected.

**Keywords:** First Mile, Rural Roads, Cost Benefit Analysis, Transport, Farmer’s Livelihoods

### **Comparative Analysis of Ridesharing Regulations - A Study on Ridesharing Regulatory Framework of Pakistan**

*Ahmed Ziyad, Zia-Ur-Rehman, Zahara Ba-tool, Ammad Hassan Khan, Hina Saleemi*

#### **Abstract**

Ridesharing companies like Uber and Careem have been operating in Pakistan for the past 5 years however, there is no existing ridesharing regulatory framework. Countries like Bangladesh, India, China, and Malaysia, along with developed states that is State of the New York, have already responded to newly introduced TNCs by implementing new regulatory frameworks. In this study, a comparative analysis of ridesharing regulations of Pakistan with those of Bangladesh, India, China, Malaysia and State of the New York, have been carried out. With the aim to assist the policymakers, a basic regulatory ridesharing regulatory framework for Pakistan has also been developed.

**Keywords:** Transport Network Companies (TNCs), Ridesharing Companies, Ridesharing Regulations, Ridesharing Regulatory Framework, Ridesharing Policy, Uber, Careem.



## **Decarbonising transport whilst mitigating climate change – seen through the lens of the 2020 coronavirus pandemic**

A combined contribution to the Department for Transport's call for a debate about reaching a net-zero greenhouse gas emissions target by 2050 and also to the appeal for evidence by the DfT on 'The Future of Transport Regulatory Review' from independent consultants:

*Keith Buchan  
Lisa Hopkinson & Lynn Sloman  
Alistair Kirkbride  
John Whitelegg*

facilitated by  
Lillian Burns (also a contributor) and  
the North West Transport Roundtable

### **Foreword**

The Department for Transport's (DfT's) intention to publish a Transport Decarbonisation Plan ahead of the next United Nations Climate Change Conference is to be commended. Originally, the UN conference (COP26) was due to be held in Glasgow in November 2020, but it has been postponed to 2021 due to the coronavirus pandemic. It is currently unclear whether or not the COP26 timetable interruption will impact on the Decarbonisation Plan timetable. However, it is to be hoped that the very changed outlooks to business and leisure travel, to face-to-face meetings and home working as a result of the Corona-19 emergency will be factored into the final plan.

At the end of March, the DfT published 'Decarbonising Transport: Setting the Challenge', which was intended to spark a much wider debate amongst stakeholders. Commendably, this report restated the government's intention to bring forward the end of the sale of new petrol and diesel vehicles from 2040 to 2035 and it confirms that the UK will at least match the EU's CO2 targets for new cars. But, oddly, although the paper sees potential for hydrogen fuel in the rail and rail freight sectors, it appears to ignore the growing realisation throughout Europe that hydrogen fuel cell-powered cars are likely to play a big

part in meeting net zero targets. Also, it does not mention the environmental benefits of electric motorbikes and scooters, electric bicycles or electric stand-on scooters. (Nor the potential for autonomous robot taxis or battery-powered trams such as the system being developed for Coventry by Warwick University). Nevertheless. The publication of 'Encouraging Walking and Cycling' by the DfT on May 9th, which brought forward trials of e-scooters, made up for this anomaly.

'Decarbonising Transport' describes the contribution to UK greenhouse gas emissions by the aviation sector as "relatively small", stating: "Overall the intention is to let demand for air travel continue to rise". This is disingenuous because, whilst domestic aviation emissions are included in the UK carbon budgets, international aviation (and shipping emissions) are counted separately by agreement with international partners and there is no accepted way of allocating emissions to different countries.

That said, the DfT holds up its report as marking the beginning of a conversation to develop the policies needed to decarbonise transport. It promises to take a holistic view of transport and says it will be looking at the potential in each transport mode to deliver their carbon budgets and achieve net zero. This is very much welcomed. It also must be borne in mind that the document was written before the Covid-19 lockdown. Since that came into force, a large percentage of the population has learnt how to make best use of conference calls and teleconferencing and employers are reassessing the need for office space and face-to-face meetings. This comes on top of the fact that the latest ONS estimate of home working, published in March, was that 26% of the population (pre Covid-19) had already worked part or all of the time from home<sup>1</sup>. This will undoubtedly increase exponentially once restrictions are lifted, rendering redundant current growth projections for commuter travel. In turn, this will have a major effect on the economic case for capital transport projects, which will need re-evaluating.

The UK's way of approaching transport in-  
1. <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/datasets/homeworkingintheuklabourmarket>

terventions needs to change dramatically. Hence, Lillian Burns, who has done voluntary planning and transport policy work for the third sector and for non-governmental environmental organisations for the past 25 years, decided to invite some independent transport consultants to set down their post Covid-19 visions.

## Introduction

The views expressed in this paper are those of the transport consultants who were asked to produce 'think pieces' looking ahead to what the transport world could and should look like after the extraordinary coronavirus experience has subsided, whilst keeping in mind the type of evidence the DfT were looking for in 'Decarbonising Transport' and 'The Future of Transport Regulatory Review'<sup>2,3</sup>.

The facilitator of this document is not a transport consultant, nor has she ever been paid for her transport or planning policy work. But she does have significant policy experience and is a journalist by training. For many years she convened the North West Transport Roundtable (whose residual funds partially paid for this report) on behalf of the Campaign for Better Transport. She has chosen to express her views for the DfT's consideration on this occasion in a simplistic and forthright fashion, although with due respect. In 10 'Dos' and 10 'Don't's, she has tried to cover some considerable ground. Her contribution is below, followed by those of the consultants.

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2. <https://www.gov.uk/government/publications/creating-the-transport-decarbonisation-plan>

3. <https://www.gov.uk/government/consultations/future-of-transport-regulatory-review-call-for-evidence-on-micromobility-vehicles-flexible-bus-services-and-mobility-as-a-service>

## Contributions

### PLEASE, OH PLEASE, DON'T RETURN TO 'NORMAL'

*Lillian Burns*

Please, oh please, UK government, don't let us return to what was our 'normal' when we emerge from the coronavirus emergency.

### DON'T

- Return to the contradictory transport policies we have seen so far in the 21st century which, on the one hand, call for reduced/zero carbon emissions but, on the other, fail to factor into greenhouse gas calculations emissions from international flights and promote aviation and the provision of more highway capacity that leads to more road trips and poor air quality
- Neglect to tighten air quality regulations in order to protect the nation's health and save tens of thousands of unnecessary deaths and much suffering from respiratory problems each year
- Hold back from funding investigations into 'green' technologies/ alternatives to fossil fuels
- Pick up where we were in further weakening the planning system and making it ever easier for unsustainable housing and highway projects to be built whilst not making it compulsory that all new developments meet high eco standards and provide green lungs/open spaces
- Demand more housing and other infrastructure than is justified by the latest population data – and factor into all calculations relating to travel and infrastructure in future the enormous growth in home working, which was up to over 26% last month before the Corona lockdown
- Remove from elected principal authority representatives the right to determine local planning/ transport interventions but do require them to take air quality into account in decision-making

- Retain the current, flawed, transport appraisal system which is based on assumptions that traffic will increase (not now likely to materialise) and that all time spent on trains is wasted
- Prioritise the economy to the extent that the environment is put at risk, for instance by rushing to support travel for the sake of it or poorly designed schemes to get things moving
- Try to pretend that the whole Covid-19 thing, (or something similar), could never happen again or that its rapid spread had nothing to do with international travel
- Fail to learn from best practice in other countries. Be looking around now to learn lessons.

## *DO*

- Seize the moment to promote environmentally sound practices and sustainable lifestyles, shortened supply chains (eg. more local foods for local markets) and transport innovations
- Re-prioritise 'reducing the need to travel' by encouraging self-sustaining local communities
- Discourage unnecessary travel with a fuel pricing system that recognises the environmental damage done by traditional fuels and by reconsidering a road pricing system
- Make it easier to work from home by requiring all new homes to be designed with a proper work/study area or office and ensuring all homes have access to fast broadband
- In view of the exponential rise in home working and the reduction in commuting, (which was apparent prior to the Covid-19 crisis), confine road investment to local safety improvements for the foreseeable future. Re-focus transport spending on sustainable modes/active travel.
- Scrap the roads programme. Treat land as the finite resource it is, requir-

ing sequential land use that prioritises regeneration initiatives and 'brownfield first' and protects specially designated areas, important open spaces and countryside – for their health/wellbeing value

- In view of hugely reduced business travel forecasts, re-evaluate HS2's economic case versus its environmental impacts and rescind the notice to proceed. Re-focus instead on providing new stations and more passing loops, re-opening closed stations and lines, providing better rolling stock/more carriages, upgraded signalling and station facilities and longer platforms
- Support zero carbon, carbon capture and tree planting schemes (including a return to tree-lined streets in urban areas). Ensure adequate funding for maintaining newly-planted trees
- Help to suppress the re-emergence of demand for overseas travel by investing in initiatives aimed at re-invigorating the UK holiday, hospitality, leisure and entertainment sectors
- Have in place robust Covid recovery plans which factor in climate change mitigation and also resilience plans (and the emergency supplies necessary to back them up) for future epidemics/ catastrophic events which will prioritise food and medical supplies and the safety and health of key workers, including those who keep transport systems functioning

## How Transport Appraisal Needs to Change

*Keith Buchan*

I am surprised that more people do not ask the simple question: "If we are so good at transport planning why do we fail to achieve what we want?". Have we solved traffic congestion? Have we cleaned up city air? Have we addressed transport's impact on climate change? Can people get to work, the shops, other facilities and each other without being forced to drive – and thus make those problems worse? Despite the expenditure of tens of billions of pounds over many decades the answer to these questions is pretty much No. But why?

There are two answers to this. The first is the general lack of political understanding and leadership. Put the proposition to most people that if you build more roads you'll get more traffic and they will get it. Yet this has been the subject of elaborate argument (and some flawed science) which has allowed policymakers to effectively ignore this simple relationship. Politicians often agree on roads that "We can't build our way out of congestion". They then proceed to fund road capacity increases and shy away from demand management, whatever form it may take.

The second is related to the first. We have built a transport appraisal system that scores the schemes which don't work above the schemes which could. Carbon emissions are pretty much irrelevant in the current system of transport appraisal. So are social distribution impacts (including regional) and health. The latter was so obviously wrong that cycle and walking schemes now count health benefits – in fact without them most of such schemes would be deemed poor value for money in traditional analysis. On the other hand, those same traditional methods ignore the disbenefits of supporting unhealthy travel (for example car dependency).

Now we must face a new set of challenges and ensure we have methods of testing out what we need to do in transport, or as it should be known transport and communications. After the COVID-19 outbreak none of the forecasts we currently have

for road, rail or air travel have any validity going forward. There will be complex new travel and non-travel behaviours whether or not a vaccine or therapeutic remedies are available. People in cities have discovered the pleasure of quieter, cleaner environments with less traffic severance, albeit in a worrying and sometimes sad context. Those same people may not, however, be very enthusiastic about getting back on public transport during rush hour unless, possibly, social distancing can be guaranteed – and that presents an issue of public transport capacity. (Some double decker buses currently sponsored by the government under emergency measures are carrying just 13 passengers – intentionally – spaced out from one another). We have talked about working from home for years – people have finally been forced to learn how to do it properly. And the software will now get even better.

But we don't need to throw out all the techniques transport planners and modelers have developed, just change the fundamental assumptions about what is valuable and what isn't.

The current assessment system is based on social cost benefit analysis, and the eccentric idea that the value of a transport scheme or package or policies can be summarised in one number – the famous BCR (Benefit to Cost Ratio). Its theoretical weaknesses were obvious from the start, and economists have been arguing about the concept since the late 1930s when its use in public decision making was first proposed.

But there are a great deal of non-theoretical problems with using social cost benefit for transport. First the costs and benefits have to be measured. This is not as simple as it sounds. Transport is not an activity which is carried out in an isolated box – it is part of everything we do. As well as this, it has impacts which are well beyond the experience of its users at the time of travel.

The act of travelling itself has a major impact on the environment through which it passes, but it also enables changes in most other areas of life, in particular land use planning. Faster travel can open up new

destinations, but the secondary effect is to reduce the number of those destinations. This lies behind one of the most important and well known statistics in transport, that travel speeds have risen but total time travelling has not reduced. Instead distances have got longer and consumed what was supposed to be a time saving.

So, identifying all the costs and benefits, which, just to make things even more complex, often interact and overlap, is quite a challenge in itself. Then comes the extreme difficulty of generating a money value for them so they can be included in the BCR. To illustrate this I list some examples that spring to mind in no particular order:

- Time savings (work time and non-work time)
- Journey quality
- Security
- Accidents

- Landscape
- Social and regional distribution

What is interesting about this list is that none of them use the same method for calculating their money values, if they are calculated at all.

