

Final Report for the Rees Jeffreys Road Fund

The Regulation of Disruptive Innovations: The Case of Dockless Bicycle Hire

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This Final Report provides, firstly, a brief Executive Summary, followed by responses to each of the questions addressed in the original proposal. The third section gives brief details for the outputs so far, with their references, together with information on the project interviews. The interviews were preceded by a review of the primary and secondary sources on dockless bicycle hire and the three case studies.

1. Executive Summary

The innate tensions between innovation and regulation are compounded by the equally delicate balance between national and local government, and with the users of the innovation. In UK transport in recent years, the trend has been to allow innovators the freedom to operate with a regulatory framework that is as light as possible. The principal aim is to allow them to assist in finding solutions to deep-seated and complex urban transport problems. As far as regulation is concerned, national government sets the agenda, but the responsibility for facilitating the delivery of these innovative solutions falls on local government, who can lack the expertise and economic resources to execute the task successfully. The result is that local government can place its faith in private sector innovators with their own commercial objectives and business models, which can contain weaknesses that fatally undermine the attainment of the wider social, environmental, and economic objectives of local authorities. In the case of dockless bicycle hire, these governance and innovator weaknesses have created a regulatory vacuum, where a patchwork of operational codes of conduct has sought to maintain some form of control over the innovators.

Consequently, dockless bicycle hire in the UK has been shaped strongly by its economic and political contexts, which have determined the trajectory and character of the policy and operational processes. Specifically, the business model of the original operators has placed significant constraints on the development of the technological innovation. Dockless bicycle hire has its origins in China, and the two early dominant operators, ofo and Mobike, both adopted a strategy of worldwide expansion at rapid speed, with rides subsidised from their extensive venture capital funds. However, this model proved financially unsustainable, with ofo now withdrawn from the UK and out of business, and Mobike opting to consolidate its position in its existing operational areas.

For their part, the local authorities were largely content to accept the dockless bicycle operators on the basis of being an apparently attractive technological innovation that made no demands on public funds. There were a variety of local regulatory frameworks, together with an accreditation scheme run by CoMoUK, the organisation that represents bicycle hire operators. However, none of these ad hoc frameworks was

legally enforceable, and the government has so far declined to introduce a statutory regulatory framework. Each of the project case studies reflects these economic and political contexts, and we conclude that a national legal regulatory framework is required to enable local authorities to provide greater co-ordination and leadership to the sector. Nevertheless, the constraints imposed by government policies of austerity with regard to local government may limit the resources and expertise available. One other possibility is that the emerging concept of micromobility, that includes docked and dockless bicycle hire, together with electric bicycles and scooters, may provide a fresh context that reshapes the operational and regulatory framework for dockless bicycle hire. The needs and preferences of users is another neglected area in the development of dockless bicycle hire, with little consideration given to consultation with the public, so that frameworks of participatory exchange need to be developed, particularly during the implementation of schemes.

2. Responses to the Original Study Research Questions

a. At what level, e.g. national or local, can dockless bicycle hire regulation be most effective; who should be given these responsibilities; and what detailed character should regulation take, e.g. quantitative, qualitative, environmental controls?

At the heart of the delivery of smart mobility systems, such as dockless bicycle hire, lie the innate tensions between innovation and regulation. These tensions are worked out and compounded by the equally delicate relations between governance levels, and with the users of the innovation. In the UK in recent years, the political, administrative, and regulatory trend has been to generally allow smart mobility innovations the maximum freedom to implement their systems as a means to not only promote economic growth, but also to find solutions to deep-seated and long-standing urban transport problems, such as traffic congestion, and ambient air quality.

If the political and regulatory climate has been set generally by national government, much of the responsibility for actually delivering on transport goals falls on local government. For their part, although they are under pressure to find solutions to complex problems, the urban local authorities can lack the expertise and financial resources to challenge the innovators in a manner that would enable the former to attain wider social and environmental objectives.

