Capturing the cycle-scape in Chiang Mai
Realities and obstacles

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Abstract

As the cycling renaissance in the Northern Thai city of Chiang Mai is gathering pace, this paper examines the driving forces behind its revival; both in an international and a local context. It discusses how the climatic and geographic characters of the city have helped to propel it into an emerging hub for international cyclists. It attempts to document a more accurate account and to highlight the characteristics of cycling in the city by collating with both the statistics gathered from the latest city transport survey and fresh primary data gathered from a series of questionnaire surveys specifically targeting local cyclists. Using these statistics this investigation reveals a growing disparity between the increasing number of bicycle owners and the actual number of bicycle trips made in the city. Furthermore, comparing the primary data against the survey statistics reveals shifting demographics of cyclists in and around the city, and an evolving function of the bicycle. Crucially, this study for the first time identifies cyclists' perceptions of riding in the city, including specific obstacles they face in experiencing the city via the saddle. These elements are then spatially mapped in order to assess the suitability of cycling in different areas of Chiang Mai. The findings suggest parts of the city that are less developed where it contains the natural backdrops of the urban fabric is fuelling the growth of cycling; while the more developed aspects of the city, particularly areas that have been modernised in the latter half of the last century, are posing the biggest hindrance for cyclists. This study hopes to shine a new light on the city's cycle-scape and develop a better understanding of the realities of cycling in the context of Chiang Mai.

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Introduction:

The popularity of cycling is growing in the Northern Thai city of Chiang Mai, where in the past few years have seen an unprecedented increase in the number of cyclists and a boom in service sectors based around the bicycle. This growth is a direct reflection of a world-wide trend initiated in a European context throughout the past decade that witnessed the revival of cycling, both on the roads, in the discussion tables and policy papers of transport planning agencies. In the context of Chiang Mai, cycling as a mode of transport has at last been recognised by both government organisations and planning authorities, resulting for the first time in its inclusion in the latest transport survey carried out between 2011 and 2012 (Jittrapirom and Emberger, CM-MTS, 2012; p.14). This renewed optimism for the two-wheeled, human powered transport is a small triumph in the progress of sustainable urban development, particularly in a city and in a culture that has been and is still much dominated by the automobile.

The data from the CM-MTS survey for the first time reveals key statistics regarding cycling in relation to other modes of transport in Chiang Mai, including mode share, ownership, distance and duration of cycling trips, their origins and destinations and other figures. But despite the wealth of statistics, the survey does not specifically uncover the perceptions of cyclists in the city, in particular, the obstacles they face in experiencing the city via the saddle.

The purpose of this paper firstly is to examine the drivers behind the revival of cycling, both in the international context and its filtration into Thailand and in particular into Chiang Mai, the climatic and geographic characters of the city are discussed to further explore how it helped to fuel the rise of cycling in the city and its emergence into a hub for international cycling. The main focal point of the study uses both statistics gathered from the transport survey and fresh primary data specifically targeting local cyclists, in an attempt to depict a more accurate image of the characteristics of cycling in the city. In doing so, the study unravels cyclists' patterns, behaviours and their perceptions of cycling in the city, including cyclists' experience of different types of obstacles. In turn these are then spatially mapped to paint a broader picture of the relationship between cycling and the wider context of the city. The findings not only help to uncover the current state of the cycle-scape of Chiang Mai, they also provide insightful information for future planning policies on sustainable non-motorised transport systems for the city.

The rise, fall and the revival of the bicycle

The bicycle has an enduring relationship with the Thai society. Since its arrival some 136 years ago in 1877; it has played a critical role in the transformation of both its cities and citizens. The bicycle was once a common sight throughout the nation's streets, as ubiquitous as the automobile in contemporary cities (see images 1-6). It provided a new means of personal mobility, and enabled many to travel for a longer time and a greater distance. As a result, it can said to have contributed towards the urbanisation of cities by the increasing mobility and milieu of the general public.

However, the general use of bicycles, as a mode of transport in Thailand, experienced a dramatic decline from the 1960s onwards, when the government initiated incentives to kick-start the automotive industry in order to rebalance the economic and trade deficits with foreign counterparts (Chiasakul, 2004; p.2). As automobiles became more affordable, an increasing number of the general population became owners; the bicycle on the other hand slowly became an old-fashioned, out of date relic. It was perceived as a mode of transport for the lower class and the poor. As Dhingra et al. have suggested, the bicycle over the years became associated with backwardness and poverty (Dhingra and Kodukula, 2010; p.1), and as a mode of transport, it shifted from a preferential mode into a captivative mode (Jain and Tiwari, 2009; p.1).

