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Economic, social and cultural transformation and the role of the bicycle in Brazil.

Introduction

Brazil is the largest country in South America and the fifth largest country in the world by land area (8.5 million km^2) and population (around 192 million people). The majority of the population (circa 80%) lives in urban areas along coastal regions particularly in the southern and south-east region and the megacities of São Paulo (11M) and Rio de Janeiro (7M). Other large cities include Brasilia, Belo Horizonte, Curitiba, Salvador, Fortaleza and Recife with populations of around 1.5 to 3 million people. Despite these highly populated urban conglomerations, 90% of urban areas in Brazil have populations no larger than 50,000 inhabitants (IBGE website). The country is one of the fastest growing major economies by nominal GDP and was reported to have overtaken the UK to become the sixth largest economy in March 2012 (BBC Website).

Economic growth has been accompanied by a rapid rise in private motorisation buoyed by a credit boom for consumers coupled with tax breaks by government (The Economist website). The national auto industry has traditionally promoted the idea that owning a car is a key component of Brazilian identity and this has ushered in a new politics of consumption amongst a growing number of consumers (Wolfe, 2010). The increasing domination of the car in Brazilian society has been stimulated by the introduction of the "popular car" (simple low cost vehicle with 1.0 litre engine and no "extras"), more widespread availability of credit/payment plans and aggressive marketing by the car industry (Presada, 1999). This continues apace with the Brazilian government announcing as recent as May 2012 a series of tax incentives to stimulate the motor industry, namely, reduced tax on personal credit and on 'industrialized products' including 'utilitarian cars'. Car makers have also pledged to match government tax reductions by providing discounts up to 2.5% off the normal prices of 'utilitarian cars' (NE10 Website).

Over the ten years up until 2009 the number of private cars on Brazil's roads increased by 74% to 32.7 million and the number of motorbikes by 280% to 11.4 million (Mortaire Gilson & Euzébio, 2009) - a national record of around 5.4 million vehicles was sold in Brazil in 2010 according to Brazil's National Federation of Motor Vehicle Distribution (Fenabrave Website). The actual number of vehicles per 1000 population in Brazil in 2011 stood at around 250 compared to between 500 and 700 across European States highlighting the potential for increased demand on existing infrastructure (DENATRAN Website). The Urban Mobility Information System of the National Association of Public Transport (ANTP Website), reports that in 2009, the mode share (all journeys) was 27% for car, 38% for walking, 29% for public transport, 3% for motorcycling and 3% for cycling. It should be noted, however, that official data on modal share is difficult to obtain and sources are often contradictory. For example, it has been suggested that the actual modal share for motorcycling is probably nearer 13% (IPEA, 2011).

Road traffic deaths are a significant problem in Brazil and the mortality rate has paralleled the growth in the motorised vehicle fleet. Brazil now has one of the highest road traffic mortality rates in the world at around 21 deaths per 100,000 population. Over the ten years to 2008, the number of annual deaths increased by around 20% from 31,000 to 39,000. (WHO, 2011). Motorcycle riders, pedestrians and cyclists are

particularly vulnerable with average mortality rates of 2.98, 5.46 and 0.75 per 100,000 population between 2000 and 2008. Motorcycle deaths are increasing at a particularly alarming rate and accounted for around a quarter of all transport related deaths in 2008 (Chandran et al. 2012).

The problems associated with the growth in motorised traffic are now the subject of continual debate in local and national media across Brazil. Journals and magazines typically feature the increasing amount of time spent in cars and the impact of congestion and pollution on health and the economy - see for example the popular weekly magazine Veja (Veja website). As Brazilian cities grapple with adjusting to a growing motorised fleet a number of policy initiatives have been launched to promote sustainable mobility and road safety. This paper provides a desk-based review of the development of policies and programmes over recent years specifically targeted at promoting cycling and improving cycle safety. Attention then turns to the case of Pelotas, a city in the south of Brazil which has arguably high potential to nurture an increase in cycling given its flat topography and the high proportion of journeys that take place within the city. Through exploratory research using a combination of methods including a focus group with members of the cycling stakeholder forum; interviews with planning officials whilst on a tour of the city observing cycle infrastructure; interviews with participants whilst taking part in a 'protest' bicycle ride (bicicletada) through city streets; and finally, on-street interviews with daily commuter cyclists, this paper highlights the tensions, conflicts, aspirations and imaginaries of a city grappling with significant growth and urban transformation.

Cycling in Brazil and policies to promote its practice

Brazil is divided into States that are grouped into five regions (South, South East, Central West, North East and North) (Figure 1). Policy for encouraging sustainable mobility is set at the national level but states and municipalities are autonomous in the development of their own strategies and directives providing they follow those defined at the national level. The Brazilian Constitution (Senado Federal, 1988) not only guarantees the independence of state and municipal levels of government but requires them to develop their own legal system for the management of their cities called 'directives for urban planning' (plano diretor). Given the regional and cultural diversity of Brazil this helps to ensure that local characteristics do not get overlooked which might be the case if a more centralised model was adopted.

The preoccupation with the car as a precondition of modernity and development (Wolfe, 2010) has generally resulted in the omission of cycling in urban planning. Brazil, as with many developing countries, adopted the methodologies of industrialized nations during the 1950s. This embraced mobility as the prime objective and the growth in private motorised traffic a natural consequence of economic development. Transport solutions were based on forecast growth leading to large scale road projects and the dominance of private motorized means for the few whilst transport conditions for the majority who relied on walking, cycling and public transport deteriorated (Vasconcellos, 2005; Vasconcellos, 2001). Whilst it could be argued that the 'mobility as prime objective'

paradigm persists today, policies and programmes have begun to be put into place to develop a more sustainable and inclusive transport system (Rodrigues da Silva *et al*., 2008).