The result is that both central and local government place themselves in the hands of private sector innovators who have their own commercial objectives and business models, and can be susceptible to a wide range of problems, including weaknesses in the business models themselves, crises in cash flow, and safety and misuse hazards with the infrastructure. In the case of dockless bicycle hire, these governance and innovator weaknesses have created a regulatory vacuum, where a patchwork of voluntary codes developed by local authorities has sought to maintain some form of control over the innovators.

Consequently, the regulation of dockless bicycle hire has hitherto depended crucially on the economic and political contexts in which it operates. Thus, the business model adopted by the principal dockless operators has shaped the environment in which development has taken place in several important ways. From its outset in China,

dockless bike hire has been subject to intense competition. From this environment, two companies, Mobike and ofo, emerged as the principal players. Both have received substantial investment, and adopted strategies of expanding at a rapid rate by offering subsidised rides, with the result that they have been making heavy losses. This led to widespread criticisms that the companies are not operating a sustainable model, and in 2018-19 both were subject to severe financial pressure. In response, the companies sought to tighten their operational models in terms of changes to access rules, pricing, and the electronic boundaries to the schemes, but the basic strategy of subsidising rides continued to drain resources.

Ofo ceased its operations completely in the UK in 2019 and is now out of business globally, while Mobike has been placing more emphasis on the need to make a profit. It has adopted a strategy of consolidating its existing areas of operation, rather than the previous strategy of expansion at all costs. Mobike's strategy has been particularly affected by its experience of a failed scheme in Greater Manchester in 2017-18, where persistent theft and vandalism of the bikes led to the company's withdrawal from the urban area. Subsequently, new companies have entered dockless operation, including Lime, Jump, and Beryl, sometimes with an extra innovation in the form of electric bikes, but the long-term expansion of dockless bicycle hire in the UK remains problematic. Basically, the tendency for bikes not only to be stolen or vandalised, but also just abandoned, and then not collected, places demands on local authorities to clear the bikes from where they are left, while the sight of bikes littering the streets is considered to adversely affect the image of cities.

With regard to governance, the lack of any national legal regulatory framework means that the sector has relied on experimentation with self-regulation, and with non-binding policy measures and frameworks by local authorities. National government has been reluctant to legislate for a regulatory framework. In 2019, this was attributed partly to the dominance on the policy agenda of the UK's withdrawal from the European Union although, as noted above, there also appears to be a political commitment to allow innovators as much freedom to operate as possible. However, in 2018 the government suggested that local authorities could use Section 235 of the 1972 Local Government Act to create specific byelaws to prevent the nuisance caused by dockless bikes, but so far the local authorities have not taken advantage of this statute. On the other hand, in 2019 the Labour MP Daniel Zeichner introduced the Dockless Bikeshare (Regulation) Bill as a Private Member's Bill, but this Bill was not supported by the government, and failed to proceed.

In the case of the operators themselves, there is an accreditation scheme run by CoMoUK, the representative body for bicycle hire operators. The local frameworks include a voluntary Code of Conduct for dockless bicycle hire in Oxford introduced by Oxfordshire County Council, and a Code of Practice operated by Transport for London (TfL). In the case of TfL, there is currently a proposal for a byelaw for dockless bicycle hire schemes, which will apply to bikes and modes such as electric scooters if the government approves their use. This is intended to replace the current patchwork of regulation operated by the London boroughs.

To a large degree, the dockless operators have been able to act autonomously, due to the political and economic environment. For the local authorities, there was considerable attraction in allowing an innovation that offered a relatively cheap and

flexible means of transport that crucially placed no demands on the public purse. In any case, the public authorities had no legal authority to prevent dockless operation. It was only as the schemes developed that major problems began to emerge, including theft and vandalism of the bikes, and general misuse. As a result, for economic reasons caused by the operational problems, and bikes left randomly in areas of low demand, over time the operators frequently reduced their areas of operation to city centres. For their part, the local authorities can feel a sense of injustice, given that they have not been directly involved in setting up the schemes, and yet are responsible for carrying the costs of clearing up abandoned bikes.