For nearly half a century, the bicycle slipped off the radar of numerous transport planners and policy makers, particularly in developing nations such as Thailand where urban development was mainly aligned with the automobile, which as a result triumphed as the dominant mode of public transport and driver for urbanisation. However, as climatic concerns came to the forefront of political and economic dialogues throughout the late 1980s and early 1990s, the bicycle 're-emerged as a cleaner, greener emblem of progress' (Fleming, 2012; p.49). This re-emergence initiated in a Western context, which after years of auto-centric development, started to rediscover the environmental and sustainable benefits of this two wheeled man-powered device.

During this transformative period the bicycle underwent an identity metamorphosis. Prior to the revival, the bicycle was strictly either a utilitarian mode of transport, a sport and recreation device or a child's toy. After the revival, the bicycle re-emerged as an icon of fashion, popular culture and a symbol for a healthy and well-minded lifestyle. Cycling became 'chic' and trendy; it is increasingly being used as a tool by marketing agencies and

major global brands (Fleming, 2012; p.49). Thus, the bicycle in contemporary cultural society has transcended its image as a simple mode of transport, recreation device or toy; it has become a symbol of fashion, of protest, of triumph, a tool to depict an alternative way of living and a mode of personal expression.

By the late 1990s, a growing number of international government agencies, environmental bodies, designers and think-tanks started to utilize the bicycle as one of the main drivers for initiating sustainable urban developments and renewal. Cycling became an apparent remedy that has the potential to alleviate environmental, social, infrastructural and a host of other urban ailments. Cities like Bogotá in Colombia, which have famously championed non-motorised transport and have since built one of the most extensive networks of cycle infrastructure, has increased the cycling mode share from 0.4% to 4% through its 'CicloRuta' and 'Ciclovia' schemes, which have helped to relieve the city's congested streets and contributed to the reduction in air pollutants (Wright and Montezuma, 2004; p.6-12). At the same time, there are strong evidences that suggest these cycling initiatives also helped to improve the city's economic, employment and social well-being (Wright and Montezuma, 2004; p.7-13). Like Bogotá, an increasing number of cities globally are following the trend in promoting cycling and implementing cycling campaigns to be included in their infrastructure planning and transport policies. One encouraging development stemming from all these 'cycle fever' activities is the creation of public use bicycle system (PUB) schemes in numerous cities worldwide.

The PUB system is a flexible non-motorised transportation system intended for general public use. The advantage of this system is to encourage more people to cycle without the worries of cost and theft (Leopairojna and Trakulvech, 2008; p.56). A handful of PUB systems have been in operation over the years, such as the 'Witte Fietsen' in Amsterdam and 'Bycyklen' in Copenhagen (DeMaio, 2009; p.2). The current generation of the PUB system was first introduced in 1996 by Portsmouth University (Bikeabout) in Southern England, which used electronically fitted bicycles that allowed users to rent the bicycles via a magnetic strip fitted card (DeMaio, 2009; p.3). PUB systems in the last decade have spread to numerous locations globally, from developed cities like New York, London, Berlin, Paris, to developing cities like Buenos Aires, Rio de Janeiro, Beijing and Mumbai, just to name a few.

Images 1-6, historical photographs depicting the prevalence of bicycles in Chiang Mai before the automobile became the dominant mode of public transport. As early as in 1902 the public can already be seen riding bicycles in the city (image 3). Even school children had lessons on how to ride the bicycle safely in the city, such as shown in image 5 of school children in Dara Academy. (Images 1 and 5 source: Satrabhaya. B, Lanna mua tawa (Yesteryear Lanna); 2007. Images 2, 3, 4 and 6 source: Satrabhaya. B, Chiang Mai in Memories; 2011)

In the context of Thailand, the revival of the bicycle can be traced to two sources. On the one hand, decades of auto-centric developments since the 1960s have resulted in a myriad of social and ecological concerns; the Thai capital has been particularly hard hit, with decreasing environmental standards having a major impact on the health and well-being of a large portion of its inhabitants. These include increasing traffic and congestion, as the city

contains almost half the automobiles in the whole country. Moreover these automobiles have created increased air pollution, which is found to frequently contain levels of suspended particulate matter between 200-400 times higher than recommended World Health Organisation levels, and carbon monoxide is 50 times higher, at the same time Bangkok's water has been contaminated by illegal dumping of chemical and other pollutants, turning the lower reaches of the Chao Phraya river to almost anaerobic levels (Glassman and Sneddon, 2003; p.97). Prompted by the urgency of the decline, citizens started forming awareness groups and organised public events to highlight their concerns. As early as 1991, campaigns started to appear in Bangkok that attempted to reintroduce the use of the bicycle back into the capital, organisations such as 'Thai Cycling For Health', sought to promote the use of bicycle to fight against problems of traffic, air pollution and energy consumption. Large public events are taking place across the city with growing frequency and increasing numbers of participants; events such as 'Bangkok Car Free Sunday' attracted only 150 participants in 2005, but are now pulling in nearly 20,000 participants in 2013 (bigstory, 2013).