Despite cycling (reportedly) representing a low percentage of the overall share of all journeys (circa 3% of journeys) there is wide variation across Brazilian cities. Generally cycling is most visible in those cities with less than 50.000 inhabitants compared to middle and large sized cities where use is much lower and public transport systems are more developed (Table 1). On average, cyclists in Brazil account for around 4% of all road traffic deaths and this rate has been increasing. In 2008 there were over 1600 cyclist fatalities with the highest number occurring amongst males in the 40-49 age group. In terms of geographical occurrence, the average bicyclist mortality rate (2000-2008) was highest in the Central-West (1.45 per 100,000 pop.) and South region (1.36 per 100,000 pop.) (Chandran *et al*. 2012).

Adult males on low incomes make up the majority of users (estimated 85%) and mainly use the bicycle as a means of accessing employment but also as a means of earning a living through, for example, distribution and servicing (Ministério das Cidades, 2007[a]). Cycling amongst middle and higher income groups is largely confined to sport and leisure activities using higher quality, more expensive bicycles around parks and recreational trails or takes place a part of specific sporting events (Ministério das Cidades, 2007[b]). Those amongst the growing middle class who do use bicycles for transport do so by choice and not out of economic necessity. They are generally stigmatized and regarded as not fitting in to what is 'normal' (Presada, 1999).

<<Insert Table 1 here>>

The first evidence of any political attention being given to cycling was in the 1970s with the emergence of national cycling policy through GEIPOT, the Brazilian agency for transport planning acting on behalf of the Ministry for Transport (Empresa Brasileira de Planejamento de Transportes), which included the development of standards and guidelines for planning for bicycles for transportation (Planejamento Cicloviário: Uma Política para as Bicicletas, 1976) (Lima Neto & Brasileiro, 2001). Although these guidelines were distributed to municipalities across the country, and small demonstration projects were built in some areas, the focus still remained on accommodating the growth in motorised traffic. Whilst the original impetus for government attention to cycling (the international oil crisis of the 1970s) waned in the 1980s, this was renewed in the run up to the United Nations Conference on Environment and Development in Rio de Janeiro in 1992, known as 'The Earth Summit', resulting in the development of some cycle infrastructure (Box 1) (Miranda & Xavier, 2007).

<<Insert Box 1 here – nb. Box 1 is optional. It could be excluded if space is limited>>

Momentum started to build again in 2002, with the publication of two documents by GEIPOT *Cycling Planning: National Diagnosis* (Planejamento Cicloviário: Diagnóstico

Nacional, 2002) and *Cycle Planning Manual* (Manual de Planejamento Cicloviário, 2002). The documents provided a 'diagnosis' for cycling in Brazil and advice on planning cycling into the urban fabric. The aim was to renew efforts by policy makers and planners to consider cycling when improving or developing infrastructure. Shortly after the publication of these documents, however, GEIPOT was replaced with SeMob (Secretaria de Transporte e da Mobilidade Urbana/National Secretariat of Transport and Urban Mobility) operating within the Ministry of Cities and is the structure that is still in place today. The focus of the Ministry of Cities is in four areas: urban development, environmental sustainability, social inclusion and spatial democratization. SeMob's remit is to encourage cities to reduce the environmental impacts of urban mobility through reducing the need for motorized travel and developing non-motorized modes of transportation (Ministério das Cidades, 2007[b]). SeMob launched the national Brazilian Program on Cycling Mobility or 'Bicicleta Brasil Program' in 2004 aimed at encouraging individual states and municipalities to develop actions that favour safe bicycle use as transport. The programme is supported by seminars, meetings and capacity-building events. The first of these events was a seminar held in 2006, in the city of Guarulhos (State of São Paulo), and involved technicians and advocates and also international non-governmental organisations such as Interface for Cycling Expertise (I-CE), Institute for Transportation and Development Policy (ITDP), German Cooperation Agency (GIZ) and the Movilization Foundation (Xavier, 2011). In 2007 SeMob published two pivotal documents, one focusing on urban mobility planning (*PlanMob: Building the Sustainable City*/*PlanMob: Construindo a Cidade Sustentável*) and the other providing an updated reference manual on cycle planning (*A Cycle Planning Manual for Bicycle Mobility in Cities/Caderno de Referência para a Elaboração de Plano de Mobilidade por Bicicleta nas Cidades*).

SeMob has since developed a set of public policies under the umbrella *Bicicleta Brasil* (Ministério das Cidades website). Key objectives of the programme are to promote the concept of sustainable urban mobility and to promote the bicycle as a means of transport within mobility plans. More specifically municipalities are encouraged to implement systems for cycle mobility (cycle lanes and paths), to increase cyclists' safety, to better integrate bicycles with public transport systems and to reduce the cost of mobility for low-income groups. SeMob also plays a role in disseminating best practice and encouraging interaction between national, state and municipal actors as well organising training for municipal officers to develop skills in implementing cycling systems (sistemas cicloviários).

As well as the actions of SeMob there are several overarching urban strategies that could impact the development of cycling in the country. The Program to Accelerate Development (Programa de Aceleração do Crescimento) or 'PAC' for short was launched by national government in March 2010 and focuses on urban and social programmes to sustain the development of the country. There are a number of PACs, for example, PAC Medium Cities (Cidades Médias) and PAC Large cities (Cidades Grandes), but PAC 'Better City' (Cidade Melhor) focuses on improving urban roads and streets including the implementation of traffic calming and cycle lanes and paths (Ministério das Cidades website). PAC da Copa, meanwhile, primarily focuses on

investment in public transport but there is also reference to providing pavements for walking and infrastructure for cycling as part of the agreement with FIFA investments for the 2014 World Cup Brazil football tournament. Other national programmes that indirectly promote cycling include Pró-Transporte, Programme for Urban Mobility and Programme for Funding Infrastructure for Urban Mobility (Programa de Financiamento de Infra-estrutura para Mobilidade Urbana – PRÓ-MOB) which all seek to integrate cycling with public transport and retrofit urban roads and streets with cycle lanes and paths. For all programmes, municipalities can apply for funding through open national competition whilst other funds are channelled to specific cities or regions chosen by government to apply (Ministério das Cidades website).