The local authorities may not have been able to exert any authority over the original business models of the operators, but the more conciliatory approach now being offered since 2018 by Mobike (particularly after its adverse experiences in Greater Manchester) and other operators, together with lessons learned by the local authorities themselves, suggests the time could be right for the national government to assume leadership in the sector and introduce a legally enforceable regulatory framework, although this would need to allow for the operation of discretion at the local level. Nevertheless, a national regulatory framework could include quality standards for bicycles, and their conditions of operation, but also give the local authorities the legal power to control the numbers of operators and bicycles. It could also include provision for local authorities to negotiate with the operators on the geographical areas in which they operate. In essence, there is a triangle of local authorities, users, and innovators, each with separate roles and having different objectives. The need is to bring these stakeholders together to provide the best possible service, at a reasonable cost to the user, and to be inclusive.

The acquisition and exchange of data is another area that could form part of a legal framework. Hitherto, there appears to have been little public use made of the data produced by dockless bicycles. Aggregated data may only have a limited use, but the more finely grained data, such as the detailed routes taken by dockless users, could assist public authorities in planning infrastructure, and integrating transport services.

b. In the relationships between innovators and regulators, what structure should regulation take, e.g. voluntary codes of conduct, or statutory controls?

As noted above, a statutory framework can give greater structure and clarity to dockless bicycle hire, with the proviso that local authorities should have the necessary capacity and leadership to guide the sector within their own areas. Larger authorities, such as London and the Metropolitan areas, are likely to have greater capacity to operate a regulatory system compared with smaller cities and towns. It is also important to emphasise that there cannot be ‘one size fits all’ solutions to the regulatory problems, and local authorities will require the discretion to act on what can be complex problems. A particular challenge is to decide how dockless operations should be distributed across an area, and who the beneficiaries should be. For example, should greater consideration be given to those living outside the areas normally targeted by dockless operators?

In the context of local authority expertise, it is also important to note that ‘soft’ forms of regulation are likely to be required, including benefits to users who use the bikes appropriately, and also negotiating with the operators in areas such as the acquisition

of data. The holding of data exemplifies the imbalance in expertise between the innovators and the local authorities, with the latter requiring the detailed knowledge to both frame and enforce codes of conduct, and more generally to negotiate with the innovators.

c. For each of the three case studies, what are the administrative and political merits and disadvantages for managing the tensions between innovation and regulation? Can any of these approaches, or a combination of them, be ‘scaled up’ for best practice regulation more generally? What are the implications for other UK cities and towns where dockless bicycle hire may be introduced?

With regard to the three case studies, it is again important to emphasise that each was subject, either directly or indirectly, to the economic and political contexts and associated processes noted above. In the case of Greater Manchester, the Combined Authority and the executive body Transport for Greater Manchester (TfGM) were attracted by the novelty of dockless operation, and the lack of public funding required. Although TfGM stipulated a six-month trial of 1,000 bikes for the operator Mobike, the company was left to act autonomously, and as a result of persistent theft and vandalism of the bikes, eventually restricted its area of operation to the city centre. This was done without consulting TfGM and caused considerable antagonism from users. Despite restricting its operation, Mobike continued to suffer theft and vandalism, and in 2018 terminated the scheme after fifteen months of operation. Mobike has acknowledged that it made mistakes in Manchester, and in future would place greater emphasis on working with the local authority. For its part, TfGM is now seeking to introduce a cycle hire scheme where the terms of the contract set out more clearly the responsibilities of operator and public authority.

In the case of dockless bicycle hire, the lack of planning controls means that the operator is able to flood the market with bikes, and then just as easily withdraw. This leaves short-term consequences for the local authorities in clearing up the mess, and in the longer-term to compensate for the loss of bicycle hire in the city.

In Oxford, the transport authority Oxfordshire County Council adopted a more facilitating role than Greater Manchester did, allowing four main dockless operators to enter the city in 2017, and each opted for a strategy of rapid expansion. This helped to create a demand for dockless use, but as in Manchester (although on a lesser scale) there was some misuse of the bikes. At their peak, the four operators were running around 1500 bikes, but by January 2019 Obike and ofo had withdrawn altogether, and the other two companies, Mobike and Pony Bikes, had reduced their size and areas of operation. In 2019, Pony withdrew, leaving Mobike as the sole Oxford dockless operator. In addition, a docked bicycle hire company, Oxonbike, ceased to operate in 2018 blaming, at least partly, the numbers of dockless bikes (although in 2019 Oxonbike resumed its service with a new operator).