On the other hand, the revival of the bicycle in a Thai context can be attributed to the country's insatiable appetite for foreign, particularly Western derived trends. The numerous shopping malls scattered across the metropolis, the access to the latest fashion trends and consumer electronics technology and the increasing ubiquitousness of advertisements throughout the city, are a reflection of the growing consumerist culture in this nation. As Marc Askew suggests, 'the lifestyle of its inhabitants share with those of the bustling cities of the region an engagement with the driving imperative to survive as well as to accumulate the status symbol of a global age, extending from housing and technology to the fashioning of the modern body' (Askew, 2002; p.15). Thus with the rising utilisation of the bicycle alongside fashion merchandises, and the popularity of Western government authorities and planning agencies employing the bicycle as a tool for urban redevelopment, it can be said it was only a matter of time before the bicycle as a trend infiltrated the Thai consumer culture.

Cycling in the context of Chiang Mai- *Characteristics and realities*

Chiang Mai is the largest city in North Thailand and also the most culturally significant. From the 13th to the 18th century the city was the capital of the Lanna Kingdom. As a result, numerous historically important sights and cultural relics draw in one of the largest

tourist numbers in the country after Bangkok. Whilst cycling tours in and around Chiang Mai have been a tourist staple for some time, the city's reputation as a hot spot for avid and competitive cycling has only been emerging in the past few years. Its feature in prestigious international online cycling magazine forums such as 'Rouleur' (Rouleur, 2011) and 'Adventurecycling' (Adventurecycling, 2010) is a reflection of its emergence as a global cycling destination (Seattleglobalist, 2014).

Images 7-12, group riders in Huay Ting Tao, Mae Hia and Doi Suthep, images 13-14. Chiang Mai Bianchi twilight ride, organised by Bianchi Thailand and TCA, images 15, Chiang Mai's first 'Critical Mass' event, images 16-18, cycling environments in Mae Rim, Doi Kum and Hang Dong. (Source, by author)

The rise of Chiang Mai into a cycling hotspot can be attributed to the city's possession of a set of unique geographical and climatic characters that facilitates a multitude of cycling disciplines. On the one hand, the city's more temperate Northern climate generates a cooler, less humid and more refreshing setting making cycling a more enjoyable experience compared to the Central or Southern parts of the country. On the other hand, Chiang Mai's geographical location along a valley surrounded by some of the highest mountains in the country translates into a myriad of paved country lanes criss-crossing picturesque rice paddies, and steep hill climbs amidst lush tropical forests that create ideal conditions for road cycling. Areas such as Mae Rim, Mae Hia, Hangdong, Samoeng and Sampatong attract a high number of road cyclists on evenings and weekends (see images 7-9, 16, 18). Meanwhile, up in the foothills surrounding the city, where local villagers over the years have created an extensive network of paths and tracks once used for foraging and hunting, are now transformed into ideal mountain biking tracks and downhill trails (see image. 17).

One phenomenon that can be seen in Chiang Mai over recent years that reflect this growth is the numerous cycling clubs appearing across the city. Venturing into its urban vicinity in evenings and weekends, large gatherings of cyclists on the streets can often be seen. These cycling clubs and meetings range from small privately organised affairs (see images 10-12) to large corporate sponsored events such as 'Bianchi Cycling Club Chiang Mai' (see images 13-14), arranged by one of the main merchants in the city and often meet at weekends for group riding sessions. Others big events such as 'Chiang Mai Sunday cycling club' and 'Chiang Mai Na Thip' often attract a large number of riders. And recently, the city hosted its first 'Critical Mass' event (see image. 15), a worldwide cycling movement that originated in San Francisco with the aim of encouraging and celebrating urban cycling through the mass participation of cyclists (Telegraph, 2008). Beyond the amateur scene, Chiang Mai in recent years is also attracting professional cycling races both in the road and mountain bike categories, these include 'The Masters Tour of Chiang Mai', 'the Tour of Eastern Lanna', the 'King's cup' and the 'Queen's Cup' events which are regularly held around Chiang Mai. In addition, the city even hosted a number of international road racing teams, who reside in the city for their off-season training (Cyclingtips, 2013).

Yet besides the climatic and geographic characters, the density of the urban fabric, particularly within the old city, with its intricate layers of residential, commercial, institutional and industrial complexes, plays a critical role in sustaining and propelling the growth of cycling. Since a large proportion of everyday activities and social interactions occur closely

involved with each other and in familiar form to the trip maker, numerous journeys taken each day can be described as what Gary Gardner referred to as 'bike-sized' journeys (Gardner, 1998; p.18).