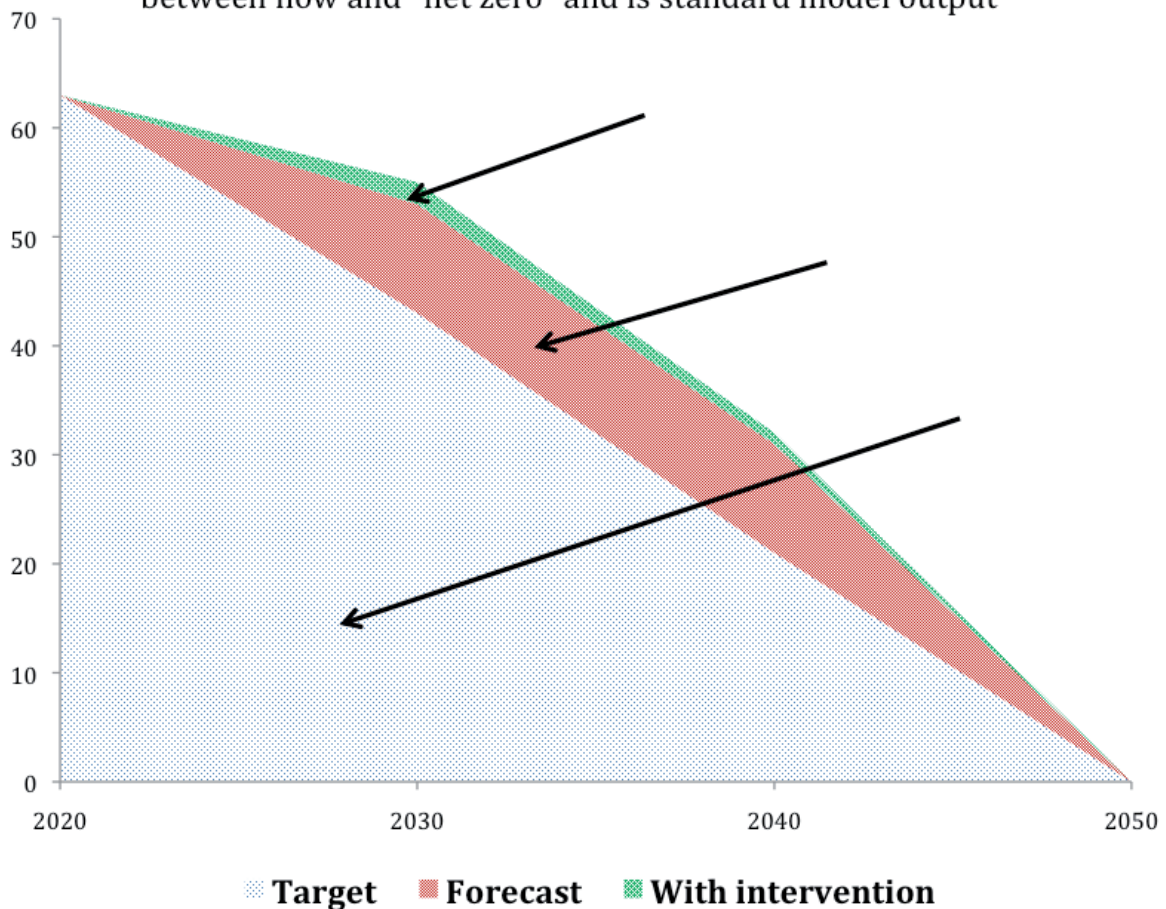
Two things are clear from this random list (carbon has not been forgotten!):

1. that not all the impacts (in particular some of the most important ones) are measured
2. that the values being applied to what is being measured are inconsistently calculated.

This is widely recognised and there have been several attempts to change it. In 1998 the introduction of "what do we want to achieve – what's the best way – how much does it cost" into appraisal (NATA) was meant to cause a fundamental change.

### How do we currently value carbon in appraisal?

The chart shows total tonnes of carbon produced by a scheme between now and "net zero" and is standard model output



Source: Keith Buchan - Local Transport Summit 2018, revised Feb 2020

A rear-guard action led to the compromise of all the old methods continuing, but alongside an “objectives led” approach. The result was the old cost benefit numbers continued to dominate. In 2008 reforms were discussed (the NATA Refresh) and mostly ignored. Last year DfT held a consultation on appraisal which received strong and practical proposals for radical change (for example from the Transport Planning Society, the Local Government Transport Advisory Group and the Royal Town Planning Institute). DfT engagement was extensive and widely welcomed and several events and conferences generated a great deal of interest and momentum for change. Unfortunately, business as usual prevailed.

This is not a time for business as usual. And this brings me to carbon. No other element illustrates the total failure of our appraisal system. Leaving to one side its valuation, the current measurement unit is wrong. We have a target date by which change must be achieved – 2050. Carbon dioxide persists in the atmosphere for about 100 years. We know that what counts is the total warming impact between now and 2050. The measurement should, therefore, not be tonnes emitted (as now) but tonne years. This would make the reduction of carbon dioxide now much more important – as it should and must be.

This is accompanied by an approach which ignores the vast majority of the carbon produced by the act of travelling. If a road scheme is proposed, and time savings calculated and valued for the many thousands of drivers in future years, the carbon they produce in driving is not counted. What is counted is the marginal change in carbon they produce with and without the scheme. Ignoring the carbon reality means that schemes which encourage carbon use are prioritised over schemes which would reduce it. The opposite of what is now Government policy. Either we include the cost of all the carbon as a disbenefit or accept that the current appraisal system is not fit for purpose.

Deciding what we want to achieve, and working out how get there, is what will produce the right mix of transport policies

and programmes. Of course, it should be robustly and carefully designed and appraised, but against our shared objectives, not to comply with a flawed and outdated economic theory.

Keith Buchan, Director, MTRU  
Skills Director, Transport Planning Society

Keith Buchan has over 40 years’ experience in transport planning including work on strategic policy development, objectives led assessment, traffic restraint, “new generation” bus priority, heavy vehicle studies and the 2008 and 2018 reports on how the UK could meet its carbon reduction targets. From 2011 to 2013 he was Chair of the Transport Planning Society and is now their Director for Skills.

## Flattening the Transport Curve

*Lisa Hopkinson and Lynn Sloman*

A recent survey by pollsters Opinium<sup>1</sup> showed the public wanted the government to respond to the climate crisis with the same urgency as it has with Covid-19. Despite the terrible consequences of the current pandemic, it has created an unprecedented opportunity for more radical measures on climate to be introduced. So how can transport planners respond to the current crisis in ways that forestall an even bigger climate crisis in the future?

The launch of DfT's Decarbonising Transport plan, two days after lockdown, may therefore have come at an opportune time. The plan acknowledges the need to act 'quickly and decisively' and use our cars less. But the scale of the climate emergency is even bigger than DfT appears to recognise: we are not on track to meet the old carbon budgets let alone Paris-compliant ones. The current DfT carbon strategy is focussed on electrifying the vehicle fleet, while still allowing traffic volumes to grow, building roads and expanding airport capacity. Even bringing forward the plan to make all new cars electric by 2035 will not reduce emissions quickly enough. The carbon arithmetic is inescapable. As well as electrifying the fleet more quickly we must reduce road and air travel significantly over the next ten years.

In a series of nine briefings for Friends of the Earth (FoE)<sup>2</sup> we identified a wide range of transport policies that can achieve the necessary cuts in road traffic and carbon, and which can also address some of the consequences of the current crisis:

The first step is to cancel the £27 billion RIS2 roads programme (2020-2025), now subject to a legal challenge on climate grounds, as well as the £3.5 billion for schemes on local authority roads. These are totally anachronistic in a post-covid climate emergency.

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1 <https://www.independent.co.uk/environment/climate-change/coronavirus-climate-crisis-uk-government-poll-environment-a9467371.html>

2 Sloman L. and Hopkinson L. (2019) A radical transport response to the climate emergency. <https://policy.friendsoftheearth.uk/insight/radical-transport-response-climate-emergency>

The second step is to urgently reallocate government road building money to local authorities for long term 15-year investment deals (capital and revenue) for local public transport, walking and cycling. This would stimulate much needed green growth and jobs. We propose reallocation of the £6-7 billion/year currently ring-fenced for road building to provide an additional £4 billion a year for local public transport (trams and buses) and £2 billion a year for walking and cycling to cover all local authorities in England. To provide additional leadership and support to councils we recommend new national bodies on Walking/Cycling and Public Transport.

Thirdly to encourage people to get back on and stay on local public transport we should make it free. Local public transport is already free in more than 100 towns across the world, including Dunkerque in France. One year on, bus trips there were up 85%, half of new bus users previously drove, and one in ten new bus users had sold their second car.

Free local bus services wouldn't be feasible or affordable under the current deregulated regime in Britain. This is the right time to take back control of ailing bus companies and establish municipal bus companies, so that all profits can be reinvested. At the same time the law should be changed to allow all local authorities to franchise and plan their bus network as a whole. To make bus services entirely free in England outside London, we estimate we'd need to spend an extra £1.8 billion per year.

Fourthly to make cycling permanently safer after the lockdown we need rapid construction of networks of segregated cycleways in all urban areas. We can learn from Seville, which built 120km of segregated cycle paths in just four years, achieving a 43% walking and cycling mode share in a city that had been considered 'too hot to cycle'. Copenhagen is also building a network of long-distance Cycle Superhighways, radiating up to 40km out of the capital.

We need a similar programme of strategic cycleways in England alongside all single carriageway main roads for 15km either

side of every settlement (removing road capacity where necessary).

This should be combined with government grants for purchase of electric bikes (e-bikes) which have great potential to reduce car mileage as they are generally used for longer journeys. They also broaden the appeal of cycling to older people, women and those who are less active. Modelling using the Propensity to Cycle Tool suggests that in the main urban areas 30% of commuters would cycle to work if e-bikes were widely available and we had a similar cycling infrastructure and culture to the Dutch.

Some short term rebound in traffic is inevitable when the lockdown is lifted due to pent-up demand. However, we need to constrain road traffic within carbon budgets while locking in positive behaviour trends such as remote working. To do this we propose an 'Eco Levy' road pricing scheme which will reduce carbon, air pollution, congestion and other serious impacts of road traffic long term, while generating significant revenue for investment. This would be distance-based but with lower rates for electric vehicles or in rural areas with fewer travel alternatives. This would apply on roads managed by both Highways England and Local Authorities.

Local authorities already have the power to introduce road charging but other than London (and Nottingham's Workplace Parking Levy) no one has had the courage before now to introduce it. The biggest hurdle has been political due to fear it will be unpopular. Yet if it is shown that the income from an Eco Levy will be used to invest in local services and provide free fares, while cutting carbon and improving air quality, many people will support it. The Ultra Low Emission Zone in London received public backing because of the obvious health benefits. And recent events have shown that Britons' appetite for radical measures in the interests of community well-being is greater than we might think. The people who tend to benefit most – those on lower income, young people, older people, women - include many of those low paid key workers we have been clapping for every Thursday.

Our estimates for FoE suggest a new distance-based Eco-Levy would raise as much as £20 billion a year, more than we need for free public transport and the necessary investment in walking and cycling. This would provide badly needed government revenue for green investment in all towns and cities, levelling up those areas that have suffered the most cuts in recent years. So far, no country or city has tried the combination of an Eco Levy and free public transport, but this is the kind of transformative policy that is now needed if we are serious about flattening the transport carbon curve.

Lisa Hopkinson

Lisa, an associate of Transport for Quality of Life, is an environmental researcher with over 30 years' experience in Hong Kong and the UK in the charitable, educational and private sectors. She has variously worked as consultant, campaigner, political aide and researcher and was co-founder and head of research for a not-for-profit think tank in Hong Kong. She was also the main author of 'Zero Carbon Britain: Making it Happen' which was published by the Centre for Alternative Technology.

Dr Lynn Sloman

Lynn, a former deputy director Transport 2000 (now the Campaign for Better Transport), is the founder and director of Transport for Quality of Life, a specialist environmental and sustainable transport business. Her work at Transport for Quality of Life focuses on designing and evaluating sustainable transport investment programmes. Lynn is a trustee of the Foundation for Integrated Transport, a board member of Transport for London and a Commissioner of the South East Wales Transport Commission.



## Lessons from the Lockdown

*Alistair Kirkbride*

The current radical changes in behaviour as a result of the Coronavirus lockdown have been described as a huge social experiment in all sorts of ways, such as regarding urban air pollution or home working. It is without doubt unique as a demonstrator of how lives and places are experienced without the domination of travelling and traffic. Let's not pretend anything is normal, but for a moment let's just explore what it might mean to people and where this might lead.

So, what have people's experiences actually been of the lockdown in terms of their own (often) radically changed mobility lifestyles and of their familiar, local places? Will these experiences have influence over how things might open up again afterwards? In a recent RSA/YouGov poll, 85% of respondents want to see at least some of the personal or social changes they have experienced continue. Who has control over the travel, traffic and transport policy and investment levers that direct what happens next?

The replacement of the congested commute and long work journeys by home working and teleconferencing is demonstrating the disutility of much "normal" travel on people's own terms. There is widespread commentary (tinged with a sense of fear by some employers) that a significant number of jobs do not need to be chained to a commute to an office.

The absence of traffic has transformed familiar places. People's experiences are of many local roads effectively becoming public realm once more and of quietness and a sense of calm. Whilst it is not currently possible to fully exploit this for social purposes, there are widespread reports and awareness of whole families out cycling on roads that would never have been considered for such purposes in normal times. This matches the reported booms in sales of bicycles.

Several cities are formally giving over this space to walking cycling. Milan led the way in April in confidently capturing the shifts in public mood. "We worked for years to

reduce car use. If everybody drives a car, there is no space for people, there is no space to move, there is no space for commercial activities outside the shops" said its mayor Marco Granelli as he announced the transformation of 35km of city streets to walking and cycling zones. "We want to reopen the economy, but we think we should do it on a different basis from before... When it is over, the cities that still have this kind of economy will have an advantage, and Milan wants to be in that category".

The rippling of this through key UK cities [<https://personsnews.com/encourage-cycling-and-walking-after-lockdown-uk-mayors-told-uk-news/>] has led to the unprecedented Government support for active travel. Whilst the DfT's announcement of £2bn for cycling and walking infrastructure is welcome, it is part of the £5bn already announced in February; the significant difference is "...the language used by Shapps in the briefing – as well as a raft of unexpected announcements... are very much novel" [<https://www.forbes.com/sites/carltonreid/2020/05/09/uk-government-boosts-bicycling-and-walking-with-ambitious-2-billion-post-pandemic-plan/>]. It needs keeping in context as estimates for Manchester's required infrastructure alone is about £1.5bn.