Oxford’s Code of Conduct for the dockless operators included provision for the numbers of bikes, bicycle safety and maintenance, avoidance of obstruction, data, and a stipulation that the operator should pay staff at least the Oxford Living Wage (which is approximately £1 above the Living Wage for areas outside London, currently £10.02 vs £9.00). Enforcing the Code was always challenging because of its voluntary character, but the Code was generally adhered to, although it became more difficult

over time, when the operators reduced the numbers of staff available to collect and maintain the bikes. In this situation, Oxford City Council was compelled to pick up abandoned bikes through its parks and refuse teams. The County Council has also been disappointed that the dockless operators have not fulfilled their Code of Conduct obligations with regard to the supply of data. As in Manchester, this illustrates the relative lack of power on the part of the local authorities in being left with the responsibility of clearing up, while lacking the powers to enforce compliance on the part of the operators.

In Oxford, actual levels of demand reduced the numbers of operators to a single one, but this experience in itself illustrates the continuing fragility of dockless bicycle hire as a business. A statutory regulatory framework can hope to manage the system, but the operators themselves need more resilient and financially sound business models, together with the flexibility to adjust to local conditions, and a greater understanding of the needs of users.

In contrast to Greater Manchester and Oxford, the West Midlands Combined Authority resisted the introduction of dockless bikes when framing its major Bikeshare scheme for a minimum of 3000 bikes across the region. Instead, the scheme was intended to consist entirely of docked bikes. Significantly, the executive body Transport for the West Midlands (TfWM) acknowledges that the adverse experience in Manchester was a key contributory factor to their decision to exclude dockless bikes.

In 2018, the Combined Authority awarded the contract for the scheme to the bike hire operator Nextbike. However, from the outset there were formidable problems in scheme implementation. A fundamental difficulty here was the lack of finance for the scheme. The Combined Authority had stipulated that there would be no public funding, and had relied on Nextbike to find a sponsor, but Nextbike could not fulfil this task. The contract had also required that Nextbike would integrate the scheme with TfWM's SWIFT integrated public transport ticketing system, but basic technical difficulties arose in making the systems compatible. In addition, Nextbike had an ambitious target of 5000 bikes, rather than the Combined Authority's aim for 3000 bikes. Complications arose in obtaining planning permission and the finance for the required docking stations, and in the event the only element of the scheme to be delivered by Nextbike was a 25 bike pilot with just 5 docking stations. In 2019, the Combined Authority ended its agreement with Nextbike, and claimed that the company lacked the expertise and resources to deliver the scheme. For its part, Nextbike claimed that the scheme chronically lacked funding, and that there had been unrealistic expectations on the part of the Combined Authority.

Although the West Midlands Bikeshare scheme excluded any dockless element, other problems (including the installation of docking stations, which are not required for dockless systems) hindered implementation. As in the cases of Greater Manchester and Oxford, the Combined Authority relied on private sector operators to deliver the scheme, but as with Mobike in Greater Manchester, the problems proved insurmountable. Significantly, for the re-tendered scheme the West Midlands Combined Authority is taking responsibility for delivery more into its own hands, and it will supply and own the bikes and docking stations, together with taking on the task of finding a sponsor. Crucially, there will also be public funding for the scheme.

Rather than the concession handed to Nextbike, the new operator will be paid a monthly fee to manage the scheme. The new scheme will also be less ambitious, with 1500 bikes, of which 10 per cent will be electric. However, the Combined Authority continues to reject any dockless element. The local authority is therefore choosing to take a higher degree of direct control, but in turn this means greater internalisation of risks and emphasis on its own expertise and financial resources to deliver the scheme successfully. It could be said that, in general, local authorities will seek to maximise value for money, and at the same time minimise the risk element. By taking more direct control, the West Midlands Combined Authority avoids the risk of relying on a private sector operator to deliver the scheme, and can hope to obtain better value for money. At the same time, from a political perspective the Combined Authority cannot offload responsibility for any weaknesses in the scheme.