In addition to the visible increase of cyclists on the city streets, part of the findings from the survey also reflected increasing number of cyclists. For example, comparing the ownership of bicycle from Punravee's 2002 survey and the 2012 CM-MTS survey, the figures show a dramatic increase of 13.74% (Jittrapirom and Emberger, CM-MTS, 2012; p.87), to put that into perspective, motorbike ownership in the same period has risen by only 4.67% (ibid). Moreover, the survey found that between 2011- 2012, 6% of journeys surveyed in Chiang Mai were made by the bicycle (see fig. 1), If we compare this figure with other major developed cities such as Vancouver, which has a 4% mode share, or London, which has a 2% mode share, or New York, which has a 1% mode share (Ely and Brick, 2012; p.51), then Chiang Mai can be said to be a small triumph for the progress of sustainable development in urban planning.

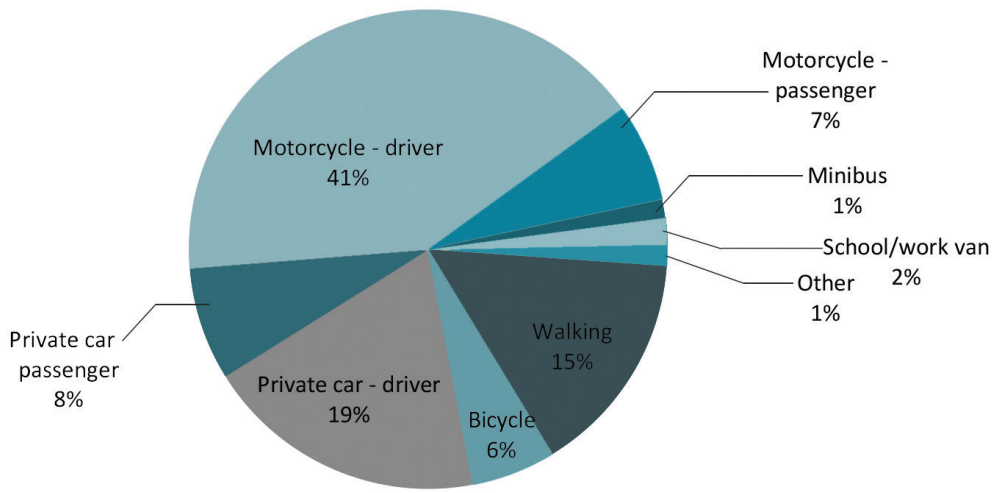


Figure 1, Mode share of different transports in Chiang Mai. Source: (Jittrapirom and Emberger, CM-MTS, 2012; p.41)

However, if we compare those figures to cities with more established cycling cultures such as Tokyo, which has a 14% mode share, or Copenhagen which has a 36% mode share, or Amsterdam which has a 38% mode share (ibid.), in this case bicycles in Chiang Mai can be said to be no more than decorative items for the streets and policy papers.

Despite the visible increase in the number of cyclists and cycling clubs in the city, other figures from the survey also suggest disparities between the increase number of bi-cycles owners, the bicycle mode share in Chiang Mai and the actual bicycle utilisation by local inhabitants. For example, 'Bike-sized' journeys, further suggests Gardner, are travel distances typically between 3.2km (surveyed in America), and 4.8km (surveyed in Holland) (Gardner, 1998; p.18). If we compare those distances to Chiang Mai, the average bike journey lasts a mere 1.1km (see fig. 2). On the one hand, this could suggest there are high numbers of short journeys in the city being undertaken by the bicycle; but on the other, it could also suggest bicycles are not being fully utilised across the city, and cyclists are being prevented from undertaking longer trips. This becomes even more evident if taking into account the average overall transport trip distance in the city, which is 4.0km (see fig. 2), suggesting a high number of journeys taken in the city each day fall in between Gardner's category of 'bike-sized' journeys surveyed in America and Holland.