The well documented radical reductions in local air pollution not only provide a colossal sense of relief for a great number of people with regard to their health, but a much wider sense of wellbeing ("It's positively alpine!": Disbelief in big cities as air pollution falls ). The RSA/Yougov poll revealed that 52% of people have noticed cleaner air. Reports from Beijing of people crying with joy to see blue sky sounds more like a denouement of some claustrophobic science fiction novel.

The key point is that these remarkable changes have been brought about by radical – albeit compulsory - demand reduction. Whilst technology has facilitated the replacements for physical travel (teleconferencing, social and professional teamworking and chat facilities), new technology in transport has had no role in creating the conditions currently experienced by so many people.

The DfT could never have conceived in early 2020 the changed contexts in which their Decarbonising Transport consultation would find itself. So, let's try to pull these slightly surreal opportunities – of learning from the lockdown "experiment" and fertile opportunities for policy shifts – together.

The two lessons from the lockdown that are striking in their absence in existing or emerging policy are (i) the lack of any reference to demand reduction and especially mechanisms for locking-in the demand reduction resulting from the lockdown, and (ii) no implicit or explicit recognition of the real public attitudes and values relating to travel, transport and traffic that have been so overtly exposed recently.

Solutions to Decarbonising Transport's aim to "...make our towns and cities better places to live, help to create new jobs, improve air quality and our health, as well as taking urgent action on climate change", look very different now to the emphases on clean fuels and technology that pervade the consultation document. "...the choices people and businesses make about travel and transport will be considered, including how digital tools could empower consumer choice".

Considering people's lockdown experiences, three appropriate post-lockdown priorities might be identified.

There should (surely?) be a deliberate and explicit focus on demand reduction – especially relating to car use. Recent announcements are a great start in locking-in local walking and cycling so long as (i) there is ultimately sufficient funding and support, (ii) It is not just left to choice by Local Authorities that leads to a patchwork of implementation and (iii) Local Authorities are not permitted to back-slide once the political tides change.

Secondly, pre-lockdown evidence demonstrated the relative importance of middle-distance journeys of 10-25 miles on emissions. Teleconferencing and use of online team services for work (and other uses) and a clearer formalisation of local work hubs needs to be a key part of future "mobility" in lockdown-lesson decarbonisation-focussed policy.

Thirdly, it is an opportunity to properly look at how the home deliveries – and wider "white van" – sector works. If things coming-to-people rather than people going-to-things is here to stay, then consolidation, local drop-off and pick-up points and appropriate delivery speeds need to become norms; what is the carbon sense of being able to order 6 items of clothing on next day delivery to send five back, and will people really want to see their neighbourhoods cluttered with traffic again for this after lockdown?

The DfT's Future of Transport Regulatory Review call for evidence is a welcome opportunity to consider the breadth of problems of regulation whether this is outdated regulation creating mode siloes or the profound problems of bus deregulation. How might the lockdown experience shine a light on these issues? Maybe we could get back to prioritising focus on the barriers to good, affordable services existing and core integration? Then the promises of MaaS might have some – and better – services to integrate.

In the medium term, the challenges of social distancing on mass transit may push people to use more shared modes and micro-mobility, but will people be reassured about cleaning regimes? Let us hope that these problems are transient so that emerging – and resultant – policy and investment is for better services, not reactive.

No-one would have chosen it, but the lockdown is a big social experiment. The cries for post-lockdown economic reconstruction are already getting louder. The risk will be the headlong rush to rebuild the shattered economy in the same way that it existed before, and with it reversion to (or worse) pre-lockdown congestion. This doesn't have to be the case. Putting resources and effort into understanding how to capture the economic benefits of a low travel demand mobility system could lead to prosperity and better-quality places, lives and significantly reduced emissions – as suggested by Milan's mayor. These ideas aren't new, but never has there been a better opportunity to realise them.

Part of the uniqueness of these times is that we have time to reflect, discuss, consider and test ideas about what could happen as life opens up again. As “decide and provide” was (thankfully) elbowing out “predict and provide” in transport policy, it’s time to decide what sort of mobility landscapes we really want.

Dr. Alistair Kirkbride

Alistair Kirkbride is a freelance researcher working on demand management with particular interest in emissions reduction, quality of life & place, rural areas and leisure travel.

[alistair@gridsquare.co.uk](mailto:alistair@gridsquare.co.uk)

## **Lessons from Overseas and the Virus**

*John Whitelegg*

We have known for many years that there is a very severe flaw at the heart of UK transport policy at all levels of government. Setting priorities and budgets is never based on joined up thinking about improving public health, improving air quality, reducing damaging greenhouse gases and making sure that all income groups and localities get a fair share of that spending.

The past has never been a smart basis for planning the future and the reluctance of UK politicians and transport consultants to engage with smarter ways of thinking e.g. backcasting, makes transport a text book example of very expensive, poor value for money, non-sustainable, carbon generating, flawed thinking.

Backcasting (European Commission, 2008) ) requires us to specify the kind of future we would like to see in place, followed by the deployment of an evidence-based methodology for taking us from “now” to that desirable future.

The virus pandemic has revealed some of the elements of a possible future that is desirable, healthy, socially just, carbon reducing, affordable and attractive. This is not to diminish the appalling nature of the disruption to ordinary life and the damage to local economies but it does trigger the thought that a different future might be possible. We can have our cake and eat it. We can have a successful, vibrant urban economy like Oslo based on its car-free city policy. We can have one of the most successful city regional economies in Europe if we follow the example of Freiburg-im-Breisgau in southern Germany and achieve reductions in car traffic and increases in cycling that we can only dream about in the UK.

The challenge for all of us now, but especially for politicians still embedded in a 1960s world of big infrastructure (more roads, HS2, more airport capacity) is to transform mindsets and thinking so that we can capture the quieter roads and improved air quality we have seen in recent weeks and link this to the Freiburg ap-

proach to creating a vibrant local economy and a zero carbon future? Why would we not want to do that?

A 2006 project examined the Swedish road safety policy known as "Vision Zero" and showed that it is possible to have zero deaths and zero serious injuries in the road traffic environment (Stockholm Environment Institute, 2006). A key part of the backcasting work that went into this report was to show the importance of reducing traffic levels and reducing speeds if we want to eliminate the multiple tragedies of death and injuries caused by road crashes. Covid-19 has reduced traffic levels and is reported as increasing cycling so we now have practical experience of what life could be like if we adopted the proven interventions that combine Swedish Vision Zero with Freiburg's highly attractive integrated public transport and Oslo's car-free city plan. We can begin to visualise the possibility that Manchester's 2% of trips every day by bike could be increased to 15% (Berlin) or 28% (Freiburg-im-Breisgau) and deliver a strong economic performance at the same time.

The UK is still dominated by a road building fetish and this is fed by the government's £27 billion spending commitment on projects that are not evidence-based. They do not generate local economic gains and do not reduce congestion. The Covid-19 experience has taken us all into the reality and practicality of substitution of Information and Communications Technology (ICT) for physical travel and we now know that it is possible to function at much reduced levels of physical movement and much higher levels of teleconferencing.

We have known for some time that £107 billion on HS2 is a huge failure of public policy because it has never been subjected to a robust test of option building and testing. We need to grasp the experience of virtual meetings and switch the whole HS2 spending into world best broadband, internet connectivity and linking every urban and rural location to high speed reliable internet connectivity.

The £107 billion cost of HS2 provides ample head room to fund high speed/high quality broadband and internet and the

kind of electrified railway that serves urban and rural areas in Switzerland so well and bring about a transformation of rural bus services as recommended in a recent Foundation for Integrated Transport (2019) report.

Recent examples of cancelled or stalled road building projects e.g. the Hereford bypass and the M4 relief road in South Wales have shown pre-Covid glimmers of new ways of thinking about transport and mobility so we can change the way we think. In Hereford a new batch of politicians heavily supported by a spirited and intelligent campaign by Herefordshire CPRE has triggered a formal process of designing alternatives to the bypass that will be far more successful than a new road in delivering carbon neutrality and reducing congestion. A similar process is under way in Wales as a result of the cancellation of the M4 relief road by the Welsh Government.

The Covid-19 experience has been very unpleasant for many people and cannot in itself justify a new direction in thinking and spending in transport and mobility. Equally it is not smart to ignore some of the things we have seen in recent weeks and ask "could we hang on to these". The reduction in air pollution is well documented and is of great benefit to the many 100s of thousands who suffer from respiratory problems and the likelihood of severe asthma attacks requiring hospitalisation. At a time of great distress about fatalities as a result of Covid-19 it is appropriate to reflect on the 42,000 deaths as a result of air pollution in Britain. Why are 42,000 deaths every year not a crisis?

It is also appropriate to reflect on the public health advantages of more cycling and the evidence that increased levels physical activity reduces obesity, cardio-vascular disease and diabetes (World Health Organisation, 2018). Cardio-vascular disease kills 170,000 people every year. 500 people with diabetes die every week. All 3 diseases are emergencies that trigger no emergency response.

Quiet streets with less traffic and lower speeds increase walking and cycling and increases in physical activity followed by

reductions in non-communicable diseases and improved air quality will reduce the 42,000 number.

The virus crisis will end and the experience of quieter streets, cleaner air and child-friendly cycling conditions is now visible and real. We can now make sure we do not lose this revelation and put in place policies and interventions that make this happen including:

- World best walking and cycling opportunities in car-free cities (Oslo)
- Zero deaths and injuries in road traffic modelled on Vision Zero in Sweden and in line with WHO recommendation that 30mph limits become 20mph where cyclists, pedestrians and vehicles mix, because this encourages more walking and cycling and produces quieter roads and child-friendly environments (WHO, 2020, Stockholm Declaration)
- A huge increase in the quantity and quality of bus services (Foundation for Integrated Transport, 2019) so that our streets are less congested and much quieter as car trips switch to bus
- Buses that never get stuck in congested traffic and provide pollution-free (they will be 100% electric) transport for all social groups
- Highly integrated and reliable public transport (Switzerland) where buses meet trains and vice versa and villages of a few hundred people have an hourly bus service
- A huge increase in high quality, electrified, rail services to connect rural areas with the destinations they need to reach

Finally and unusually there is no funding problem at all with delivering all the above and that is before we take into account the huge additional gains (costs avoided) in public health and reductions in the huge costs of NHS treatment, congestion and carbon. We have £107 billion plus £27 billion in the mobility transformation fund.

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Professor John Whitelegg

Associate, Zentrum fuer Mobilitätskultur in Kassel in Germany. Visiting Professor, School of the Built Environment, Liverpool John Moores University. Editor, World Transport Policy and Practice. Member of the Board of Directors of the Californian organisation "Transportation Choices for Sustainable Communities Research & Policy Institute"

Author of "Mobility: A new urban design and transport planning philosophy for a sustainable future".

John lives in Shrewsbury and is a trustee of the Shrewsbury Civic Society and president of CPRE Herefordshire.

## **Impact of First Mile Access Improvements on Small-Scale Farming in Kenya and Tanzania**

*Robin Workman, John Hine, Andrew Otto, Wynand Bezuidenhout, Peter Njenga*

### **1. Introduction**

The “First Mile” is a reference to the primary segment of transport that includes the first stage in the movement of goods and services in rural areas. In the case of this research the First Mile links farmer’s from their farm to the nearest produce collection or consolidation point, or local market. The term first mile is used figuratively to describe the first movement of produce from the farm, but in reality it can be a few metres up to several kilometres, depending on the remoteness of the farm. The road infrastructure in this first transport segment in many low income countries often consists of earthen access roads or tracks that are inaccessible to four wheeled vehicles. This specific link is also referred to as the ‘Last Mile’ in terms of movement of goods and services from their urban source to their rural destination. For example, in the context of this research fertilisers or pesticides could be produced in urban factories and transported to farms, and the Last Mile could be a bottleneck for the delivery and make the products more expensive for the farmer. Poor road conditions were cited in the World Development Report (World Bank, 2008) as a reason for the high marketing cost of agricultural produce and of inputs such as fertilisers.

Means of transport on the first mile vary from human portage, animal carts, bicycles and motorcycles, to tractors, pickups and small trucks. The transport used is frequently a function of the type and condition of the road. These modes of transport and the condition of the road can have a significant influence on the quality of agricultural products by the time they reach their destination. For delicate and perishable produce, the first mile is a critical part of the journey to market where crop damage and wastage is highly likely to occur due to the poor condition of the road pavement.

### **2. Background**

The issue of ‘First Mile’ has previously been researched by IFRTD, with two pilot studies in Kenya (Njenga et al, 2014) and Tanzania (Njenga et al, 2015). These studies confirmed that the first transport segment from the farm is critically important to the performance of the whole agricultural supply chain. The standard of road and its condition affect the transport costs and influence the profitability and livelihoods of the farmer. The pilot studies referenced above indicated the need for larger studies to confirm the planning and policy implications of these initial findings.

Transport efficiency is also important for reducing post-harvest losses, as highly perishable crops are vulnerable to long periods in the heat. Many crops such as tomatoes, mangoes, soft fruits and bananas can be bruised and lose value through transportation over rough roads or loading/handling at collection points.

Agriculture remains a significant part of many developing economies. In Sub-Saharan Africa the sector employs 62% of the population and generates 27% of the GDP (Livingston et al, 2011). According to the Food and Agriculture Organisation (FAO) (2012), agricultural growth involving smallholders, especially women, is most effective in generating employment for the poor and reducing extreme poverty and hunger.

Rural access and transport services play a central role in enabling agricultural development (Banjo et al, 2012), but when it is not operating efficiently it is the most serious bottleneck (Salami et al, 2010). A recent systematic review of more than 50 worldwide studies showed that the extension of rural road networks has positive effects on the welfare of rural populations. Economic and social gains have been demonstrated and any negative effects were found to be minimal (Hine et al, 2016).

It should however be recognised that there are many other factors that influence agricultural production and the livelihoods of farmers. The research discussed in this paper focuses on transport along the first mile, but has also considered other factors

such as exploitation and the formation of farmer's associations.