It cannot be said that any one of the case studies, or a combination of them, in themselves offers an obvious case for the ‘scaling up’ of dockless bike sharing. More significantly, for each of the case studies, the economic and political contexts have played a crucial role in framing decisions and influencing implementation. Although, as we have discussed, lessons can clearly be learned from the processes adopted in each case study area, addressing the problems caused by contexts and the associated processes are more likely to be important for other cities and towns seeking to introduce dockless operation, rather than copying other local authorities.

In summary, a national statutory framework could provide the local authorities with the means to impose quality and quantity controls on the operators. From there, the local authority needs to carefully monitor implementation of the scheme to ensure that day-to-day management, operation, and maintenance are effective, and that the operators are adhering to the conditions laid down. It is also important to not only ensure users understand the scheme, and have a reward system for using the bikes appropriately, but also to obtain their feedback, and act on the findings. An important consideration here is that a key reason for the lack of long-term sustainability of the dockless bike hire business model has been the limited attention and dedication of responses to maintenance in their determination to minimise overheads. This represents short-term gain versus long-term cost. However, maintenance is essential because the bikes have to operate and be made available in a harsh environment that includes both exposure to the elements, purposeful vandalism, and carelessness on the part of users. Improvement of maintenance would therefore be one way to improve adaptive capacity.

Nevertheless, the inherent character of dockless bicycle hire means that some degree of misuse is probably inevitable, given the relative ease with which the bikes can be stolen and dumped. In these circumstances it is necessary for operators and local authorities to work closely to ensure that the operator not only complies with conditions for managing the bikes, but also compensates the local authority for any cost and inconvenience caused in clearing up the bikes. Data obtained through the GPS trackers already built into the bikes could play a significant role here. However, such data, particularly if deployed to monitor users in real time, can raise issues of privacy. At the same time, the data itself is a valuable resource, and can be used by the local authority for wider planning purposes. It is therefore important for agreements to be established with the operator to share key data prior to implementation.

One other vital consideration is the areas of operation. For their part, the operators should require clearance from the local authority on the virtual boundaries of operation (known as geofencing), and consult with the authority if these are adjusted. At the same time, the local authority may wish the operator to extend operation into areas with social need, and in these cases some element of subsidy is likely to be required.

d. Do the dynamics of empowerment in the relationships between local authorities and innovators entail the construction of new types of collaboration, rather than conflict? What are the underlying bases of these relationships, e.g. the desire to promote bicycle use for health and environmental reasons, combined with the need to maintain regulatory order?

Rather than empowerment, the development of dockless bicycle hire has demonstrated the weaknesses on the part of both operators and local authorities. For the original operators, the limitations of the business model have severely restricted the scope for development. Evidence from the case studies suggests that operators such as Mobike have been modifying their strategy to seek greater operational stability over time, and also building firmer relationships with local authorities. For the public authorities, it has been the technological innovation in itself that was the attraction, rather than specifically identifying dockless bike hire as a key element in integrated transport strategies.

The weaknesses on both sides have created a vacuum in terms of ordered development and regulation. Dockless hire gives greater freedom to the user in terms of flexibility and cost, but on the other hand entails more detailed management and supervision with regard to the distribution, collection, and maintenance of the bikes. In turn, the impacts on the built environment of bicycle misuse intensify the need for collaboration between operators and public authorities. As dockless bicycle hire operation has progressed, so the operators have increasingly recognised the importance of building relationships with local authorities. Hitherto, their business models have not encouraged stability, although it could be argued that innovation has an inherent degree of instability and uncertainty. Consequently, in dealing with innovators and their schemes, a local authority is likely to require large amounts of resilience and adaptability, together with a recognition that risk is a basic element in the promotion and implementation of innovation. Similarly, it is also fair to expect more resilience and adaptability on the part of operators. In these conditions, there is likely to be a blurring of the public and private sectors, and so politically it is important to gain public understanding and sympathy for these procedures.

e. What are the wider implications of dockless bicycle hire for gaining a greater understanding of the evolving relationships between disruptive innovators, regulators, incumbent cycle and public transport operators, and users?