A symbolic moment for cycling arrived on the 30th May 2011 when during the weekly radio programme *Café com a Presidenta*, a popular platform for highlight social policies and programmes of the government, President Dilma Rousseff declared the need to create a 'culture of cycling in the country', and more specifically, for cycling to be regarded as a serious means of transport and for municipalities to develop safe cycling infrastructure. This coincided with the launch of the government funded 'Way to School' (Caminho da Escola) social programme aimed at guaranteeing students the means to get to school. Following an application for funding by municipal governments, more than 27,000 bicycles and helmets for students at state schools across 70 small municipalities were distributed. A further target was also set by government to provide bicycles to a further 100,000 students across 300 cities (Café com a Presidenta website). Another significant moment for cycling followed on the 3rd of January of 2012 when national government approved Directive 12.587 defining National Policy for Urban Mobility. This directive requires all cities with more than 20,000 inhabitants to develop a Plan for Urban Mobility integrated into master plans for urban development (Plano Diretor) and revised every 10 years. The legislation provides an important mandate for state mayors and municipal secretaries trying to orient policies towards sustainable urban mobility and to dedicate resources to cycling (Senado Federal, 2012). However, the primary objective of stimulating economic growth through, as set out earlier, providing tax breaks for the auto-industry and concentrating spending on large scale infrastructure projects, appears to directly contradict policies and programmes to support and encourage cycling as part of the emerging sustainable urban mobility paradigm. The fairly bureaucratic process of applying for funding requires the commitment and expertise of officers within local municipalities which is often missing. Within this context there has been a growth of protest movements questioning the direction of transport policy and growing impatience at the lack of progress in the development of integrated cycle systems across cities.

Cycling Advocacy in Brazil

The beginning of cycling advocacy in Brazil probably dates back to the early eighties with movements in Rio de Janeiro and São Paulo. For example Sirkis (2000) notes how the establishment of the bicycle network in Rio de Janeiro was the result of intense lobbying by NGOs and the Green Party during the 1980s and early 1990s. This included mass cycle rides (aka 'Tuesday Night Bikers') along, for example, the famous Copacabana area and general publicity campaigns against the hegemony of car and

public transport oriented policies of state transport and urban development departments. A municipal Working Group for Cycle Systems was initiated in 1993 and hosted by the Secretary of the Environment at the municipality of Rio de Janeiro. This was an important forum for stakeholders provide input into planning the strategic cycle network for the city. Crucially, the strategy was backed by successive city mayors allowing funding to be committed to developing cycle infrastructure. In São Paulo cycling advocacy took on the practice of cycling at night during the mid-1980s. Started by Renata Falzoni, the Night Biker's Club of Brazil has grown from a small movement enjoying the simple pleasures of riding a bicycle amongst friends towards a mass movement today demanding a better traffic environment for bicycles (Night Biker's Club website).

In recent years, inspired by movements in Rio de Janeiro and São Paulo, a number of advocacy groups have sprung up across Brazil. A National Union to represent cycling was launched in 2007 called the União de Ciclistas do Brasil (União de Ciclistas do Brasil website). Some advocacy groups, for example ViaCiclo - Associação dos Ciclousuários da Grande Florianópolis (Associação dos Ciclousuários da Grande Florianópolis website) from the city of Florianópolis (State of Santa Catarina) are highly organised and have been successful in forming international partnerships and increased investment in cycle infrastructure by the municipal council (Xavier, 2010).

Critical mass[1], or the 'bicicletada' (Bicicletada website) as it is known in Brazil, is also beginning to flourish in cities across the country as more people have started to question the direction of transport policy. The general objective is to encourage the use of the bicycle as transport amongst the public and to encourage policy makers and planners to create more favourable conditions for cycling on city streets. The form of mass protest on two wheels is a relatively recent phenomenon in Brazil (at least outside of Rio de Janeiro and São Paulo) and in part is a direct response countering ideas of 'progress' promulgated by the car industry in mass advertising and the media. There is evidence that this may be causing antagonism amongst sections of society unsympathetic to this form of protest and of ideas about more sustainable ways of moving around the city. Unfortunately, it was the actions of one person driving his car through a procession of cyclists during a bicicletada in the city of Porto Alegre on the 25th February 2011 that caught most (inter)national media attention. At the time of writing (September 2012) the defendant is still awaiting trial raising suspicions amongst some activists that violations to cyclists by motorists are not taken seriously by the Brazilian authorities (YouTube[1] website).

Case study: Pelotas, Rio Grande do Sul.

Attention now turns to one example of a city in Brazil that is witnessing significant social and material transformation and increasing levels of motorisation causing conflict and dissonance in relation to the future role of cycling on city streets. Pelotas is a medium sized city located in Rio Grande do Sul, the southernmost state of Brazil and is situated

[1] Originally founded in 1992 in San Francisco, Critical Mass consists of an 'organised coincidental' mass meeting of cyclists at a set location and time to travel by bicycle (slowly and in procession) through city streets to call for better conditions for cycling by local policy makers and to highlight the potential of cycling to the public (Carlson, 2002).

approximately 250 km (155 mi) south of the State capital Porto Alegre and 180 km (112 mi) north of the country border with Uruguay (Figure 1). The population of Pelotas at the last Census was 328,275 distributed over an area of 1610 square kilometres giving a population density of around 204 people per square kilometre. The city's economy was based historically on cattle farming and it was an important economic centre for the meat trade in Brazil during the second half of the 19th and beginning of the 20th century. Today its economy has diversified and there is a strong focus on commerce and service industries for the south region of the state (Treptow, 1987). There are also five higher education institutions in the city that bring a large academic population of some 20,000 students.