As a result of the problems noted above, there is a growing awareness that rural infrastructure, including the location and standards of roads to markets, needs to be planned in conjunction with transport services, in order to reduce transport costs and crop wastage, to gain the maximum advantage for rural farmers, transporters and the ultimate consumers of the produce.

The First Mile is recognised as the part of the chain which has the most problems, is the most expensive when expressed in tonne/km terms and provides the biggest transport constraints to the development of agriculture. These initial movements usually take place on local tracks and may involve non-motorised transport, making them more expensive, for example head loading has been found to be in the order of up to 30 times more expensive per tonne/km than moving goods by truck (Hine et al, 2016).

The dynamics of transport on the first mile and the effect it has on farmers' livelihoods and ultimately on poverty, is not well understood. This research aimed to explore this aspect of the transport chain and make recommendations for practical application and policy consideration.

### 3. Methodology

Research was carried out in Kenya and Tanzania. Two sites were selected in each country, specifically looking at smallholder farmers who were producing for the market, rather than large-scale farms. The sites selected had similar challenges that small-scale farmers experience in getting agricultural produce from the farms to the market.

In Kenya the sites were in Meru County and Machakos County, with both having French beans as the main crop. Meru County has a mix of good soils and favourable climatic conditions. Machakos is semi-arid, but good soils allow irrigated agriculture as well as drought resistant crops. French beans are largely grown as an export crop and require high market compliance

standards. They need to be transported as quickly as possible to collection centres and cooled if they are not transported on to market immediately.

In Meru the available access roads were washed out as a consequence of inadequate design and are no longer accessible to vehicles. Manual transport, such as headloading and backloading, is prevalent on these roads, but is expensive (Hine et al, 2016). In Machakos the access roads are generally in reasonable condition, with some variation depending on the season. A combination of animal carts, motorcycles/bicycles, small trucks, pickups, wheelbarrows and headloading are used for transporting the crops.

In Tanzania the study was carried out in Matola and Madeke districts, both in the Southern Highlands. In Matola the main crop is potatoes, which suits the high altitude and cooler conditions. In Madeke pineapples are grown, which thrive at a slightly lower altitude. This is a hilly area with temperate climate for most of the year.

In Matola the farm access roads are mainly of earthen construction with minimal design. The surface is vulnerable to rainfall and the roads quickly become impassable during the rainy season. The situation in Madeke is similar. Both areas lack formal collection points, so farmers bring their produce to the main road for collection. Transport is a combination of ox carts, motorcycles, animal carts and headloading to the roadside collection points.

The study investigated several issues, including road condition, farm production, transport services, gender and the potential cost benefit analysis of extending motorable roads closer to the farm.

It was important to determine the condition of the roads, so that any crop damage could be related back to the suitability of the infrastructure. Condition surveys were carried out on all the study roads using a variety of means such as:

- Traditional visual surveys using a drive-through methodology.
- DashCam videos of the roads, assessed in the office by the project engineer.

- Road roughness was measured in terms of International Roughness Index (IRI).

Farm production and transport services data was collected using specifically designed and tested survey procedures, with a combination of quantitative and qualitative approaches (Table 1). Quantitative data was collected using household questionnaires for farmers, transport service operators, and market / collection point feedback. Having identified and mapped the survey area a cluster sampling approach was employed. This was developed by the project staff and survey managers in liaison with local key informants, and implemented by the enumerators. The survey procedure ensured that, small-holder farmers with good accessibility, and poor accessibility, were both surveyed. An equal balance of men and women were invited to participate in the focus group dis

cussions. The market traders and transporters were recruited from the transport routes, collection points and local markets used by the farmers.

The questionnaires captured information such as crops grown, quality and price, means of transport, costs and conditions of accessibility in the first mile. More than 700 questionnaires were completed, along with nine key informant interviews and five focus group discussions.

#### 4. Findings

Production and net income data for Kenya and Tanzania are shown in Tables 2 and 3<sup>1</sup>. In both research locations in Kenya the farm sizes were relatively small. Despite their higher yields, farmers in Meru were at a considerable disadvantage because the prices they received, per kg, were around

Survey instruments	Kenya		Tanzania		Total
	Meru	Machakos	Matola	Madeke	
Farmer's Questionnaire	126	129	132	139	526
Transporter's Questionnaire	35	35	90	26	186
Market, seller / farmer's produce data Questionnaire	4		10		14
Collection point / market general data Questionnaire	5		4		9
Key informant interviews	6		3		9
Focus Group Discussions	2		5		5

**Table 1:** Survey Sizes and Survey Procedures Used, Showing the Number of Responses for Each Survey Instrument

	Area farmed in Acres	Yield kg	Yield/ acre kg/acre	Price received US cents/kg	Net income US\$	% of harvest spoiled	%of harvest sold as 2nd quality or spoiled
Machakos							
Mean	1.2	1,350	1,297	70	366	9%	9%
Median	1.0	700	800	60	268		
Meru							
Mean	0.4	1,005	3,596	34	171	3%	4%
Median	0.25	900	2,725	30	144		

**Table 2:** Production and Income of Farms, for French Beans in Machakos and Meru areas of Kenya

1. Note rates of exchange used are: US\$1 = 100 Kenya Shillings (KSh) = 2245 Tanzania Shillings (TSh)



half of those in Machakos. There was only one commercial buyer for export in Meru, whereas there were several in Machakos.

Farms in Tanzania were significantly larger (see mean area farmed in Tables 2 and 3), and incomes higher, although crop spoilage and selling at below 'best quality' was much higher compared with Kenya. 'Best quality' is the crop that demands the highest price, but the assessments of crop quality in these locations are largely subjective. Second quality is a crop that demands a lower price than best quality, but the scale is not well defined.

Data on the modes of transport and transport costs for the first-mile are presented in Tables 4 and 5 for Kenya and Tanzania respectively. Due to the hilly terrain and lack of suitable roads and tracks in both Meru and Madeke, head/back loading was by far the dominant means of first mile transport. In contrast, a range of modes could be used in both Machakos and Matola. The loads reported in the tables were for a consignment, and not necessarily the loads carried in one trip (It is unlikely that loads of 50 kg or 90 kg would be carried by a porter on one trip).

	Area farmed in Acres	Yield kg	Yield/acre kg/acre	Price received US cents/kg	Net income US\$	% of harvest spoiled	% of harvest sold as 2nd quality or spoiled
Matola/Potatoes							
Mean	1.9	8,093	3,997	13	631	24%	5%
Median	2	4,350	3,600	13	294		
Madeke/Pineapples							
Mean	4.4	59,073	15,452	10	4,741	32%	22%
Median	3	30,870	12,000	9	1,939		

**Table 3:** Production and Income of Farms, Potatoes and Pineapples in Matola and Madeke areas of Tanzania

	Machakos				Meru
	Head/ back load	Motor-cycle	Donkey cart	Donkey	Head/back load
Observations	50	23	11	7	82
Mean Load, kg	52.8	141.3	231.3	112.5	65
Mean Distance, km	1.43	1.8	1.35	2.2	1.53
Mean US cents /kg	1.49	1.14	0.74	1.2	1.11
Mean US cents /kg-km	2.03	1.39	0.65	0.63	0.95

**Table 4:** Types of First Mile Transport for Green Beans in Kenya

	Madeke, Pineapples	Matola, Potatoes			
	Headload	Headload	Motor cycle	Donkey cart	Ox cart
Observations	126	53	34	30	14
Mean Load, kg	37.1	91.9	85.7	101.9	123.4
Mean Distance, km	0.34	0.67	1.44	1.78	2.15
Mean US cents/kg	1.51	0.84	1.04	1.11	1.11
Mean US cents/kg-km	20.9	5.38	1.95	1.79	0.88

**Table 5:** Types of First Mile Transport for Pineapples and Potatoes in Tanzania

Transport data	Potatoes	Pineapples		
	Truck	Truck	Motorcycle	Pickup
Load, kg	10,512	3,505	103	813
Distance, km	582	195	31.5	108
Charge US\$	517.6	177	9.8	66.8
US cents/kg	4.92	5.05	9.5	8.2
US cents/ kg-km	0.0085	0.026	0.3	0.076

**Table 6:** Examples of Longer Distance Transport of Farm Produce in Tanzania

Examples of longer distance transport for Tanzania, to the market and beyond, are given in Table 6. The efficiency and low costs associated with truck transport is very apparent when taking heavier loads and travelling longer distances.

In all the study locations it was found that road condition is too poor for four-wheeled motorised transport services. As can be seen in Table 5, human portering, animal transport and motorcycles are the most common means of transport. Head and back loading are the most expensive means of transport per tonne/km. Depending on its load and trip distance, it was found that a fully loaded truck, on a long distance route, might charge as little as one per cent of the typical costs of human portering, or ten per cent of a motorcycle, when expressed in terms of costs per tonne/km.

The analysis shows that the cost of first mile transport has a considerable impact on the net incomes of the farmers, with more significance in Tanzania (pineapples and potatoes) than Kenya (French beans). Using two different methods of analysis for the Tanzanian data, multiple regres-

sion and simple tabulation of average results, it was estimated that transport costs and spoilage on the first mile, accounted for around 30% to 40% of net farmer incomes. While in Kenya, they accounted for around 10% to 15% of net farmer incomes.

The study also found that the average area farmed by men was significantly larger than that farmed by women. Women's farms tended to be closer to the collection point than for men, but their first mile transport costs were higher, despite using similar modes of transport. Yields per acre were lower for women in three locations, however for Madeke pineapple farming, women achieved 58% higher yields. Overall, in each location women's net incomes were substantially less than for men.

## 5. Cost benefit analysis

In order to test whether it would be economically viable to extend roads closer to the farm, a cost benefit analysis was undertaken. The Madeke pineapple producing area was chosen for this because it had the most perishable crop and accessibility to the farms was low with signifi-

	Less than 0.5 km to collection point	More than 0.5 km to collection point
Number of farmers surveyed	95	36
Average distance to collection point	0.15 km	0.97 km
Total distance of farms to collection point	14.38 km	34.85 km
Average transport charge for head / backloading	1.48 US cents/kg	1.56 US cents/kg
Average revenue per kg of pineapples	10.3 US cents/kg	8.64 US cents/kg
Average crop losses	12.7%	10.7%
Average farm size	4.1 acres	5.66 acres
Average net income per farm	5,880 US\$	4,499 US\$
Average net income per acre	1,425 US\$	1,020 US\$

**Table 7:** Data on Pineapple Farms in Madeke, Tanzania, based on their proximity to the collection point

cant potential for road improvement. The analysis is inevitably tentative because of the uncertainty in predicting how farmers, and the transport and marketing system, will respond to the changes. Therefore a number of assumptions have had to be made.

The area selected produces one third of all pineapples grown in Tanzania. The total length of farm access roads is 16 km, of which only 5 km is accessible all year. The data has been analysed in terms of the distance to collection point, as shown in Table 7.

Most farms are close to the collection point (on average 0.15 km), but 27% are on average 1 km away. Despite the six fold difference in average distance, the head/backloading transport charges only increased by 6% per kg. While at the same time the selling price of pineapples was 16 % less, and the net incomes per acre were 28% less, for the farms closest to the collection points. These results confirm previous regression analysis in this project which showed that farms with higher initial transport costs were negatively correlated with lower incomes. However, the reason for lower farm incomes for remote farms is almost certainly the result of a number of factors in addition to the direct costs of transporting produce.

The Focus Group interviews confirmed that it was the custom for head/backloading charges not to substantially increase with distance, despite the increased effort. One possible explanation of the small difference in transport charges (i.e. 6% difference for a six fold difference in distance) is that the same farm workers did both harvesting and transport and that while nominally they may be paid the same, or little different, for transport (between a near and remotely located farm) effectively the remotely located farm either had to pay more for harvesting and other farm activities, or gained less from the farm labour as a consequence. This would have a knock-on effect of reducing net farm incomes for the remotely located farm as a result.

A set of road maintenance and upgrade interventions were suggested that would enhance accessibility in the area by reha-

bilitating the roads and in some cases reducing gradients to make them accessible to a wider range of vehicles. The interventions are designed to provide year-round basic access, particularly on the 16 km of access roads. These were costed using average local rates for typical road maintenance interventions in the area. A full programme of investment in roads of TSh 1,158.5 M (or US\$ 32,250 per km) was assumed to occur for rehabilitation in 2019. After this, annual routine maintenance of TSh 15 M (or US\$ 420 per km) was assumed with a larger periodic maintenance effort of TSh 129 M (US\$ 3,600 per km) in 2024 and 2029.

It would be reasonable to assume interventions on a scale that would reduce the average distance to an all-season motorable road to 0.5km from the more remote farms, reducing the previous average by 0.5 km from 1.0 km. For transporters to regularly access roads to collect produce there needs to be good all-year round access that the farmers, transporters and wholesalers have confidence in. The decision to base the CBA on a revised distance from farm to accessible road to 0.5 km was based on the fact that this would be a reasonable intervention for the local road organisation to make.

An elasticity was derived as the proportionate change in net incomes per acre divided by a proportionate change in transport charges, i.e.

The elasticity of net income per acre to transport charge

$$= (-0.284/1) / (0.057/1) \\ = - 4.98$$

Hence a 1% decline in transport charges is associated with a 5% increase in farm incomes. However, it should be noted that other factors besides transport costs may also have played a part in reduced incomes of the more remote farmers. For the purposes of the CBA, it is also recognised that part of the predicted rise in farmers' incomes, following any intervention, may also be because of better bargaining power, and so possibly at the expense of the incomes of middlemen, transporters and buyers. It is therefore suggested that

an elasticity of -2.5 is used for evaluation purposes.