Over the past year, dockless bicycle hire has become more likely to be defined in terms of wider systems of micromobility. This refers to personal transport for one or two people, and in addition to docked and dockless bikes, also includes electric bikes and scooters. Consequently, dockless bicycle hire can be seen as both competing with these other forms of micromobility, and also offering the possibility of being

integrated with them. Currently, electric scooters are banned in the UK on public roads and footpaths, although the government is holding a consultation on the possibility of introducing them. The timing and outcome of this is made more uncertain through the Covid-19 virus outbreak, with e-scooter services being withdrawn in many European and US cities. However, electric scooters have spread rapidly across the world, led primarily by the United States based companies Lime and Bird. Significantly, Lime is operating dockless bikes in London, while in 2018 the ride-hailing app Uber purchased the electric dockless bicycle hire company Jump, and in 2019 commenced a service in London. Uber is emphasising that, for ‘first mile-last mile’ transport, the Jump bikes can be cheaper and more convenient than Uber’s car service. Thus electric dockless bikes can widen the scope of operation in terms of distances covered, and also those able to use them. In turn, the development of these services raises questions about the degree to which they can be integrated into existing public transport services, and of the relationships between the public and private sectors. In fact, the Covid-19 virus outbreak has meant the reduction and withdrawal of many public transport services, and this has had the effect of boosting demand for cycle hire in many countries, an advantage which operators are promoting. For example, in London Jump is offering free rides to National Health Service workers.

As we have noted, to a large degree dockless bicycle operations have developed separately from public transport operators. In the future, by providing ‘first mile-last mile’ transport dockless bikes can complement public transport. At the same time, it can also offer competition for customers, and potentially take people away from public transport use. There is little evidence at the moment concerning the displacement impact of dockless bikes on public transport (although the success of the major docked scheme in London has affected both public transport passenger numbers and walking), but it is in these sorts of areas that local authority leadership can play a key role in seeking to bring greater co-ordination. In addition, there is a need for a clear mandate from national government in terms of rules, resources, and expertise, so that a genuine capability is created to enforce co-ordination.

With regard to users, their needs and preferences are largely missing links in the implementation of dockless bicycle hire. The operations have been producer led, with little consideration given to consulting the public. This raises the basic question of who the service is for, and that throughout the introduction of dockless bicycle hire the interests of the people who actually use it (or choose not to use it), have not been considered to be important. Paradoxically, it could be said that in cases such as Greater Manchester, it was the public in responding to the innovation after implementation that contained the disruptive force, rather than the innovator and the innovation itself. The public disrupted Mobike’s expectations for their technological innovation, and the company lacked the means to respond in an appropriate way. The public therefore held significant power in terms of communicating responses directly, but this power was limited in terms of the innovator’s reactions. In addition to its failures in taking account of public responses, Mobike was also unable to construct narratives that could allow the public to perceive the bikes in terms of a process of empowerment that could enhance mobility and choice of mode. In essence, the company failed to work within any significant framework of participatory exchange, and this inability to recognise user power indicated the limitations of an innovator that relied on the novelty of technological innovation.

The physical presence of dockless bike technology offers a route to power, as it allows consumers to express their preferences and needs, and to do so visibly in the public domain. However, societal expectations of technological innovations are unlikely to be satisfied, such as in the case of the environmental and health benefits of cycling, if those responsible for the innovation are unwilling, or lack the means, to interpret these choices in a strategic way over time.

3. Project Outputs

(i) The paper ‘The Dynamics of Public Participation in New Technology Transitions: The Case of Dockless Bicycle Hire in Manchester,’ was published in the major journal *Built Environment* in Spring 2019. The paper uses the project case study of the Mobike dockless bicycle hire scheme in Manchester to illustrate the reasons for failure of this disruptive innovation. This paper is at **Dockless a**.