<<insert figure 1 here>>

The topography of the urban area is flat and on average only 7 metres above sea level. There is a strong presence of water bordering the city with the Arroio Pelotas and Canal São Gonçalo providing navigable access to the Lagoa dos Patos ('Ducks Lagoon'). The climate ranges from humid subtropical to temperate with average temperatures in Celsius ranging from low to mid-teens during the winter months (June-August) and high twenties early thirties during the summer months (December-February). The urban fabric is based on a grid pattern used in Spanish colonial American towns (Figure 2). Despite the struggle between modernity and tradition, and due to the early implementation of preservation laws, Pelotas has one of the richest, homogeneous and best-preserved neo-classical architectural settings in the country (Gutierrez, 2004).

<<insert figure 2 here>>

In Pelotas, as in the rest of Brazil, the bicycle remains a common means of transportation among lower income communities who typically do not have access to private motorised transport and who are inhibited from using public transport because of cost or because timetables do not suit working patterns. Each day around 18,000 (predominantly male) workers use a bicycle as mode of transport (Bacchieri *et al*., 2005). The favourable climate, flat topography, fairly compact urban form and highly connected (gridded) street network appear to provide the fundamentals of a 'cyclable' city. However, cycle infrastructure is still sparse and although some cycle lanes have been provided they are often of very poor quality and do not form part of a coherent network. There is also considerable danger posed to cyclists because of the speed and intensity of motorised traffic as car, and in particular motorcycle, ownership has increased dramatically. Available data for the 5 year period between 2003 and 2007 highlights that cyclists accounted for 11 per cent of all traffic-related injuries and 13 per cent of traffic related road deaths (Prefeitura de Pelotas, 2013) – as noted earlier, bicyclists accounted for around 3.8 percent of road traffic deaths across Brazil during the period 2000–2008 (Chandra et al. 2012). Many incidents go unreported. For example, a population-based survey of cycle commuters in Pelotas revealed that approximately one thousand reported being involved in a road traffic incident causing them physical injury during the previous twelve months on the journey to/from work (Bacchieri *et al*., 2005; Bacchieri, *et al.* 2010). Efforts have been made to reduce the

number of casualties in the city but this has mainly been through campaigns targeted at cyclists to encourage them to maintain their bicycles and to wear protective clothing such as helmets and high visibility equipment and to 'respect the traffic rules' (see for example, Prefeitura de Pelotas (municipal council) website from 2003). It is not uncommon to see official literature and local media and press coverage focus on educational campaigns whilst little is done to improve infrastructure for cycling or to tackle a traffic environment that is becoming increasingly hostile to vulnerable road users (see for example, local newspaper Diário Popular website from 2004).

Pelotas received specialist consultancy from GEIPOT before it was abolished in 1979 (see earlier) when a study for introducing cycling infrastructure was developed. Over the decades it has applied to various other government programmes that include support for cycling infrastructure but has never been successful - the municipality received no feedback from government as to why the city was unsuccessful but municipal officers believe this could be linked to political divide (different objectives between political parties at national and local level) or because the bids were technically weak due to lack of expertise and resources (Personal communication: Officer at Municipality of Pelotas 16/07/2012). However, momentum appears to be gaining as Pelotas has recently been selected to apply for the PAC mobility programme. The bid is mainly focused on improving conditions for public transport but has included cycling infrastructure because of the potential for cycling in the city owing to its compact size and flat topography. Several fairly high profile seminars which have included sustainable transport organisations such as Embarq Brasil have also been hosted in Pelotas to try to generate recognition for cycling and action amongst local policy makers (Embarq Brasil website[1]).

There are two active cycling advocacy groups in the city. Movimento dos Usuários de Bicicletas de Pelotas (MubPel) (Movement of Bicycle Users of Pelotas) originated in 2004 and is estimated to have around 200 members. The objective of the group is to (re)claim space for the bicycle by pressurising the government to build cycle lanes and paths especially for workers (personal communication: Horácio Severi, 12/07/2012). The group organised the first bicicletada in Pelotas which was held on the 1st of May 2004 and it continues to organise other events and campaigns to raise awareness in the local media (Figure 3). More recently, a group was set up in 2010 called Pedal Curticeira which seeks to promote cycling for health, recreation and to access the natural environment, and in so doing, help to develop a culture of cycling in Pelotas. It does this by encouraging the public to take part in organised social rides which typically start in the city centre and head out to the countryside. Participation in rides varies but group rides reportedly consist of between 50 and 100 people during the summer months (Personal communication: Leandro Karam, 16/07/12) (Pedal Curticeira website).

<<Insert Figure 3 here>>

The remainder of this paper draws on exploratory research that took place in December 2011 and January 2012. Over a period of three weeks a multiple methods were used to

understand the significant growth and transformation that is taking place in Pelotas and to reveal the discourses surrounding the perceived role of cycling in the future development of the city. The approach used to gather data was inspired and informed by the qualitative component of the UK Understanding Walking and Cycling study (notably interviews and ethnographic observation) with which the author was previously involved (Pooley et al. 2011; Pooley et al. 2013). Methods used were; a focus group discussion at Pelotas City Council with the newly established urban mobility observatory (Observatório da Mobilidade Urbana); observations during an accompanied ride with a city official and a city planning officer to witness the 'progress' being made to plan cycling into city infrastructure; interviews with participants taking part in the local mass participation ride or 'bicicletada' (critical mass) to understand motivations and aspirations of the participants; and finally, random intercept interviews with cycle commuters to understand motivations and aspirations for future mobility.

Focus group discussion with the urban mobility observatory

The Observatório da Mobilidade Urbana (Observatory of Urban Mobility) was created in 2010 and is attended by up to 20 representatives of the municipal authority urban planning department, public transport operators, local cycle advocacy groups, academics and other local people with an interest in sustainable mobility. Although the group does not have any institutional powers, it has increasingly been the focus for consultation on urban mobility matters including the city mayor. In the words of one of its members, is 'committed to observe, study and develop solutions for urban mobility in Pelotas' (Personal communication: Leandro Karam, 16/07/12). A focus group took place with 12 members of the Observatory in December 2011, which represented the majority of the organisations involved in the forum, to understand perceptions of cycling in the city and the potential and barriers towards its development.