Whilst the overall manpower required to transport pineapples from the farm will reduce by 35%, following the existing marketing arrangements overall transport for head/backloading charges will fall by only 2.2%, or US cents 0.032 per kg. At the same time it may be expected that there will also be a small increase in freight charges as the truck has to travel the extra distance to pick up the more remote loads, so overall truck freight charges would increase by US Cents 0.007 per kg. Therefore an overall fall in transport charges of 1.7% combined with an elasticity of -2.5 would, assuming a robust causal relationship, be associated with an overall rise in net incomes of 4.25%.

In the calculation it is assumed that overall incomes will rise by 2% per year in the area (both with and without the investment) as further land is devoted to pineapple farming. It is also assumed that if the interventions take place in 2019, then in 2020 only half the full benefits are assumed to occur, with the main full benefits occurring from 2021 onwards. A fifteen year planning time horizon was used in the analysis.

The results of the Cost Benefit Analysis are shown in Table 8. It can be seen that, according to the calculations the investment is very worthwhile.

Total investment costs:	US\$ 516,000
Net present value:	U\$ 1.37 M
IRR:	47%
Discounted Benefit-Cost ratio <sup>2</sup> :	2.65
(Discount rate 12%)	

**Table 8:** Results of Discounted Benefit-Cost Calculation

<sup>2</sup> If the ratio is above 1 then discounted benefits are greater than discounted costs, and the investment becomes worthwhile. For a BCR of 1 the NPV will be zero and the IRR will be 12%.

## 6. Discussions/Recommendations

The findings and analysis were presented to stakeholders throughout the project. A summary of the main discussions and recommendations is given below:

### 6.1. Extend motorable roads closer to farms:

The results of the research show clearly that the most cost-effective transport on the first mile is by truck. In Tanzania it was estimated that the cost to transport by truck per tonne/km is around one tenth of that by motorcycle and often much less than this compared with head and backloading. To take advantage of truck transport there needs to be both vehicle accessibility and effective load consolidation.

The cost of transport could be reduced and farmers' incomes increased if larger vehicles could be brought closer to the farm. However, trucks can only be used if the access roads are suitable, i.e. if they are wide enough, not too steep and the surface is suitable for heavy vehicles. There would also need to be an effective maintenance regime in place and operational so that reliable access could be guaranteed in all except the most exceptional circumstances.

### 6.2. Introduce or strengthen farmer's associations / cooperatives:

From focus group discussions it is clear that the areas where farmers do not have any type of association, they receive a lower price for their crops. Forming a farmers' association would strengthen the farmers' position and could allow them to negotiate better prices for their produce. The earlier pilot study of First Mile transport of onions in Kenya found that farmers' associations were active in helping to consolidate loads and organise the timing of truck transport to maximum advantage (Njenga et al, 2014).

In addition there could be benefits in lobbying as a cooperative for improved road access. The farmers in Meru expressed a keen interest to become involved in infrastructure provision to their farms; at present they are paying a premium for headloading and backloading their produce to the collection point, but there would be

a significant saving if trucks could ply the access roads.

It would be necessary for the association to liaise closely with the local engineering department, initially to consult over the work necessary to rehabilitate the roads, but also to participate in training on how the roads need to be maintained.

### *6.3. Community participation in road rehabilitation and maintenance:*

There was interest expressed during interactions with local communities to become involved in the provision and maintenance of the road infrastructure to farms. However, they are reluctant to get too involved without technical training. This is however a subject that warrants further investigation as a potentially cost effective and sustainable solution.

Several countries in Africa have a history of using the lengthworker system of maintenance. This usually involves tasks such as clearing drains and culverts, removing debris and filling small depressions and potholes with locally available material.

If a community system were to be used for road maintenance, it could be appropriately managed through a farmer's association. Farmers could use simple farm tools for the works and ox-carts to transport materials. To support farmers a simple manual for spot improvement and maintenance could be prepared and circulated, with the support of local technicians who could impart some basic training, such as the supplement published in the Organic Farmer magazine in Kenya (Beusch et al, 2008).

### *6.4. Adding value at the farm*

In the second Tanzania country workshop there was a suggestion that value could be added at the farm by taking on some simple processing tasks of the produce. In the Madeke area of Tanzania, which predominantly produces pineapples, the government had set up a processing facility to dry pineapples for packaging within the pineapple growing area. Ultimately this did not succeed, but it would have made sense because of the remoteness and long distances for transport, the poor road conditions and the vulnerability of the crop.

Transport costs of the processed product would ultimately be cheaper because the produce being transported is smaller in volume and lighter in weight.

## **7. Conclusions**

The research has increased understanding of the dynamics of transport on the first mile and the effect it has on farmer's livelihoods and ultimately on poverty reduction. The results have indicated that it is cost effective to upgrade roads from farm to collection point and reduce the first mile distance, in order to minimise transport costs and reduce wastage of crops being transported slowly on poor roads. This information should be disseminated widely so that policy makers have all the information necessary to make decisions that can positively impact on farmer's productivity and food security.

### **Author details:**

Robin Workman, TRL, Nine Mile Ride, Wokingham, Berks, UK: Robin is a principal international consultant, specialising in rural roads in LICs, accessibility and maintenance.

Email:

[rworkman@trl.co.uk](mailto:rworkman@trl.co.uk)

John Hine, Independent, Wokingham, Berks, UK: John is a Transport Economist, specialising in LICs and cost benefit analysis.

Andrew Otto, TRL, Nine Mile Ride, Wokingham, Berks, UK: Andrew is a senior engineer, specialising in pavements, materials and capacity building in LICs.

Wynand Bezuidenhout, Independent, Pretoria, South Africa: Wynand is a Transport Specialist for Sub-Saharan Africa at the European Investment Bank.

Peter Njenga, IFRTD, PO Box 314, 00502 Karen, Nairobi, Kenya: Peter is an Executive Director for IFRTD.

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# **Comparative Analysis of Ridesharing Regulations - A Study on Ridesharing Regulatory Framework of Pakistan**

*Ahmed Ziyad, Zia-Ur-Rehman, Zahara Ba-tool, Ammad Hassan Khan, Hina Saleemi*

## **1.0 Introduction**

In the past decade, the technology-based discoveries and progress in communication and information have resulted in the introduction of new services in the transport sector (Haider et al., 2015). On-demand ridesharing apps, which link the personal car owners with the passengers in nearby localities using GPS position system, have become very common (Alexander and González, 2015). Transport Network Companies such as Uber and Careem have already started providing e-hailing services in many countries.

As defined by the California Public Utilities Commission, Transport Network Companies (TNCs) are organizations providing services of pre-arranged trips using online portals or apps for linking passengers with drivers using their personal vehicles (Koffman, 2016). These TNCs have been known to enter the taxi market without prior approvals from governing regulatory authorities. When brought under the investigation of the regulatory framework, Uber argues that it is not a transportation company rather it is a technology-based company (Mundy, 2018). In many countries, such as the U.S., the majority of the states have developed regulatory frameworks to enable ridesharing (Flores and Rayle, 2017). Without seeking approval from regulatory authorities, in Pakistan, Careem and Uber, two of the most dominant TNCs, entered the taxi industry in 2015 and 2016 respectively (Imtiaz Ali, 2017b). In March 2019, Uber acquired Careem for \$3.1 billion so it started operating under its own name as a separate entity of Uber.

This paper aims to compare the ridesharing regulations of neighboring countries of Pakistan that is Bangladesh, India, China along with developed countries that is Malaysia and New York State. First, a literature review related to similar studies conducted has been discussed. It is followed by research methodology. Then, a comparison of the ridesharing company,

driver, and vehicle-related regulations of the aforementioned countries is carried out. The results section comprises of proposed ridesharing regulations for Pakistan. In the end, the paper is concluded, and future research recommendations have been provided.

## **2.0 Literature Review**

The introduction of ridesharing companies in the taxi market has always evoked local regulators to think of ways and methods to outlaw them or achieve parity with taxicabs (Farren et al., 2016). Since the ridesharing companies consider themselves to be mobile applications rather than being a transportation company, most of these do not obtain permits prior to operation from local authorities (Cetin and Deakin, 2017). These new ridesharing companies have not been welcomed by taxi markets as well. Local taxi and transport companies, in various regions, have fought to completely ban or shut down the TNCs (Flores and Rayle, 2017). This is due to the fact that with the introduction of TNCs, the demand for taxis has reduced (Koffman, 2016). The business model of TNCs such as Uber does not clarify whether to treat it as a transport service or information technology service which makes it difficult to fit into existing regulatory frameworks nationwide (Kozik). With time, efforts were done to introduce new regulatory legislation for TNCs. In the United States, TNCs have been regulated in multiple states such as San Francisco and New York, at the local and municipal level (Board et al., 2016).

The prominent TNCs of Pakistan include Careem, Uber and Shahi Sawari (Anjum, 2017). Careem and Uber entered the ridesharing industry of Pakistan with a gap of a year. Following the pattern adopted by most of the ridesharing companies worldwide, these two TNCs started operating without prior approval from local transport authorities (Kanwal, 2017). In cities of Pakistan like Islamabad, where the majority of public transport is carried out by taxis, Uber and Careem badly disturbed the taxi industry. Following the economic imbalance caused by newly introduced TNCs, local taxi drivers started protesting (Bilal, 2018). There was also a notification issued

from the Local Transport Department of Punjab Province, related to the complete ban of TNCs (Imtiaz Ali, 2017a). Later on, the government officials and TNCs senior officials carried out various meetings for the formulation of a new regulatory framework for ridesharing vehicles. However, until now, no steps have been taken at the provincial level, which may indicate the practical implication of regulations for the TNCs.

In the past, very few researchers have done an effort to compare ride-hailing regulations of different countries. A case-specific policy analysis was carried out by the International Transport Forum which compared the ridesharing regulations of Portugal with international ridesharing regulations of countries; United Kingdom, Ireland, The Netherlands, France, Germany, and Bulgaria (Forum, 2016). In 2016, a study on passenger transport by taxi, hire car with driver and ridesharing in the EU, also compared ridesharing regulatory frameworks of all most all EU countries (Frazzani et al., 2016). Based on the comparative analysis and interviews from local authorities' officials, this report provided an in-depth qualitative and quantitative analysis of ridesharing regulations observed across EU countries. Igor Dosen and Helen Rosolen also researched and wrote a research paper on "Uber and Ridesharing" which comprised of the current disputes and legal actions against one of the biggest TNC of the world that is Uber (Dosen and Rosolen, 2016). The countries under consideration comprised of a wide mix from Asia, Europe, and states of America. Later in 2018, the Law Reform Commission of Hong Kong published an essay on the regulation of ridesharing services in Hong-Kong. A comparison of overseas ride-hailing regulatory frameworks of EU Countries, China, Australia, India, States of America and Canada, was presented in it based on which new regulatory recommendations for Hong Kong were made (Priscilla, 2018). In 2017, a study carried out on ridesharing regulations of major American Cities by Transport Research Record, qualitatively analyzed various company-based, vehicle-based and driver-based ridesharing regulations (Beer et al., 2017).

This research extends the ridesharing regulations comparative analysis effort being done at the international level by comparing ridesharing regulations of Bangladesh, India, China, Malaysia and State of New York and proposing policy recommendations for Pakistan based on the formulation of new ridesharing regulatory framework.

### **3.0 Methodology**

In order to analyze the ways in which different countries and states have responded to the advent of on-demand ridesharing companies in their respective jurisdiction, a qualitative comparison of ridesharing regulations of these countries was carried out. The comparative analysis was conducted on the ridesharing regulations extracted from various ordinances and legislative documents that had been placed on the websites of transport departments of respective countries.

The countries chosen for comparison purposes included neighboring countries of Pakistan that is China, India as well as the countries sharing the same demographic characteristics as that of Pakistan that is Bangladesh and Malaysia. A developed state that is State of New York was also selected for incorporating the impact of technologically up-to-date ridesharing regulations. Since, at the time of research, Pakistan did not have its own regulatory framework for ridesharing, therefore its existing taxi/cab regulations were included in the comparative analysis.

For the comparison purpose, the ridesharing regulations of the aforementioned countries were sorted into three categories that is ridesharing company-based regulations, ridesharing vehicle-based regulations, and ridesharing driver-based regulations. The aim was to determine similarities and differences among the on-demand ridesharing regulations of these countries which might assist the government agencies and relevant provincial transport departments of Pakistan to form a basis of ridesharing legislation for regulating ridesharing in the country. This basic regulatory framework was proposed to assist the policymakers in molding existing taxi regulations into ridesharing regulations of Pakistan.