(ii) The blog post ‘The Sharing Economy and Blurring in Public-Private Relationships’ was published on the *Built Environment Blog* web site in June 2019. The paper examines how the more direct effects of sharing are likely to result in a blurring of the public and private sectors where integrated service providers become dominant players. This blog is at **Dockless b**.

(iii) The blog post ‘The Datafication of Urban Transport’ was published on the *Built Environment Blog* web site in September 2019. The blog examines the value of data to urban transport planning, using dockless bicycle hire as a case study. This blog is at **Dockless c**.

(iv) The paper ‘Urban Local Authorities and the Delivery of Smart Mobility: The Case of Dockless Bicycle Hire in the UK’ will be submitted to a major journal. The article observes that, when it comes to delivering smart mobility, urban local authorities are under intense pressure from above and below. From above, there is pressure from central government to deliver policy ‘solutions’ that do not place severe burdens on public expenditure. From below, the authorities can recruit private sector innovators, who can apparently deliver the required ‘solutions.’ At the same time, this places the local authorities in the hands of smart mobility innovators who have their own commercial agendas, and these may be unstable and limited in their ability to deliver.

Nevertheless, if local authorities bypass these types of innovators, they can be drawn into alternative ‘solutions’ that have their own distinctive problems and limitations. In these cases, local authorities may take the ‘solution’ into their own hands, but this increases the public pressure to deliver, while national government maintains control of policy and financial resources.

The comparative case studies of dockless bike hire in Oxford, and the West Midlands Bikeshare scheme, are employed for this paper. The paper concludes that the pressures on local authorities to deliver smart mobility schemes are likely to increase, but the result can be a blurring of the public and private sectors, with these systems politically and operationally required to display a high degree of resilience and adaptability.

Completion of this paper has been somewhat delayed by the need to take account of continuing developments with regard to the West Midlands Bikeshare scheme, but it is now almost complete, and will be submitted shortly. We will also submit this paper to the Rees Jeffreys Road Fund.

(v) The article ‘Micromobility and the Politics of Cycling’ will be submitted to the major practitioner journal *Local Transport Today*. The article examines how the politics of cycling may be influenced by the development of smart mobility. Traditionally, the cycling lobby in the UK has been relatively fragmented and weak. A significant turning point came in the case of London, with the development of cycle highways and the ‘Boris Bikes.’ However, these developments have come at a considerable financial cost, which is not necessarily available to many local authorities in times of austerity.

Into this space came dockless bike hire, which appeared to offer a free means for local authorities to promote an attractive solution to urban transport problems. However, experience in places such as Greater Manchester has damaged the image of dockless, while in London itself it has proved difficult to regulate, while offering competition to Transport for London’s own docked scheme.

Dockless bike hire in itself may have already passed its peak as a major solution to urban transport problems, but now more emphasis is being placed on developing systems of micromobility. These systems can potentially enhance the public image and use of cycling, particularly through developments such as electric bikes, but by integrating systems such as electric scooters, there is a risk that safety and environmental concerns can undermine the political strength of cycling.

This article awaited recent development in micromobility, but is now nearly completed, and will be submitted shortly. We will also submit this article to the Rees Jeffreys Road Fund.

(vi) Evidence will be submitted to the Department for Transport’s *Future of Transport Regulatory Review*. This will be on the theme of micromobility, and how best to regulate the vehicles in this category. This evidence will be submitted in May 2020, and we will also submit it to the Rees Jeffreys Road Fund.

(vii) Twenty interviews have been conducted for the project. The material contained in the interviews is an invaluable resource, both in gaining an understanding of events, and in the insights the interviews provide into the questions addressed in the project. Those interviews included representatives of operators (3x), cycling and bikeshare sector representatives (4x), local policy makers and politicians (7x), and academic and other experts (4x). The numbers interviewed included two people who were re-interviewed.

(viii) A four page policy brief will be produced, that will summarise the key insights and recommendations of the project, and will be sent to all those interviewed for the project. Their responses will be invited and we will also submit the brief to the Rees Jeffreys Road Fund.