The perception of who currently cycles in Pelotas amongst members of the group reflected wider evidence presented earlier in this paper viz. cycling is performed mainly by males in lower income groups for everyday travel. Cycling was also perceived as a popular form of transport for students at the local universities. The group recognised that there had been a noticeable increase in cycling amongst the middle classes for recreation and health (Box 2). There was a feeling amongst the group that those on lower incomes would continue to aspire to own a car or motorbike as long as cycling was stigmatized and the car promoted as a status symbol of modernity and success. Interestingly, members of the (largely middle-class) forum expressed their role and moral duty to try to influence this trajectory by setting an example and cycling themselves. But whilst many of the forum members cycled to a varying degree for leisure purposes (and only some for transport purposes) there was general acceptance that city cycling was not always practical and that the experience was not always pleasant. For example, concern was raised about the speed and the threat posed by fast moving motor traffic, the perceived culture of acceptance of speeding and poor traffic etiquette, and the lack of enforcement (and absence) of traffic rules. Some members of the group expressed that they simply had learned to adapt to this changing situation by adopting various 'coping mechanisms' such as riding in a more confident

and defensive manner but accepted that current traffic conditions were still likely to deter those who do not currently cycle.

<<Insert Box 2 here>>

Discussion around efforts being made to support cycling provoked quite candid claims that transportation planning at municipal level is still mostly concerned with facilitating car travel. The programme to tarmac cobbled streets within the city centre was cited as an example. There was a perception that this had encouraged the increase in traffic speed and therefore difficulty for pedestrians trying to cross the road and cyclists trying to make left turns. There was criticism that the opportunity was missed to improve infrastructure for walking and cycling when this work was planned and implemented. It was also revealed that there is no strategic plan for a city-wide cycle network in Pelotas and what has been established has mainly been *ad hoc* and a reaction to opportunities that arose and pressure by activists rather than as part of a proactive strategy for cycle network development. Although the city has a masterplan this does not incorporate a mobility plan of any description. It was highlighted that there is a requirement for developers to provide a neighbourhood impact statement when proposing any development (Estudo de Impacto de Vizinhanca - EIV). There was general scepticism, however, whether any attention is actually given to this and real concerns over construction of real estate which continues apace without any serious consideration of non-motorised access or the impact of development in terms of urban mobility.

As noted earlier, the Pelotas street network is based on a grid system and streets are generally wide and are able to accommodate purpose built cycle tracks separated from traffic. However, accommodating them would generally require removing kerbside parking. It was revealed that this is often controversial because the ability to park a car freely on the street outside homes and businesses is seen by the car driving public as a 'right'. Cycle tracks are perceived as a threat to that right and an inconvenience to car users and local business typically resulting in stiff resistance to any proposal for their development as commented on by one municipal officer when revealing reluctance within the planning department to try implement this type of facility, *"If we manage to install a cycle lane we are always scared that in the moment we take space away from car parking there is always the danger that people won't use the cycle lanes and people will say...'but no-one is using them!'"*

Reflections were provided on ways of bringing about sustainable transport in the city (Box 3). Some participants highlighted the problem of short-term strategy and of the need for a long-term vision that would extend beyond the term of the ruling political party of the time. There was also recognition that the municipality lacked the skills to develop an effective cycle network even if strong political will was established. Others could not envisage that cycling could flourish without also making car driving more inconvenient or costly. However, despite the strong desire to protect the city's cherished heritage it was noted that private buildings within the city have been removed in recent years and turned into parking areas *(*estacionamento) to cope with demand including what was once the city's only cinema.

<<insert Box 3 here>>

Observations whilst witnessing infrastructure with city officials

A guided tour around the city of around 10km with city officials (along Avenues Ferreira Vianna, Adolfo Fetter, Dom Joaquim and Domingos de Almeida covering the city centre and neighbouring areas) highlighted the particular problems faced by cyclists riding the streets of Pelotas (see Figure 2).. The most significant piece of recent infrastructure completed within the past twelve months was a two-metre wide two-way cycle track (ciclovia) along the highway Avenida Ferreira Viana which extends the existing cycle lane along Avenida Adolfo Fetter (constructed in 2006) to link Pelotas centre with the Laranjal neighbourhood adjacent to the Lagoa dos Patos some 12km to the east of the city The corridor is heavily trafficked during holidays and the summer months as the local population heads to the beaches of Laranjal. At 3.2km, it is the longest stretch of continuous cycle route in the city. The cycle route is separated from the main highway by intermittent plastic road studs and red and white painted lines that continued across side roads and junction entry points (Figure 4) and is heavily used by workers and also by leisure riders during weekends and holidays. The cycle track stopped short at side-roads and junctions including several roundabouts along the route and on the main approach to the city centre. It was explained that sections of the route were planned to be used for car parking and that the City Council initially did not want to appear to be encouraging cycling along these sections because it 'does not want to take responsibility for the cycle lane' whilst funding was being put in place to complete the missing links.

Resistance to the implementation of cycle structure by some locals was also evident. One resident who initially objected to the cycle track reportedly placed two large rocks on the route outside of their property to prevent the passage of cyclists – cycle activists later corroborated this information and explained how they had got together and removed the rocks. The officials explained that the middle-income residents along the route had objected to the route on the grounds that it would attract 'the wrong type of people' and by this it was meant 'poor people'.

Infrastructure built within the previous decade was also visited which included an obstacle strewn contraflow cycle lane (ciclofaxia) along Avenida Domingos de Almeida (Figure 5) and a marked cycle lane along Avenida Dom Joaquim barely one metre wide parallel to the central reservation of a two-lane avenue (Figure 6). Not surprisingly the majority of cycle users were reported to avoid - and indeed were observed avoiding - this lane sticking closely to the kerb near the footway (or riding the footway) adjacent to the slow traffic lane. They were also observed deliberately contra-flowing traffic within the gridded one-way system in order to avoid elaborate detours along one-way systems put in place to improve traffic flow and manage kerbside car parking. When asked about this 'deviant' behaviour, the officials commented that they understood (and sympathised) with what cyclists were seeking to achieve by this but were unable to confirm whether any infrastructural improvements or adaptations were going to be put in place to try to resolve it. The accompanied tour ended with recognition that the city council was still at an early stage of developing comprehensive cycle network. The

feeling amongst the officials was that political will to improve infrastructure for cycling had never been stronger but there was an urgent need to secure finance and the skills to develop a suitable cycle system.