#### 4.0 Categorisation of Regulations

The comparison of regulations was broadly categorized into three types that is ride-sharing company-based regulations, ride-sharing vehicle-based regulations and ride-sharing driver-based regulations, which comprised of regulations imposed on ride-sharing companies, vehicles and drivers respectively. A detailed analysis of the ordinances of these countries showed a high number of regulations. Not all of the regulations were present in every country's legislation, based on which, only the most common regulations were chosen for comparison purposes with the objective to provide readers with more useful results. However, some regulations were also selected for comparison based on their frequent discussion and highlighting in literature such as ride-sharing driver criminal background check as discussed in "Study on passenger transport by taxi, hire car with driver and ride-sharing in the EU" by European Commission (Frazzani et al., 2016) and in a research paper "Uber and Ride-sharing" by Department of Parliamentary Services, Parliament of Victoria (Dosen and Rosolen, 2016)

#### 5.0 Comparison of Regulations on Ridesharing Companies

The regulations comparison of ride-sharing companies comprised of 8 main regulations: (1) Minimum fleet size required, (2) requirement of a company operation license/permit, (3) acts or ordinances to be followed by TNCs, (4) adequate car parking provision, (5) professional trainings of drivers, (6) drivers' fitness check, (7) fare calculation criteria and (8) insurance coverage policy. Table - 1 summarizes the results of comparative analysis of company based ride-sharing regulations. Apart from Malaysia, in all the countries, ride-sharing companies are required to own a certain minimum car fleet size for example 200 in case of India (Conventus Law, 2017, Department of Motor Vehicles, 2017, Ministry of Road Transport and Highways, 2016). In all the countries, company operation license or a permit is required before a ride-sharing company can legally operate in the respective country (China Ministry of Transport, 2016d, China Ministry of Transport, 2016c, China Ministry of Transport, 2016b, China Ministry of Transport, 2016a, Conventus Law, 2017, Department of Motor Vehicles, 2017, Ministry of Road Transport and Highways, 2016, National Highway & Motorway Police, 2000, Punjab Code Government of the Punjab, 1939, Punjab Laws Online, 1965, Punjab Traffic Police, 1969, Road Transport and Highways Division, 2017). In the state of New

Sr #	Regulation/Guideline/Advisory	Pakistan	Bangladesh	India	Malaysia	China	State of the New York
1	Minimum Fleet Size	✓	✓	✓	x	✓	✓
2	Company Operation License Requirement	✓	✓	✓	✓	✓	✓
3	Legislations/Policies for Ride-sharing	x	✓	✓	✓	✓	✓
4	Adequate Parking Requirement	✓	✓	✓	x	✓	✓
5	Drivers' Trainings	x	x	✓	✓	✓	✓
6	Drivers' Fitness Check	x	x	✓	✓	✓	✓
7	Regulated Fare Calculation Criteria	✓	✓	✓	✓	x	✓
8	Insurance Coverage	x	x	✓	✓	✓	✓

**Table1:** Comparison of Company-Based Ride-sharing Regulations

York, a TNC operation license is required. Similarly, in China and Malaysia, Network Appointment Taxi Business License and Intermediation Business License are required (China Ministry of Transport, 2016d, China Ministry of Transport, 2016c, China Ministry of Transport, 2016b, China Ministry of Transport, 2016a, Conventus Law, 2017, Department of Motor Vehicles, 2017). However, in Pakistan, any cab company has to seek a permit from provincial transport authority, before it can operate legally in the country (National Highway & Motorway Police, 2000, Punjab Code Government of the Punjab, 1939, Punjab Laws Online, 1965, Punjab Traffic Police, 1969).

Regarding the third dimension that is acts or ordinances to be followed by the TNCs, every country has its own act(s) which cab companies in Pakistan and ridesharing companies in other countries have to follow. In Bangladesh, ridesharing companies have to follow Ride Sharing Services Policy, 2017, Bangladesh Regional Transport Authority (Road Transport and Highways Division, 2017). In Pakistan, the list of governing acts to be followed by cab companies includes Motor Vehicle Ordinance, Motor Vehicle Rules, Motor Vehicle Act and National Highway Safety Ordinance (Punjab Code Government of the Punjab, 1939, Punjab Laws Online, 1965, Punjab Traffic Police, 1969, Road Transport and Highways Division, 2017). Adequate parking space is a necessary requirement in ridesharing regulations of Bangladesh, India, and China, State of the New York and in taxi regulations of Pakistan (China Ministry of Transport, 2016d, China Ministry of Transport, 2016c, China Ministry of Transport, 2016b, China Ministry of Transport, 2016a, Ministry of Road Transport and Highways, 2016, National Highway & Motorway Police, 2000, Punjab Code Government of the Punjab, 1939, Punjab Laws Online, 1965, Punjab Traffic Police, 1969, Road Transport and Highways Division, 2017). However, regulations of Malaysia impose no such restriction on TNCs (Conventus Law, 2017, Department of Motor Vehicles, 2017).

The fifth and sixth dimensions that is professional training of drivers and drivers' fitness check are compulsory in the regulatory framework of India, Malaysia, China

and State of the New York. Bangladesh has no such policy for TNCs (China Ministry of Transport, 2016d, China Ministry of Transport, 2016c, China Ministry of Transport, 2016b, China Ministry of Transport, 2016a, Conventus Law, 2017, Department of Motor Vehicles, 2017, Ministry of Road Transport and Highways, 2016, Road Transport and Highways Division, 2017). An important regulation that is fare calculation criteria varies from country to country. It is strictly regulated with the exception of China. In Bangladesh, India, and Malaysia, the TNCs are bound to calculate fare based on guidelines from relevant transport authorities (Conventus Law, 2017, Ministry of Road Transport and Highways, 2016, Road Transport and Highways Division, 2017). In China, ridesharing companies follow market-adjusted price as a fair criterion whereas, in the State of New York, TNCs are allowed to calculate fare based on self-introduced fare calculation criteria (China Ministry of Transport, 2016d, China Ministry of Transport, 2016c, China Ministry of Transport, 2016b, China Ministry of Transport, 2016a, Department of Motor Vehicles, 2017). In Pakistan, cabs have to strictly follow fares as defined by provincial transport authority (National Highway & Motorway Police, 2000, Punjab Code Government of the Punjab, 1939, Punjab Laws Online, 1965, Punjab Traffic Police, 1969). The last regulation in comparison is of insurance policy for drivers, passengers, and vehicles. The legislation of the State of New York and Malaysia regulate TNCs for providing insurance coverage for drivers, passengers, and ridesharing vehicles whereas China's regulatory framework imposes insurance coverage for drivers and passengers only (China Ministry of Transport, 2016d, China Ministry of Transport, 2016c, China Ministry of Transport, 2016b, China Ministry of Transport, 2016a, Conventus Law, 2017, Department of Motor Vehicles, 2017). Ridesharing regulations of India and Bangladesh does not have any clause related to insurance policy (Conventus Law, 2017, Ministry of Road Transport and Highways, 2016).

## **6.0 Comparison of REgulations on Ridesharing Vehicles**

Following the regulations for TNCs, there were regulations for vehicles as well in all

countries under consideration. Since there was no separate legislation or act for ride-sharing in Pakistan so standard legislation related to the taxi industry of Pakistan, was used for comparison purpose. The results of the comparison are summed up in Table – 2. The comparison shows that in all the countries, there is a basic requirement of vehicle fitness certificate (China Ministry of Transport, 2016d, China Ministry of Transport, 2016c, China Ministry of Transport, 2016b, China Ministry of Transport, 2016a, Conventus Law, 2017, Department of Motor Vehicles, 2017, Ministry of Road Transport and Highways, 2016, National Highway & Motorway Police, 2000, Punjab Code Government of the Punjab, 1939, Punjab Laws Online, 1965, Punjab Traffic Police, 1969, Road Transport and High-

ways Division, 2017). Based on the engine capacity of vehicles, only the Indian ridesharing policy specifies it as to be at least 750 cc (Ministry of Road Transport and Highways, 2016). The requirement for minimum seating capacity varies from country to country. The numbers for Pakistan, India, Malaysia, China and State of New York are five, seven, eleven, seven and seven respectively whereas there is no such requirement imposed by Bangladesh Ridesharing Services Policy 2017, as shown in Table - 2. The installation of fare meter is a compulsion, as specified by taxi regulations of Pakistan and ridesharing policies of India, China and State of the New York (China Ministry of Transport, 2016d, China Ministry of Transport, 2016c, China Ministry of Transport, 2016b, China

Sr #	Regulation/Guideline/Advisory	Pakistan	Bangladesh	India	Malaysia	China	State of the New York
1	Requirement for Vehicle Fitness Certificate	✓	✓	✓	✓	✓	✓
2	Minimum Engine Capacity	x	x	✓	x	x	x
3	Seating Capacity Limitation	✓	x	✓	✓	✓	✓
4	Fare Meter	✓	x	✓	x	✓	✓
5	"TAXI" sign on vehicle	✓	x	✓	x	✓	x
6	Advertisement Restriction	✓	x	✓	x	✓	✓
7	Mobile Radio or Communication Setup	x	x	✓	x	✓	✓
8	First Aid Box	x	x	✓	x	✓	x
9	Vehicle Age Limitation	x	✓	✓	✓	✓	✓
10	Display of Driver Identification	✓	x	✓	x	✓	✓
11	Standard Livery/Decal	✓	x	✓	x	✓	✓
12	Panic Button/Emergency Alert	x	✓	✓	✓	✓	✓
13	Special registration for vehicles	x	✓	x	x	✓	x
14	GPS System	x	x	✓	x	✓	✓
15	Area restriction	✓	✓	✓	x	✓	✓

**Table 2:** Comparison of Vehicle-Based Ridesharing Regulations

Ministry of Transport, 2016a, Ministry of Road Transport and Highways, 2016, National Highway & Motorway Police, 2000, Punjab Code Government of the Punjab, 1939, Punjab Laws Online, 1965, Punjab Traffic Police, 1969). In the same set of countries except for State of the New York, TNC vehicles are bound to display a "TAXI" sign whereas the ridesharing policy of Bangladesh and Malaysia does not specify such requirement (China Ministry of Transport, 2016d, China Ministry of Transport, 2016c, China Ministry of Transport, 2016b, China Ministry of Transport, 2016a, Conventus Law, 2017, Department of Motor Vehicles, 2017, Ministry of Road Transport and Highways, 2016, National Highway & Motorway Police, 2000, Punjab Code Government of the Punjab, 1939, Punjab Laws Online, 1965, Punjab Traffic Police, 1969, Road Transport and Highways Division, 2017).

Pakistan's Motor Vehicle Ordinance and Motor Vehicle Rules prohibit the advertisement of any kind on cabs and public service vehicles. India and China are only countries under consideration which allow ridesharing vehicles to advertise (China Ministry of Transport, 2016d, China Ministry of Transport, 2016c, China Ministry of Transport, 2016b, China Ministry of Transport, 2016a, Ministry of Road Transport and Highways, 2016). State of New York also imposes a restriction of an advertisement on ridesharing vehicles. Presence of mobile radio or similar communication setup is mandatory in India, China and State of the New York (China Ministry of Transport, 2016d, China Ministry of Transport, 2016c, China Ministry of Transport, 2016b, China Ministry of Transport, 2016a, Ministry of Road Transport and Highways, 2016). In vehicle-based regulations, the presence of first aid kit in the vehicles is standardized by India and China only. The requirement of vehicle age varies significantly among the countries in comparison, as shown by Table – 2, however, Pakistan's legislation and policies specify no such vehicle age limit (National Highway & Motorway Police, 2000, Punjab Code Government of the Punjab, 1939, Punjab Laws Online, 1965, Punjab Traffic Police, 1969). Pakistan, India, and China make it essential for taxis and ridesharing vehicles to follow a standard livery, separating such

vehicles from personal use vehicles (China Ministry of Transport, 2016d, China Ministry of Transport, 2016c, China Ministry of Transport, 2016b, China Ministry of Transport, 2016a, Ministry of Road Transport and Highways, 2016, National Highway & Motorway Police, 2000, Punjab Code Government of the Punjab, 1939, Punjab Laws Online, 1965, Punjab Traffic Police, 1969). In the State of New York, ridesharing vehicles are required to display respective TNC decal or badge (Department of Motor Vehicles, 2017).

Panic button or emergency alert button is obligatory in ridesharing policy and legislation of Bangladesh, India, and China (China Ministry of Transport, 2016d, China Ministry of Transport, 2016c, China Ministry of Transport, 2016b, China Ministry of Transport, 2016a, Ministry of Road Transport and Highways, 2016, Road Transport and Highways Division, 2017). In Malaysia and the State of the New York ridesharing regulations, it is compulsory for a TNC app to display an emergency alert function for the passenger (Conventus Law, 2017). The registration of ridesharing vehicle also varies for example in India and Malaysia, TNC vehicles are to be registered as public service vehicles and in China, such vehicles are to be registered in the state as network taxis (China Ministry of Transport, 2016d, China Ministry of Transport, 2016c, China Ministry of Transport, 2016b, China Ministry of Transport, 2016a, Conventus Law, 2017, Ministry of Road Transport and Highways, 2016). India, China and State of the New York also make it essential for ridesharing vehicles to have a properly functioning GPS system. The regulations of other countries do not specify any such compulsion (China Ministry of Transport, 2016d, China Ministry of Transport, 2016c, China Ministry of Transport, 2016b, China Ministry of Transport, 2016a, Conventus Law, 2017, Department of Motor Vehicles, 2017, Ministry of Road Transport and Highways, 2016, National Highway & Motorway Police, 2000, Punjab Code Government of the Punjab, 1939, Punjab Laws Online, 1965, Punjab Traffic Police, 1969, Road Transport and Highways Division, 2017). Except for Malaysia, the taxi regulations of Pakistan and ridesharing regulations of Bangladesh, India, China and State of the New York, imposed an area restriction on

TNC vehicles (China Ministry of Transport, 2016d, China Ministry of Transport, 2016c, China Ministry of Transport, 2016b, China Ministry of Transport, 2016a, Conventus Law, 2017, Department of Motor Vehicles, 2017, Ministry of Road Transport and Highways, 2016, National Highway & Motorway Police, 2000, Punjab Code Government of the Punjab, 1939, Punjab Laws Online, 1965, Punjab Traffic Police, 1969, Road Transport and Highways Division, 2017).

## **7.0 Comparison of REgulations on Ridesharing Drivers**

Although the majority of the driver-related regulations in the context of ridesharing had already been covered in the aforementioned two comparisons, some of the common driver regulations for ridesharing were compared in this section. Table – 3 shows a summary of the comparative analysis of driver-based ridesharing regulations. Different driving license requirements are a part of cab and ridesharing regulations of every country/state under consideration. Pakistan’s governing taxi regulations state that a taxi driver must possess a “motor cab driving license” (National Highway & Motorway Police, 2000, Punjab Code Government of the Punjab, 1939, Punjab Laws Online, 1965, Punjab Traffic Police, 1969). Ridesharing policies and regulations of India imposes a condition that the driver working with TNC must possess a “commercial driving license” (Ministry of Road Transport and Highways, 2016). Regulations of Malaysia, China and State of the New York include a compulsion for TNC drivers to obtain public service vehicle license, network appointment taxi driver license and New York State Driver’s License along with TNC permit, prior to starting ridesharing (China Ministry of Transport, 2016d, China Ministry of Transport, 2016c, China Ministry of Transport, 2016b, China Ministry of Transport, 2016a, Conventus Law, 2017, Department of Motor Vehicles, 2017). The ridesharing policy of Bangladesh is silent on the driver’s licensing requirement (Road Transport and Highways Division, 2017).