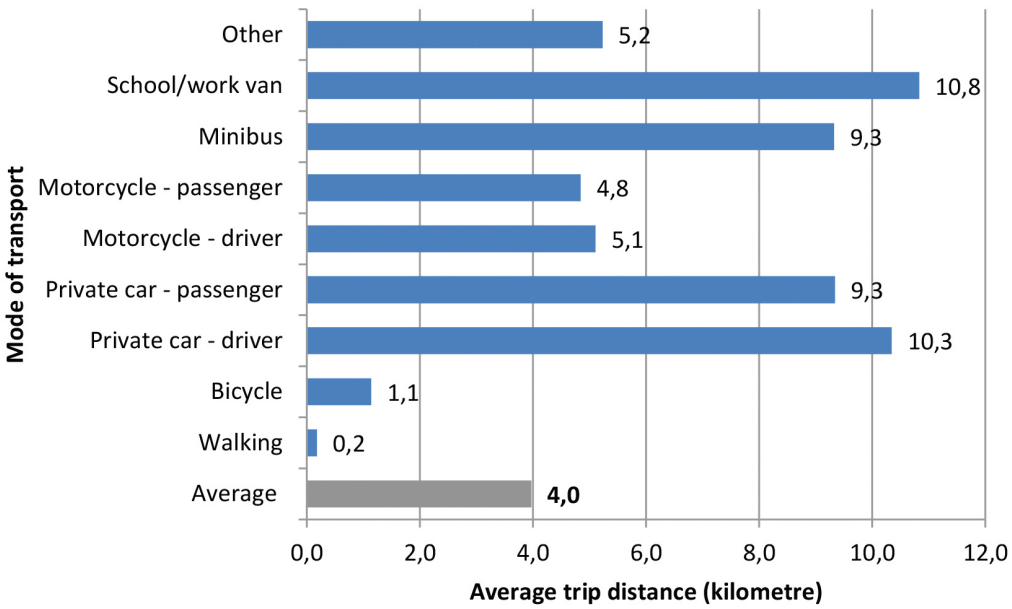


Figure 2, average trip distances by different modes of transport in Chiang Mai. Source: (Jittrapirom and Emberger, CM-MTS, 2012; p.46)

The findings from the survey in part support the visible increase of cyclists on the city streets, but at the same time undermine the optimism of the increasing number of

cyclists in Chiang Mai. The result strongly suggest the dramatic increase of bicycle owners did not translate directly on to the city streets and the average distance of cycling trips, instead, it uncovered a huge potential of journeys undertaken each day in the city can be converted from the automobile and the motorcycle to the bicycle. These figures can be said to represent a single facet in a kaleidoscope of scenarios that combine to depict the broader picture that represents the cycle-scape in Chiang Mai, and despite the wealth of statistics, the survey does not reveal perceptions of local cyclists in the city, in particular, the obstacles they experience.

Methodology, Findings and Analysis- *Patterns, behaviour and obstacles affecting cyclists*

In order to gain more insightful knowledge on perceptions of local cyclists in Chiang Mai, 101 participants living or working in the city were recruited across the core municipality districts to participate in face to face questionnaire surveys. The field study was conducted throughout March of 2014 over a period of fourteen days. The time of survey was conducted daily in 2 different shifts, one from 8am to 10am, and the second from 5pm to 8pm; this was done in an attempt to focus the study on local commuter cyclists going to and from work. The sample groups were selected through geographic cluster sampling method, (Daniel, 2012; p.152-155), which divided the participants into 16 sampling groups that represented the different sub-districts (tambon) that combine to form the core municipality area of the city (see fig. 3). Within each tambon, a randomly selected group of cyclists was further recruited from the streets. An average of 6 cyclists were interviewed per each tambon, however for tambon Chang Peurk 9 cyclists and tambon Suthep 8 cyclists were interviewed, this increase reflected the higher residential population in these 2 tambons. Before each questionnaire survey was conducted, the participants verified they lived and worked in the city and were also living in the local vicinity; two prerequisites that were crucial in order to meet the compatibility of the participants to survey and establish an equal distribution of the sampling group in their respective tambon. The questionnaire survey itself was further divided into two parts. The first part consists of 13 multiple choice questions that gathered the demographics of the cyclists and their cycling behaviour and patterns. The second part consists of 6 open ended questions that attempted to uncover their perceptions of cycling in the city, in particular identifying the obstacles they faced, which are then mapped to reveal different parts of the city that facilities and hinders cycling.