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Interviews whilst taking part in a mass bicycle ride (bicicletada)

Personal participation in the local bicicletada at the beginning of January 2012 provided the opportunity to observe participants 'in action' and to briefly interview some of them to try to understand why they were motivated to take part. Riders converged in the city centre for the 15km round trip from the city centre to the Laranjal neighbourhood along the Avenida Adolfo Fetter cycle route. The event was attended by around 30 people consisting of largely younger males but women and families with children were also present (YouTube website[2]). The bicicletada in Pelotas typically takes place at least once a month during the evening so that people have time to leave work and join the event. Routes for the procession are varied but generally avoid using roads or holding up motorised traffic because the aim is to provide a celebratory and non-confrontational social event. Most participants were observed wearing helmets and protective gear in the form of reflective sashes and the sense of personal responsibility for safety was apparent. The group largely consisted of those from middle-income groups on new or well-maintained bicycles and provided a stark contrast to the bicycles used by workers on an everyday basis on the streets of Pelotas. Short interviews with around a dozen participants (including families with children) revealed a recurrent theme of the enjoyment and sociability of taking part but also of the desire to promote bicycling by standing up and being counted. Essentially, participation was about putting the body and bicycle on public display in the hope of gaining publicity and support for the development of better cycle infrastructure.

<<insert Box 4 here>>

Interviews with cycle commuters

Random street interviews were conducted with a small sample of fifteen cycle commuters in December 2011. Riders were intercepted in the city centre and at the Marina Ilha Verde Condominio (gated community) along Avenida Adolfo Fetter as they made their way to or from their workplace. Participants were male lower paid workers aged between 34 and 56 years and were largely 'typical' of the population who cycles in Pelotas. Nearly all had ridden a bicycle since childhood and now used a bicycle as a means of transport on most days of the week. As well as general questions about bicycle use (e.g. How long have you been riding a bicycle? Why do you ride? How often?) the discussions focused on the experience of riding a bicycle in Pelotas and whether there were ambitions to stop cycling and to purchase a motorbike or a car.

The recursive theme when discussing the experience of cycling in Pelotas amongst the majority of those interviewed was the lack of respect towards cyclists by other road users. Comments were typically supplemented with specific recent examples of negative interactions with motor vehicles and the need to ride with caution. Even the

minority of participants who did not explicitly express any personal fear of cycling in traffic recognised the need for confidence and defensive riding. It is often assumed that the majority of those who use the bicycle as a principal means of transport in Brazil do so because they have to and few do so by choice. For example Presada (1999; p403) states, 'Ask any one of them [workers] if they would change their bicycle for a car and you will invariably get an enthusiastic and resounding "yes", no matter how poor, under educated or under privileged'. The street interviews highlighted that the picture is more complex. The ambition to transfer to cars and/or motorbikes was commonly expressed but this was far from emphatic and those interviewed were more ambivalent. Some expressed that they had no interest in abandoning cycling, and even those who had mixed feelings and/or were in the process of thinking about the purchase of a car or motorcycle, expressed their desire to continue to cycle at least some of the time.

<<insert Box 5 here>>

Discussion and Conclusions

This paper set out to provide an overview of the current socio-cultural and political state of cycling in Brazil and to outline the policies and activities over recent years to promote cycling as part of a drive towards sustainable urban mobility. It began by highlighting that the combination of rising incomes; increased availability of credit; government tax breaks to the auto industry; and relentless advertising linking ideas of progress and Brazilian identity with automobility; are fuelling a rapid rise in the number of motorised vehicles on Brazilian roads. It also revealed that within this context cycling for transport in Brazil is 'invisible' mainly because it is performed by low-income groups and a cultural stigma is associated with its practice. On the other hand recreational cycling is visible mainly because it has been adopted by an increasingly leisured middle class and practiced within designated boundaries including purpose built trails and esplanades (Copacabana, Rio de Janeiro being one example). All of this means that cycling amongst predominantly poor male workers on Brazil's roads is becoming increasingly hostile and dangerous, casualty rates are increasing and the incentive for abandoning cycling more obvious.

Whilst some may argue that the traditional approach to transport planning in Brazil with 'mobility as prime objective' persists, Rodrigues da Silva *et al*. (2008) have noted that the concept of sustainability within urban planning and mobility, has started to be incorporated to varying degrees across Brazil reflecting the different (and profound) economic, social and cultural differences between the Brazilian regions. This is partly driven by the increase in activity over the past decade in the adoption of various policies and programmes for cycling by the current Ministry of Cities and the recent adoption (January 2012) of a directive mandating the development of urban mobility plans by states and municipalities. It was also highlighted that cycling advocacy is on the rise in Brazil. In some municipalities this has been partially successful in both raising public attention and increasing the policy focus on cycling but has also generated conflict exemplified by the incident during a mass protest bicycle ride in Porto Alegre in February 2011.

Attention then turned to the case study of the city of Pelotas based in Rio Grande do Sul in the south of the country, a less prosperous region than Rio de Janeiro or São Paulo. Exploratory research using multiple methods revealed the high potential for cycling and indeed the significant level of cycling that already takes place in the city amongst the poorer workforce. It also revealed the alarming rate of cycling casualties involved in road crashes and that efforts to date to deal with this problem typically focus on publicity campaigns urging cyclists to take responsibility for themselves through proper maintenance of bicycles and the use of protective gear (and some might say, 'keeping out of the way of traffic'). Personal observations when accompanying council officers and cycling around the city confirmed that infrastructure is poor and recent developments have either omitted cycling altogether or have created conditions that do not improve the situation for cyclists because they are incorrectly or impartially implemented. The focus group revealed that this can be attributed to lack of skills and resources within the municipality or fear of backlash from the motoring public with aspirations of modernity. Moreover, it was widely acknowledged that there is a general disregard for traffic laws by motorists and lack of enforcement by the authorities which puts vulnerable users at increased risk (as the high rate of traffic casualties amongst these groups appears to confirm).