It is compulsory for the taxi drivers and TNC drivers to wear company uniform or follow the company’s dress code, in taxi regulations of Pakistan and ridesharing

regulations of India respectively (Ministry of Road Transport and Highways, 2016, National Highway & Motorway Police, 2000, Punjab Code Government of the Punjab, 1939, Punjab Laws Online, 1965, Punjab Traffic Police, 1969). Other countries and State of the New York do not contain any such restriction in respective ride sharing policies or legislation (China Ministry of Transport, 2016d, China Ministry of Transport, 2016c, China Ministry of Transport, 2016b, China Ministry of Transport, 2016a, Conventus Law, 2017, Department of Motor Vehicles, 2017, Road Transport and Highways Division, 2017). Driver’s criminal background check is the only regulations in comparison which is common in all the countries and state, taken into consideration in the comparative analysis (China Ministry of Transport, 2016d, China Ministry of Transport, 2016c, China Ministry of Transport, 2016b, China Ministry of Transport, 2016a, Conventus Law, 2017, Department of Motor Vehicles, 2017, Ministry of Road Transport and Highways, 2016, National Highway & Motorway Police, 2000, Punjab Code Government of the Punjab, 1939, Punjab Laws Online, 1965, Punjab Traffic Police, 1969, Road Transport and Highways Division, 2017). The driver training program is not necessary as per taxi regulations of Pakistan and ridesharing policy of Bangladesh (National Highway & Motorway Police, 2000, Punjab Code Government of the Punjab, 1939, Punjab Laws Online, 1965, Punjab Traffic Police, 1969, Road Transport and Highways Division, 2017). State of New York suggests the TNCs educate and train drivers on their behalf but as such, there is no essential regulation which is to be followed by TNC drivers (Department of Motor Vehicles, 2017). However, the policy framework of India, Malaysia, and China have certain obligations when it comes to initial or repeated training of TNC drivers (China Ministry of Transport, 2016d, China Ministry of Transport, 2016c, China Ministry of Transport, 2016b, China Ministry of Transport, 2016a, Conventus Law, 2017, National Highway & Motorway Police, 2000).

The record of the driver’s fingerprint is mandatory in China and the State of the New York ridesharing regulations (China Ministry of Transport, 2016d, China Minis-

try of Transport, 2016c, China Ministry of Transport, 2016b, China Ministry of Transport, 2016a). Although TNCs do not impose a limitation on their drivers for providing ride sharing services in collaboration with competitor TNCs, still Bangladesh, India, and China restrict TNC drivers to provide services in collaboration with only one TNC (China Ministry of Transport, 2016d, China Ministry of Transport, 2016c, China Ministry of Transport, 2016b, China Ministry of Transport, 2016a, Ministry of Road Transport and Highways, 2016, Road Transport and Highways Division, 2017). The taxi regulations of Pakistan do not impose such a restriction on taxi drivers, nor the ride-sharing regulations of Malaysia and the State of New York (Conventus Law, 2017, Department of Motor Vehicles, 2017, National Highway & Motorway Police, 2000, Punjab Code Government of the Punjab, 1939, Punjab Laws Online, 1965, Punjab Traffic Police, 1969).

## 8.0 Results and Discussion

Regulation of TNCs and the taxi industry, while keeping a level ground, has always been a challenging task for transport authorities. In order to enhance the transportation network, it can be achieved by specifying minimum vehicle standards, driver related regulations, insurance compulsions and maintenance of necessary service quality, for both TNCs and taxi industries (Schneider, 2015). Regulations concerning the taxi industry of Pa-

kistan contain some basic rules which can be found in ridesharing regulations of other countries. The analysis of company regulations, as shown in figure table – 1, shows an in-depth analysis of TNCs regulatory frameworks. The requirement for TNC operational license acts as the entry ticket for TNCs which is not a part of the taxi regulations of Pakistan. Further, driver training and driver fitness check are also not included in it. Although Pakistan’s taxi regulation states the regulated fare calculation criteria, no TNC in Pakistan can be found following it. It can be inferred that not only developed but developing countries also have formulated a strong regulatory framework for ridesharing companies that is India.

It is evident from the table – 2 that Pakistan’s current taxi regulations are not sufficient for regulating the modern TNCs as it does not comprise of essential ridesharing vehicular regulations found in ridesharing legislation of other countries. TNCs in Pakistan have been observed violating the existing taxi industry regulations of Pakistan. This statement is supported by the fact that no TNC vehicle in Pakistan follows minimum seating capacity restriction, has a fare meter installed in it or displays a “TAXI” sign on it. Ridesharing policies of India and China, are found to provide more detailed regulatory policies for a vehicle involved in ridesharing, as shown in Table – 2. The vehicular ridesharing regulations of Malaysia and Bangladesh are not

Sr #	Regulation/Guideline/ Advisory	Pakistan	Bangladesh	India	Malaysia	China	State of the New York
1	Special Driving License Requirement	x	x	x	✓	✓	✓
2	Uniform/Dress Code Requirement	✓	x	✓	x	x	x
3	Driver Criminal Background Check	✓	✓	✓	✓	✓	✓
4	Compulsion for Driver Training	x	x	✓	✓	✓	✓
5	Driver Fingerprint Record	x	x	x	x	✓	✓
6	Restriction to work for single TNC	x	✓	✓	x	✓	x

**Table 3:** Comparison of Driver-Based Ridesharing Regulations

very detailed as compared to that of China and India since these are recently introduced. Table – 3 is a clear indication of the fact that there are almost no driver related regulations for the taxi industry in Pakistan. As in the case of other regulations, India and China, lead the comparison by providing more detailed driver related regulations for ridesharing drivers, as shown in Table – 3. In the comparison, the State of New York’s TNC regulatory framework, do not tend to lead any comparison since every city in the state has its own strict regulatory framework intact as well.

Taking benefit of today’s modern information technology features, TNCs like Uber have become successful in providing ride-sharing services to the riders which are easy to use. The instant connection between the driver and the passenger saves the time of both drivers and passengers (Hou Yuquan, 2015). Though the entry of TNCs in taxi industries across the world has provided numerous advantages in public transportation systems, however, there is no guarantee that the existing and conventional public transportation systems will continue to work “perfectly” with the newly introduced ridesharing platforms. The formulation of monopolies, the absence of asymmetric information for choosing various services from and the introduction of external effects such as air and noise pollution, are some of the important factors which show the need for regulating TNCs (Rienstra et al., 2015).

In Pakistan, TNCs have been known to be working without the approval of local authorities. The traveling receipts obtained from TNCs, show that drivers are exempted from the income tax payments (Yaseen, 2017). Also, vehicles being used for TNCs, are not required to pay tax or fee for being used on roads for public service purposes. The absence of payments in the form of income tax from the drivers and registration or operational tax from TNC vehicles must have a massive impact on the revenue of the local transport departments.

In literature, broad categories of regulations on taxi industry comprise of price regulation, capacity regulation, and quality regulation. In a study carried out on ridesharing regulations of different States

of America, the same regulation categories were highlighted that is entry based licensing of TNCs, the imposition of the driver and vehicle-related regulations ensuring the quality of services and chalking of responsibilities of TNCs such as insurance, etc. (Amin and Esma, 2016). International Transport Forum also carried out a case-specific policy analysis for-hire passenger transport and identified a generic set of regulations for ridesharing platforms. It comprises of regulations based on economic, social and administrative factors (Forum, 2016).

As already discussed before, there are no existing taxi or cab regulations of Pakistan which may be imposed on ridesharing companies and vehicles as well (National Highway & Motorway Police, 2000, Punjab Code Government of the Punjab, 1939, Punjab Laws Online, 1965, Punjab Traffic Police, 1969). There are several acts and bylaws in general, which comprises of various clauses related to taxi or cab services. Keeping in view the literature and the comparative analysis of this paper, the proposed ridesharing regulations, as shown in Table – 4, may help the policymakers in forming the basic regulatory framework for making the ridesharing policy of Pakistan.

The comparative analysis of ridesharing regulations in this paper shows that some of the taxi-related regulations found in the legislation of Pakistan are being used as ridesharing regulations in other countries such as driver criminal background check and the requirement for vehicle fitness certificate. The ridesharing regulations proposed in Table – 4 are formulated by considering the most commonly used ride-sharing regulations among other countries included in the comparative analysis. The objective behind the proposed regulatory framework for ridesharing services is not to restrict or unwelcome the new ridesharing companies from operating in Pakistan, rather the aim is to ensure the better mobility, safety, and welfare of both the drivers and consumers by providing a sustainable transportation service. Regulators must also consider the fact that the introduction of newly developed mobile-based ridesharing apps is necessary for competing in the long-term race of integrated

Company-Based Regulations
<ul style="list-style-type: none"> <li>• Restriction on the total number of licensed operators</li> <li>• Criteria for the qualification of company operational license</li> <li>• Specification of driver/contractor rules</li> <li>• Appropriate criteria for fare calculation</li> <li>• Definition of maximum and minimum tariff limits</li> <li>• Discrete fare criteria for airport passengers</li> <li>• Application of labor laws/rules for limiting driver working hours</li> <li>• System for getting feedback from passengers</li> <li>• The compulsion for ridesharing vehicle stands, pick up and drop off points.</li> <li>• Insurance regulations for drivers, passengers and vehicles.</li> </ul>
Vehicle-Based Regulations
<ul style="list-style-type: none"> <li>• Special registration of ridesharing vehicles</li> <li>• Vehicle fitness certificate</li> <li>• Minimum engine and seating capacity</li> <li>• First aid box</li> <li>• Vehicle age restriction (based on mileage or years of use)</li> <li>• Display of driver identification and TNC decal on the vehicle</li> <li>• Emergency/panic button inside ridesharing vehicles</li> <li>• Area restriction on TNC vehicles</li> </ul>
Driver-Based regulations
<ul style="list-style-type: none"> <li>• Special driving license requirement</li> <li>• Driver criminal background check</li> <li>• Mandatory TNC driver training</li> <li>• Restriction to work for single TNC at a time</li> </ul>

**Table 4:** Proposed Ridesharing Regulatory Framework for Pakistan

transportation system in the near future. A better approach would be to introduce common ridesharing legislation for both taxi industry and ridesharing companies operating in Pakistan so that not only coherent legislation is implemented for both conventional and modern transportation systems but the conflicts among these two, hindering the public services, can also be avoided.

## 9.0 Conclusions

Innovations in information technology have changed the way drivers and passengers in the taxi industry interact. This has been made possible due to the advent of various organizations that are providing services of pre-arranged trips using online portals and apps, known as Transport Network Companies TNCs. With the introduction of ridesharing companies in the existing taxi market, the need for their regulation also emerged. Different countries such as Bangladesh, India, China, Ma-

aysia and states such as State of the New York, reacted by proposing some regulatory policies for newly introduced ridesharing companies.

In Pakistan, ridesharing companies made their debut in recent three years. TNCs like Uber and Careem were highly welcomed and liked in Pakistan based on their economical fares and prompt ridesharing services. At the government level, there was no policy or regulatory framework proposed for the regulation of TNCs. Although there were some notifications and letters published notifying the ban of these services, but no real-time action was taken. In this paper, an effort was done to compare the existing taxi regulations of Pakistan with the ridesharing regulations of different neighboring and developed countries to get a basic idea and later on formulate regulatory ridesharing policy which may assist policymakers in moving forward with the idea of developing proper ridesharing legislation for Pakistan. Since



there was no ridesharing legislation of Pakistan so existing taxi regulations were included in this comparative study to propose ridesharing regulations.

The comparative analysis of ridesharing regulations of countries and taxi regulations of Pakistan presented that based on company regulations, Pakistan's legislation did not contain ridesharing regulations which are common in ridesharing policies and legislation of other countries that is the requirement for TNC operational license and compliance to an approved ridesharing act. As compared to other countries, the majority of the bylaws related to the vehicles are a part of Pakistan's legislation. These include vehicle fitness certificate requirements, seating capacity limitation and area restriction. However, some other necessary vehicle-based regulations that is panic buttons in vehicles and vehicle age limitation, are not a part of the taxi industry legislation of Pakistan. On the same comparison grounds, driver-based regulations of Pakistan do not contain any restriction for drivers to possess a special driving license, a professional TNC driver training, and a restriction to work for a single company at a time, as is the case with ridesharing regulations of other countries.

Keeping in view the most commonly used clauses of ridesharing policies of Bangladesh, India, China, Malaysia and State of the New York, and along with the generic ridesharing regulations, as mentioned in the literature, a basic ridesharing regulatory framework for Pakistan have been proposed. The company-based regulations, to be considered in making ridesharing policy of Pakistan, comprise of requirement of a special TNC operation license, specification of appropriate fare criteria (to balance TNCs with taxi industry), imposition of discrete fare criteria for passengers traveling to or from airports and implementation of insurance coverage of vehicles, passengers and drivers involved in ridesharing.

The vehicle-based regulations include special registration of TNC vehicles, the restriction on vehicle minimum engine capacity, minimum seating capacity, and age. Area operational restriction proposed in vehicle-based regulations will assist in

reducing congestion in cities' transportation network. The driver-based proposed regulations include but are not limited to, special driving license for TNCs, driver criminal background check, and a mandatory TNC driver training prior to initiating ridesharing for a single TNC company at a time.