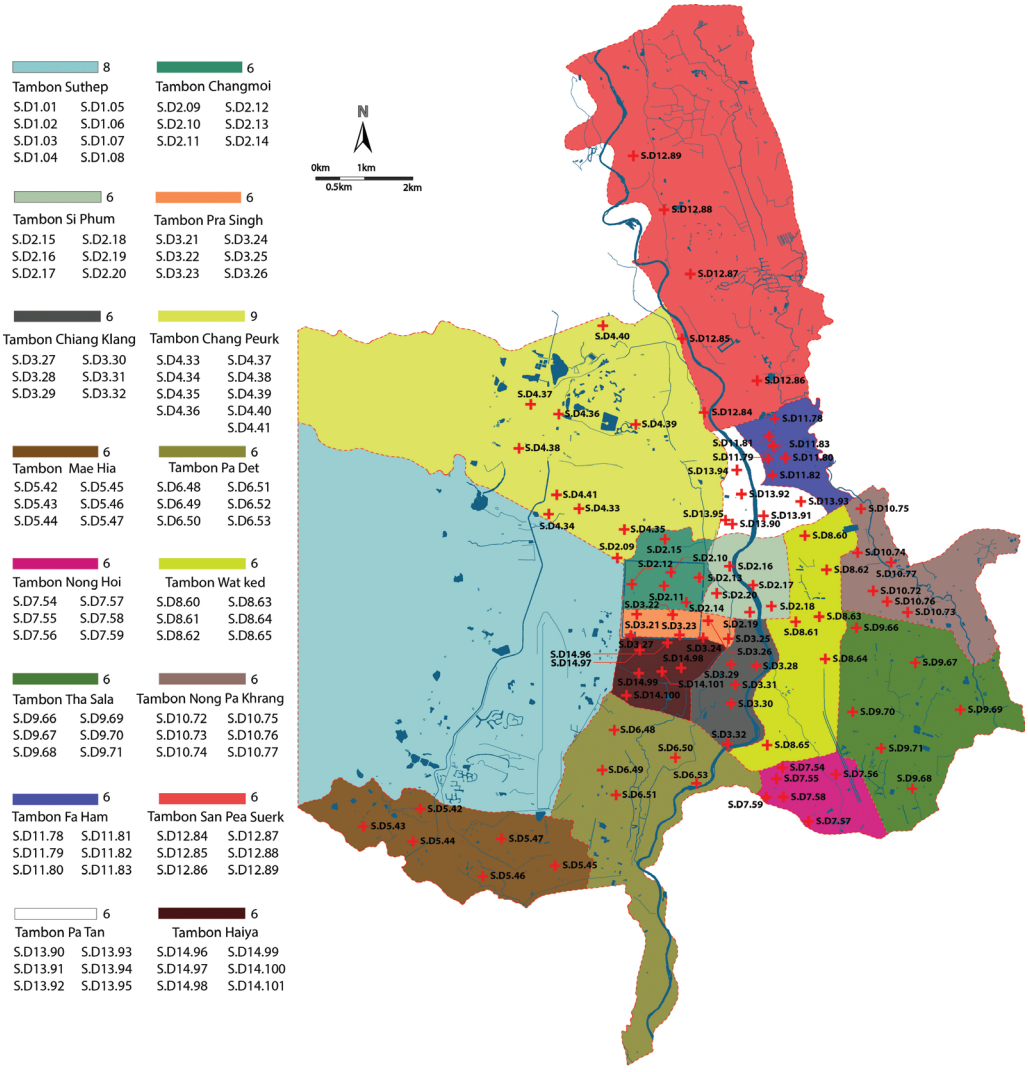


Figure 3, survey locations distribution across the core municipality area of the city, and identification number of each participant cyclists.

Limitations

The study has 2 main limiting factors. Firstly it concerns the coverage of the study area, which due to the limit of time and budget, only covers the core of the city (Ampour Muang), which includes the 16 sub-districts (tambon) as mentioned previously, the outer districts such as Doi Saket, Mae Rim, Hang Dong, San Sai, Saraphi and San Kam Pang there-

fore are beyond the scope of this survey. The locations where the surveys took place were designed to equally reflect the number of sub-distracts (see fig. 3); rather than focusing on certain areas which are known to contain high concentration of cyclists, this survey wanted to capture a wider and more divergent perspective of the different cycling experiences in the city as a whole.

Another limitation was the selection of the participants for the study. Although tourists make up a large proportion of the cycling population within the core of the city, the information gathered from cycling tourists was not used towards the findings of the research. The reason for this is because this study aimed to focus on long term cyclists in the city, with experiences that had been accumulated over a long period of time. Therefore the transience of tourists' cycling experience in the city might not fully reflect the complete image of cycling in Chiang Mai.

Findings and Analysis

The result of the first part of the survey gathered demographic information of the participating cyclists and their general cycling behaviour. Review of the findings makes interesting comparisons to the CM-MTS survey; these include age, gender and cycling patterns. In the CM-MTS survey, the report revealed amongst the 6% bicycle mode share, aged 65 years and above have the highest portion of bicycle usage at 19.6%, while 25-64 years and under 18 years both share 5.1% of usage and 18-24 years only has 1.1% of usage (Jittrapirom and Emberger, CM-MTS, 2012; p.58). This survey revealed 25-34 years has the highest share of cycling with 32 participants (31%), and 18-24 years with 17 participants (17%) and 55 years and above only 6 participants (6%) (see Table. 1). Regarding gender, CM-MTS recorded that 6.7% were female riders compared to just 4.5% male riders (Jittrapirom and Emberger, CM-MTS, 2012; p.57), this survey found a contrasting outcome where 73 participants (72%) were male riders and 28 participants (28%) female riders (see Table. 1). In the CM-MTS survey, it reported that the average cycling trip is 1.1km with an average duration of 8 minutes (Jittrapirom and Emberger, CM-MTS, 2012; p.46-47), while not directly comparable; this survey found that 40 participants (39%) cycle for more than 1 hour and 53 participants (52%) cycle more than 5 kilometres per trip (see Table. 1).

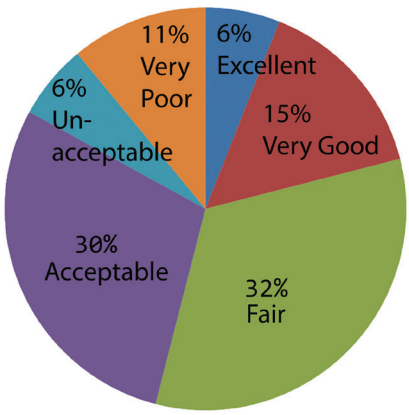
Furthermore, this survey also found 50 participants (49%) categorised themselves as fitness cyclists; while 43 participants (42%) attributed cycling due to environmental con-

cerns; 53 participants (52%) indicated they cycled on a daily basis, of which 35 (34%) use mountain bikes; and 39 respondents (38%) indicated they have been cycling for 3 years or more (see Table 1).