Momentum does, however, appear to be building in Pelotas with the recent development of a 'mobility observatory' involving a variety of stakeholders (which has started to be consulted by the mayor's office), growing pressure from advocacy groups of mainly middle class interests and publicly visible and increasingly populated mass cycle rides known as 'bicicletadas'. Indeed, the implementation of recent cycling infrastructure by the municipality is believed to be a result of this persistent pressure. Despite this, cycle planning within the municipality is at an early stage and a strong vision and strategy backed by the necessary resources (and skills training) is still lacking. Public debate has started to happen, for example, through public events spurred by recent developments promoted by Embarq in the State capital, Porto Alegre (Embarq website[2]). The notion of the bicycle being a solution to a multitude of policy objectives including reducing the impact of motor traffic and congestion, protecting Pelotas's unique built heritage, encouraging social inclusion and promoting health is starting to form part of local authority discourse.

Transport in Brazil is at a crossroads with cities across the country experiencing severe traffic problems. As incomes rise and credit becomes available, there is a danger that lower paid workers will abandon cycling (walking and public transport) altogether, purchase personal motorised transport, and join those already contributing to urban transport problems. The momentum does appear to be building for policy makers to adopt more sustainable approaches and to cater for a pluralistic transport system rather than one solely based around accommodating more motorised traffic. There is recognition at government level that a proper cycle system needs to be embedded in the urban fabric to restore safety and dignity for the 'invisible' population that already cycles out of necessity (and who may be thinking of purchasing a car) and that is sufficiently safe and attractive to encourage the middle classes to use the bicycle for at

least some short journeys. Perhaps the biggest challenge for national government, states and municipalities is, not so much engineering infrastructure, but developing a culture where cycling is seen as a normal part of Brazilian mobile identity. This is important if policies to promote use of that infrastructure are to succeed.

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BOXES TABLES AND FIGURES

Box 1: Development for cycling in Rio de Janeiro

Rio de Janeiro

The quantity and quality of cycle infrastructure between states and municipalities varies but Rio de Janeiro is perhaps the city that has progressed most in terms of developing cycling (Golub, 1999). In 1991, under the project name *Rio Orla,* Rio's cycling facilities started to be built along the promenade at Ipanema, Copocabana and the neighbourhood of Barra da Tijuca as part of the preparatory process of Rio '92, the United Nations Conference on Environment and Development. Since then the city has made steady progress developing its cycling system. At state level the Transport Secretariat coordinates the program "Rio, Estado da Bicicleta" whilst the municipality of Rio de Janeiro, through the Municipal Environment Secretariat (SMAC) runs the policy program "Rio, Capital da Bicicleta" (da Silva *et al.*, 2011). This is supported by a working group "GT Ciclovias" with representatives of other municipal Secretariats and input from cycling advocacy groups such as Transporte Ativo (Transporte Ativo website). Work has also been supported by international NGOs such as the Dutch organisation I-CE (Interface for Cycling Epertise), ITDP (Institute for Transportation and Development Policy), Clinton Climate Initiative (Clinton Foundation), GIZ (German International Cooperation) and Movilization Foundation. To date around 240km of cycle paths have been developed and there are plans to extend the network to 450km by 2014 (Bici Rio website). A public bicycle hire scheme, BikeRio (Bike Rio website) also began operating in October 2011 with 34 automatic hire points (accessed by credit card or cellphone) and a total of 340 bicycles. The system is widely regarded as a success with reports that up to April 2012, the scheme had 66,000 registered users with 500,000 journeys having been made and an average of around 4,000 trips a day (Respostas Sustentáveis website) – similar systems are in operation across Brazil in Petrolina, Porto Alegre, Porto Leve, São Paulo and Sorocaba (Mobilicidade website). Fresh impetus was given to developing cycling infrastructure and programmes following the Rio+20, the United Nations Conference on Sustainable Development in 2012 and current plans are underway to ensure cycling infrastructure and the public bicycle hire scheme is expanded in time for the FIFA World Cup Brazil in 2014 and Olympic Games Rio 2016.

Box 2: Focus Group Comments

Perceptions of who cycles in Pelotas

"Workers on low income using the bicycle and also young people linked to academia"
Officer 1, Municipal Secretary of Safety, Transit and Transport, Pelotas City Council.

"People who use the bicycle because they need to and not because they are conscious [about benefits to the environment, health etc]"
Cycling Advocate, MubPel.

"Workers but also middle classes are cycling for leisure"
Cycling Advocate, Pedal Curticeira.

Symbolism of the car & 'setting the example'

"Many workers change the bicycle as soon as they can afford a motorbike or a car. It is more convenient to sell the *vale transporte* [public transport pass provided by employer] to get the money to buy a motorbike in installments"
Director of public transport company.

"To own a car here is a status symbol. As people perceive the country as developing the car becomes a symbol of development. The television sells this image"
Officer 2, Municipal Secretary of Safety, Transit and Transport, Pelotas City Council.

"We are a group of social activists that have some influence at a 'higher level' and are getting support from younger people and from people who come to study in Pelotas and bring a different way of thinking. However, the car is very attractive still for low-income groups - it [confers] status, convenience - added to the lack of investment in infrastructure for cycling. The pressure for having a car is stronger than the pressure that the activists can make. If the situation does not change it will be very difficult to encourage more cycling." *Director of social cooperative for transport workers.*

"I use the bicycle to give an example". *Academic at local university.*

"We are opinion formers so we are examples".
Officer 1, Municipal Secretary of Safety, Transit and Transport, Pelotas City Council.