## **10.0 Future Research**

This research was carried out based on the existing ridesharing regulations of neighboring countries and other developed countries/states. The comparative analysis showed the missing or deficient legislative areas in taxi and ridesharing industry of Pakistan; however, it did not include the impact of external factors directly affecting the utilization of TNCs in Pakistan for example, in the city of Lahore, prior to the introduction of ridesharing companies, there were no for-hire passenger taxis. Although buses and rickshaws existed but vehicles designated as "taxis" did not exist on roads. In the capital city of the same country that is Islamabad, since the start, conventional taxis had been operating as three-wheeled transportation vehicles were not allowed. In this scenario, it becomes important to know the opinion of the public as well as the existing taxi owners, before formulating legislation. Doing so will ensure that the rights of rival transportation service providers are not violated in developing ridesharing legislation for Pakistan. Detailed interviews and surveys are recommended, for future research, to get an idea of the opinion of the general public for fine-tuning the proposed regulatory framework.

Since TNCs operate through mobile-based apps and drivers as well as passengers are required to provide detailed personal information to ridesharing companies before taking benefit of their services, data sharing in this format raises alarming concerns related to data privacy (Hallgren et al., 2017). It is recommended that along with the real-time ridesharing regulations, the information technology-based regulations involving the security and privacy of user data and its theft preventing, may also be derived after having a detailed overview of such regulations of other countries. For future research, it is recommended that a

detailed analysis of taxi industry legislation, be carried out and legislation similar to the proposed ridesharing regulations, be eliminated, so as to eradicate the confusion for existing and newly introduced taxi and transport network companies.

Author details:

Ahmed Ziyad (Corresponding Author)  
Department of Transportation Engineering & Management  
University of Engineering & Technology,  
Lahore, Pakistan, 54890

Email:

[ziyad.chaudhry@gmail.com](mailto:ziyad.chaudhry@gmail.com)

Zia-Ur-Rehman, Ph.D.,  
Department of Transportation Engineering & Management  
University of Engineering & Technology,  
Lahore, Pakistan, 54890

Zahara Batool, Ph.D.,  
Institute of Transport Studies  
University of Leeds, Leeds LS2 9JT, UK

Ammad Hassan Khan, Ph.D.,  
Department of Transportation Engineering & Management  
University of Engineering & Technology,  
Lahore, Pakistan, 54890

Hina Saleemi,  
Department of Transportation Engineering & Management  
University of Engineering & Technology,  
Lahore, Pakistan, 54890

### **Acknowledgements**

The authors acknowledge the cooperation and assistance of ridesharing companies' staff members for providing up to date information related to the research subject. The authors also thank transport department officials for contributing towards the existing conditions of ridesharing regulations of Pakistan. Lastly, the authors would like to thank all the personals who assistence throughout this comparative study and research.

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TEST NUMBER	YEAR DATE	TITLE	CLIENT	OBTAIN FROM	PRICE - £
01	1973	Environmental effects of European intercity transport	OECD	TEST	3.50
02	1974	Maplin Spur Railway : alternative routes	Defenders of Essex	n/a	
03	1974	Pedestrian movement in Brockley	TRRL	TEST	2.00
04	1974	Energy and other consequences of freight transfer to rail	OECD	n/a	
05	1975	Implementing the Dykes' Act : 3 examples - ISBN 0 905545 01 X	DoE	DoE	
06	1975	Environmental effects of traffic restraint in Singapore	World Bank	Sold Out	
07	1976	Improving the pedestrian's environment	DoE	TEST	5.0 (vol)
08	1976	Improving the pedestrian's environment	DoE	TEST	
09	1976	Improving the pedestrian's environment	DoE	TEST	
10	1976	Improving the pedestrian's environment	DoE	TEST	
11	1976	The Pedestrian : planning and research. ( Book ) by John Elkington, Roger McGlynn and John Roberts ISBN 0 905545 01 X	TEST	Sold Out	
12	1976	Traffic policies in Singapore : Pedestrian activities and problems	World Bank	n/a	
13	1976	Traffic policies in Singapore : Pedestrian activities and problems	World Bank	n/a	
14	1976	Ismailia Master Plan Vol. 13: Environmental Factors	n/a	n/a	n/a
15	1976	The European market for sliding doors and operating gear for bus and rail systems	PLC Engineering Ltd.	n/a	

16	1976	Government consultation document on transport policy : paper community costs of freight movement	T2000	T2000	
17	1976	Driving test failures analysis	TRRL	n/a	
18	1976	Driving instruction analysis	TRRL	n/a	
19	1977	Survey of Ecologists in local authorities	New Scientist	Of 3 articles	0.80
20	1977	The impact of traffic policies in Singapore	TEST	Offprints of 3 articles	0.80
21	1977	Sutton High Street : Stage 1	London Transport	n/a	
22	1978	Europe 1990 : Patterns of Environmental Protection and Planning	Hudson Research	Hudson Research	
23	1978	Sutton High Street Study : Stage 2	London Transport	n/a	
24	1978	A review of studies of sport and recreation in the inner city, by John Roberts ISBN 0 90097969 0	Sports Council	Sports Council	
25	1978	Financing and management of urban pollution control services	OECD	n/a	
26	1978	as above : case studies of the Greater London Council and LB Hammersmith	OECD	n/a	
27	1978	Financing and management of urban pollution control services	OECD	n/a	
28	1978	Impact of tourism on the environment of the Alvor Estuary – Portugal	OECD	n/a	
29	1978	Carrying capacity as an indicator of tourism impact	OECD	n/a	
30	1978	Outflows from major conurbations	OECD	n/a	
31	1978	Traffic limitation in tourism sub-regions and centres	OECD	n/a	

32	1979	Rural decision-making : Dorset pilot study	DoF	University College, London	
<b>TEST NUMBER</b>	<b>YEAR DATE</b>	<b>TITLE</b>	<b>CLIENT</b>	<b>OBTAIN FROM</b>	<b>PRICE - £</b>
33	1979	Bus routeing and pedestrianisation in Kingston	London Transport	n/a	
34	1979	Independencia New Town, Venezuela : feasibility study	Yorke, Rosenberg & Mardall	Yorke, Rosenberg & Mardall	
35	1979	The management of leisure : study for the Yates Committee	DoE / DART	n/a	
36	1979	The commercial sector in leisure, by John Roberts ISBN 0 906 577 04 7	Sports Council / SSRC	SC / ESRC	1.50
37	1980	Sutton High Street - a study of pedestrianisation ISBN 0 85329 108 X	London Transport	London Transport	5.50
38	1980	Innovation and efficiency in countryside recreation provisionm - state-of-the-art review presented to 1980 Conference of the Countryside Recreation Research Advisory Group Lancaster University 16th - 18th September	CRRAG	TEST	2.50
39	1981	Buses and Pedestrian areas ISBN 0 85329 110 1	London Transport	London Transport	3.50
40	1981	Pedestrian precincts in Britain, by John Roberts ISBN 0 905545 02 8	TEST	TEST	6.75
41	1981	Statistical supplement to above ISBN 0 905545 03 6 ( xeroxed to order )	TEST	TEST	10.00
42	1981	The environment of family leisure - paper presented to the IX Seminar of the International Council of Sport and Physical Education : Sport, Leisure and the Family, Brugge, Belgium	ICSPE	TEST	4.50

			9th - 13th September			
43	1981		<b>Park Now, Pay Later? A study of offensive parking in Central London ISBN 0 905545 04 4</b>	<b>TEST</b>	<b>TEST</b>	<b>5.00</b>
44	1982		Urban walking provision : paper presented to Seminar at Strathclyde University 1st - 2nd July 1982 ' World Developments in Pedestrian Planning '	Strathclyde University	TEST	1.50
45	1982		Urban walking provision : three nations compared - paper to PTRC Summer Annual Meeting Warwick University, 12th July 1982	<b>PTRC</b>	<b>PTRC</b>	
46	1983		Commercial responses to pedestrianisation - paper to PTRC Seminars. London, 25th March 1983 / 20th March 1984, ' Issues in Pedestrianisation Schemes '	<b>PTRC</b>	<b>PTRC</b>	
47	1983		Robbing Sir Peter to pay Serpell - full paper on which Guardian article ' Why should the train be allowed to go on taking the strain ' ( Guardian 2nd June 1983 ) was based	<b>TEST</b>	<b>TEST</b>	<b>0.75</b>
48	1983		The OECD's International Study of tourism impact on the environment. Paper to University of Bradford seminar, 29th June 1983	University of Bradford	TEST	0.75
49	1983		<b>Investing in British Rail ISBN 0 907347 03 7</b>	<b>Transport 2000</b>	<b>T2000</b>	<b>5.00</b>
50	1983		Company Cars : Interim Report ISBN 0 905545 05 2	LATA	LATA/TEST	2.00
51	1984		<b>BR : A European Railway Vol 1, ISBN 0 907347 05 3</b>	<b>Transport 2000</b>	<b>T2000/TEST</b>	<b>5.00</b>
52	1984		do. Vol 2 ISBN 0 907347 07 X	do	do	do
53	1984		<b>Playing at Work - offprint of paper in Leisure Studies Vol 1, Number 2</b>	Sports Council	TEST	0.75



54	1984			Sports Council	TEST	1.00
55	1984	Playing with Money - paper for Societe et Loisir on Commercial Sector in Leisure		Sports Council	TEST	1.00
56	1984	DIY Outlets - In or Out of Town? Paper for PTRC Summer Annual Meeting - Brighton, July		London Transport	TEST	1.00

TEST NUMBER	YEAR DATE	TITLE	CLIENT	OBTAIN FROM	PRICE - £
57	1984	Large DIY Stores - project report - may be published by LRT 1985 / ISBN 0 905545 08 7	London Transport	London Transport or TEST	?
58	1984	The Company Car Factor / ISBN 0 905545 06 0	LATA	TEST	5.00
59	1984	After The Bus - social effects of rural bus service withdrawal / ISBN 0 905545 07 9	Friends of the Earth	TEST	Sold Out
60	1984	The Dornoch Firth Rail Bridge	RDS Scotland	n/a	Sold Out
61	1984	Impact of Government Policy on US National Parks	Churchill Trust	TEST	1.50
62	1984	London - the most Civilised city ? 4 - page leaflet	CILT	TEST	0.25
63	1985	Car Passenger Travel : An alternative to Public Transport ?	TRRL	n/a	
64	1985	The Commercial Sector as a Supplier of Leisure Goods and Services 1979 - 1985	INLOGOV	n/a	
65	1985	The Accessible City : Effects of Traffic Restraint on the Environment and Economy of the City of London / ISBN 0 905545 09 5	CILT	TEST	7.50
66	1985	Retaining the Settle-Carlisle Railway ( provisional title ) for publication, Autumn 1985			

Due to a production error the appendix to Paul Marchant's article in WTPP 26.2 contained some incorrectly formatted elements, the correct version is reproduced below. We apologise for any confusion this may have caused.

## Appendix

A simple example showing the superiority of using a longitudinal design instead of cross-sectional

To show effect of the number exposed to risk in night to day crash ratios: comparing cross-sectional and longitudinal approaches.

An issue of importance in road crash studies is the number, or rate (per unit time) of crashes 'C' adjusted for the number exposed to risk 'F', the flow of traffic. This would seem to be sensible. Then using subscripts 'N' for Night and 'D' for Day, the quantity of interest is no longer  $C_N/C_D$  but becomes  $C_N/C_D / (F_N/F_D) = \frac{C_N F_D}{C_D F_N}$ . However, without measurement of the number exposed to risk both night and day, we cannot know the size of this quantity. The ratio of the number exposed to risk Night to Day may vary considerably between different roads and may well be related to the nature of the road, which in turn may be key to the lighting chosen. Such considerations make any claim that it is the variation of lighting alone which is responsible for the variation of  $C_N/C_D$  crash ratio highly suspect.

Now for a 'Before and After' study (that is a longitudinal approach) where lighting is changed in-between, the quantity of interest for a road is the ratio, before and after, of the above quantity,  $\frac{C_N F_D}{C_D F_N}$ .

Using B to indicate 'Before' and A for 'After' we obtain the relevant quantity, the ratio of ratios.

$$\left[ \frac{C_{NA} F_{DA}}{C_{DA} F_{NA}} \right] / \left[ \frac{C_{NB} F_{DB}}{C_{DB} F_{NB}} \right]$$

A value of less than one would denote a reduction in the night to day crash ratio. A 'statistically significant' value of less than one would be taken as evidence that the change of lighting has been successful in reducing the night to day crash ratio.

Because one might expect the ratio of the night to day numbers exposed to risk to be approximately stable, before and after on a given road, these  $F_N/F_D$  values therefore cancel in above expression. Of course, it would be useful to have accurate measurements of traffic, flow  $F_N$  and  $F_D$ , to put into the above expression. However, in the absence of such information it is reasonable to assume the values for traffic flow will closely cancel in the expression.

The ratio of after to before ratios of night to day crash numbers,  $\frac{C_{NA} C_{DB}}{C_{NB} C_{DA}}$ , in a longitudinal study is therefore likely to be a better indicator of whether new lights have improved or worsened matters as it is much less affected by ignorance of the numbers exposed to risk, as in the case of a cross-sectional study. It is these values,  $\frac{C_{NA} C_{DB}}{C_{NB} C_{DA}}$ , of the after to before ratio of ratios for every road in the study sample, together with their appropriate estimates of uncertainty, that need to be analysed in a longitudinal study.

The argument against a cross-sectional design, as opposed to using a longitudinal one, is the same for any other cause of the number of road crashes that is correlated with lighting (that is, one which is different from night to day numbers exposed to risk).

Therefore, as shown above, longitudinal studies give more trustworthy results when ascertaining what effect road lighting might have on road crashes as it tends to rule out extraneous impacts, as these are likely to remain more-or-less the same at the end as at the beginning.