While in the CM-MTS survey attempts were made to capture the public's perception of the quality of the transport infrastructure of the city, with which 43% of respondents were found to be satisfied and 6% dissatisfied (Jittrapirom and Emberger, CM-MTS, 2012; p.80). However, as this statistic represents the combination of all the transport modes, therefore it does not give an accurate reflection of cyclists' satisfactory ratings alone. Thus the second part of this study captures more accurate perceptions of cycling in Chiang Mai, which 6 respondents (6%) rated the cycle infrastructure as excellent, 33 respondents (32%) rated as fair and 11 respondents (11%) rated as poor (see Fig. 4).

Table 1, Social-demographics, general cycling behaviour and patterns of the primary data samples (%)

Status	Total:101	100%	Reason for cycling	Total:101	100%
- Student	**30**	29%	- Environmental reasons	**43**	42%
- Employer	**27**	27%	- Save money	**24**	24%
- Employee	**26**	26%	- Faster	**8**	8%
- Other	**18**	18%	- traffic	**16**	16%
			- Other	**10**	10%
Gender	Total:101	100%	Distance	Total:101	100%
- Female	**28**	28%	-Under 1km	**9**	9%
- Male	**73**	72%	- 1-2km	**20**	20%
			- 2-4km	**19**	19%
			- 5+ km	**53**	52%
Age	Total:101	100%	Cycling duration	Total:101	100%
- Under 18	**16**	16%	- Under 5 minutes	**3**	3%
- 18-24	**17**	17%	- 5- 15 minutes	**15**	15%
- 25-34	**32**	31%	- 16- 29 minutes	**14**	14%
- 35-44	**14**	14%	- 30-60 minutes	**29**	29%
- 45-54	**16**	16%	- 1 hour +	**40**	39%
- 55 and above	**6**	6%			
Type of cyclist	Total:101	100%	How long have been cycling	Total:101	100%
- Commuter cyclists	**14**	14%	- Under 6months	**26**	26%
- life style cyclists	**11**	11%	- 6-12 months	**13**	13%
- Recreational cyclists	**21**	21%	- 1-3 years	**23**	23%
- Fitness cyclists	**50**	49%	- 3+ Years	**39**	38%
- Other	**5**	5%			
Frequency	Total:101	100%	Type of bicycle	Total:101	100%
- Daily	**53**	52%	- Racing	**13**	13%
- Few times a week	**14**	14%	- Mountain	**35**	34%
- Once a month	**2**	2%	- Folding	**9**	9%
- Only occasionally	**32**	32%	- Fixed-gear	**11**	11%
			- City	**25**	25%
			- Other	**8**	8%



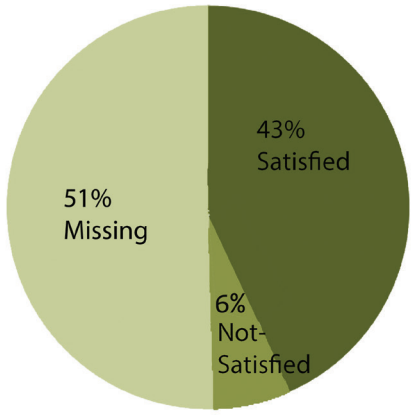
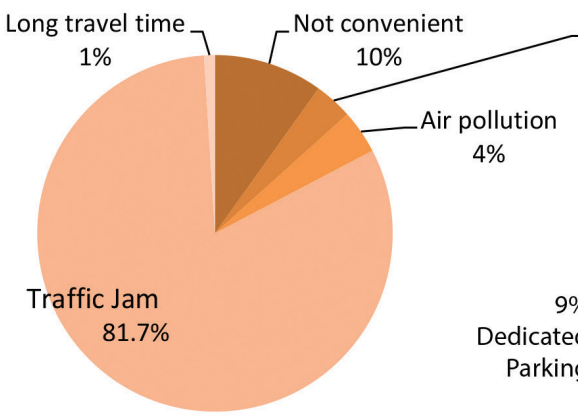


Figure 4 (left), Cycle-infrastructure satisfactory ratings gathered from primary data. **Figure 5** (right), Travel arrangement satisfactory ratings gathered from city transport survey2. Source: (Jittrapirom and Emberger, CM-MTS, 2012; p.80)