Experience of cycling in Pelotas

"I am scared of the cars. When I moved to Pelotas I tried to use my bicycle in the beginning to go to work but gave up because I felt unsafe. Now I use buses and walk."
Journalist at local newspaper.

"I think we have already advanced a bit. It is not ideal but it is a lot more than we had. Before I was scared of cycling on the road. Now I am less scared because the more you ride your bicycle the more confident you get and you learn to be firm in relation to the car. We are not free, we are women...but we get more confident."
Officer 1, Municipal Secretary of Safety, Transit and Transport, Pelotas City Council.

Box 3: Focus Group Comments continued…

Visions on how to achieve a cycling culture in Pelotas

"We need to have a plan for the city for the next 20 years and we need this to last through governments. That is what we are trying to achieve. Together with different people we are seeking to develop a strong vision. But we need someone from outside to help us with that vision and plan."
Director of public transport company.

"As well as the need to improve public transport and walking and cycling we need to restrict cars in the city through taxation and reduced parking. It is difficult to think about improving cycling without restricting the car. But because historically the city lacked any strategic plan for the rise in car use it does not have the ability to accommodate the current growth in demand which is leading to increased congestion. This will automatically make it difficult to use the car."
Officer 2, Municipal Secretary of Safety and Transit and Transport, Pelotas City Council.

The most important thing is political will. Our group is very important and we need permanent actions and not only on car-free day. We need to change political attitudes or nothing will happen. We already have examples...many city streets were tarmacked during this government but no cycle lanes were provided when they could have been from the start. There is some funding now so apparently there might be some cycle lanes being retrofitted in some of the streets but this came later. So there is a gap between actions and intentions and this is due to lack of political priority. But I believe we can be a cycling city."
Officer 1, Municipal Secretary of Safety and Transit and Transport, Pelotas City Council.

Box 4: Comments from participants of Bicicletada

"I take part because as well as being a pleasurable activity it is one of the best alternatives to the traffic problems that we have...and there are many. But also because I can take my son - he is eleven years old - and this can raise his awareness of his option [of cycling] as a viable alternative for his generation."
Male, 30s.

"These activist groups are important to spread the idea to society but I still think we need cycle infrastructure. If there is no infrastructure there is no way, we need to feel safe. [Me: Why are all these car horns sounding?] The horns are to support us. There are people who find it very cool…until one of us gets in their way, and then they don't like it!"
Male, 20s.

"Pelotas is a city for bicycles because the topography is totally flat and it is easy to cycle [but] you have to make cycle lanes."
Male, 60s.

"I like to ride my bicycle and it might be interesting to ride in a large group. I have never been before, this is my first time."
Male, teenager.

Box 5: Comments of cycling commuters

Experience

"People don't respect you. If you don't take care of yourself they pass over you. I've never had an accident but a friend of mine did and the car didn't stop when it should have." *Male, 30s, Cycled from Barro Duro neighbourhood*.

"I respect everything but there are many motorists who don't respect me. For example they turn in front of you. The problem is that we don't have a specific lane for us."
Male, 20s, Cycled from Porto neighbourhood.

"I always suffered lots of abuse from cars and motorbikes. In Pelotas motorists don't respect cycle lanes either. Our culture is very different. North of Porto Alegre people already respect the cyclist. It is very different."
Male, 40s, Cycled from Navegantes neighbourhood.

"Best thing ever. I don't feel threatened. I cycle contraflow, do whatever, it is good for my heart. I am very confident. The cars don't bother me. I won't take the bus."
Male, 40s, Cycled from Areal neighbourhood.

Ambitions for motorbike/car ownership

"This year I want to buy a car because it is more useful for my work as a gardener to carry the equipment."
Male, 30s, Cycled from Barro Duro neighbourhood.

"I have started paying for a car [but] I don't want to let the bicycle go."
Male, 50s, Cycled from Getulio Vargas neighbourhood.

"No [ambitions to buy a car] because I don't know how to drive. I would like to change the bicycle for a motorbike."
Male, 30s, Cycled from Navegantes neighbourhood.

"I am used to my bicycle, I would never change my bicycle for a car or a motorbike. My wife sometimes rides a bicycle and my daughter always goes to school by bicycle"
Male, 40s, Cycled from Areal neighbourhood.

"Yes' I'd change my bicycle for a car or a motorbike."
Male, 30s, Cycled from Central area.

"Yes, I'd change [for car but not motorbike]. Because it's faster."
Male, 20s, Cycled from Porto neighbourhood.

"I wouldn't change to a motorbike not even for free as it's too dangerous. I already had a car but had an accident and sold and now I use a bicycle."
Male, 60s, Cycled from Pestano neighbourhood.

Table

Table 1: Indicators of mobility across different sized cities in Brazil

Size of population (thousand)	Average trips/person/day					
	Total	Public transit	Car	Motorbike	Bicycle	Walk
60-250	0.97	0.27	0.18	0.03	0.06	0.43
250-500	1.17	0.36	0.29	0.03	0.04	0.45
500-1000	1.46	0.44	0.48	0.02	0.03	0.49
1000+	1.78	0.62	0.60	0.03	0.02	0.52
Total	1.34	0.43	0.38	0.03	0.04	0.47

Source: ANTP, 2004 (Table 132, p135)

Figure 1: Division of Brazil into Sates (and location of Pelotas, Rio Grande do Sul).

Figure 2: The Pelotas street network

Source. G. King.

Figure 3: The first bicicletada in Pelotas on the 1st May 2004.

Source: H Severi.

Figure 4: Two-way cycle track along Avenida Adolfo Fetter

Source: G. King.

Figure 5: [Cyclist ignoring] Narrow cycle lane along Avenida Dom Joaquim

Source: G. King.

Figure 6: Two-way contra-flow cycling along Avenida Domingos de Almeida

Source: G. King.