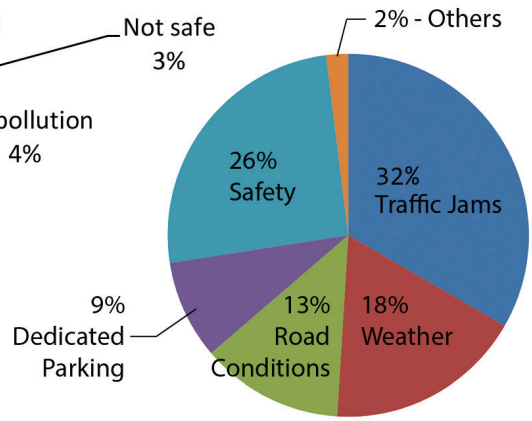


Figure 6 (Left), data from transport survey indicating different reasons for travel arrangement dissatisfaction. Source: (Jittrapirom and Emberger, CM-MTS, 2012; p.80). **Figure 7** (right), Primary data indicating different types of obstacles cyclists faced riding in the city.

Interestingly, this study reveals a possible demographic shift of cyclists in the city. Looking at the CM-MTS survey, it revealed 46.2% of cyclists use the bicycle to go home, 20.4% to go shopping and 13.9% for work trips (Jittrapirom and Emberger, CM-MTS, 2012; p.70). This survey however, found that 50 participants (49%) use the bicycle as a means

of exercise, in comparison to 7.2% in the CM-MTS survey (ibid). This disparity suggests an increasing numbers of cyclists to be found on the streets are fitness riders. This becomes even more evident if we compare the average cycling distance reported by CM-MTS survey which is 1.1km (see fig. 2), while this study found that 53 participants (52%) cycled for more than 5km (see Table 1).

The main objective of this study is to identify and document the obstacles cyclists have to face in experiencing the city via the saddle. This was achieved from two perspectives. Firstly, the respondents identified a specific obstacle from a common set of barriers facing cyclists such as traffic jams, weather, road surfaces, parking and safety. The outcome found 33 respondents (32%) pinpointed to traffic jams as the biggest barrier against cycling in the city, while safety posed the second biggest obstacle with 26 responses (26%) and the weather 18 responses (18%) (see fig. 7). This response of 32% attributing to traffic jams is another direct reflection of the dominance of the automobile in Chiang Mai, and it's also something that CM-MTS survey have similarly identified, with 81.7% of the respondents attributing to the same reason for dissatisfaction with their travel arrangements (see fig. 6).

Secondly, this study for the first time geographically identified areas of the city that pose the biggest hindrance for cycling and parts of the city that facilitate cycling. For each part an open-ended question was presented to the respondents; of the 47 responses (46%) to the first part, four areas in the city have been identified as the most challenging for cyclists; these include inside the main city centre with 19 responses (19%), Super Highway pose the second biggest obstacle with 17 responses (17%), following Super Highway is Canal road with 13 responses (13%) and last is Nimmanhaemin road with 8 responses (8%) (see Fig. 8).

Table 2, Output of the investigation into the suitability for cycling in different parts of the city.

Areas that hinder cycling		Areas that facilitate cycling	
1. Too many traffic jams in almost every road and drivers drive very fast	2. Outside of the city	1. Chiang Mai University, and Royal Flora (Rajchapreuk)	2.Rajchapreuk, Doi Kum, Samoeng, University and park
3. On the main street	4. Anywhere that does not have cycle lane	3. Outside of the main city	4.Around Nong-hoi
5. Manhole covers on the road	6. Canal road	5.In main stadium [700 years]	6.Huay Ting Tao
7. On the main street	8. Super Highway	7.The way to Doi Suthep [especially in the morning about 5.30am - 9.00 am]	8.Near parks and the mountains
9. Traffic crossings	10. Super Highway	9. On the main street	10. Mae Hia
11. Nimmanhaemin Road	12. There are only 2 lanes on main road	11. Huay Ting Tao	12.Rajchareuk
13. Mae Hia	14. In every road because cyclists have to share the same lane with motor vehicle. Where accidents can happen if they are careless	13. Mae Hia	14.On the pedestrian side walk
15. In the main city	16. On the Super Highway	15. Nimmanhaemin Road	16. Near parks
17. In the main city	18. Around Canal road	17. In Chiang Mai University	18. Outside of the city
19. Nimmanhaemin Road	20. Everywhere as there are too many cars	19. Around the moat	20. Doi Saket especially at Pa-pong, the way to hot spring at San Kam Peng
21. In the city have lot of cars	22. Around Canal road mainly	21. Royal flora (Rajchapreuk), Doi Suthep and Mae Hia	22. Up to the Doi Suthep palace
23. Somewhere around the Canal road	24. Rincome intersection	23. Chiang Mai University	24. In Chiang Mai University (CMU)
25. In the main city	26. Around Canal road	25. Doi Suthep	26. Around the countryside
27. At Chotana Road [beside golf course], the way to 700 years Stadium that there have too many rough roads, There isn't traffic light at the stadium junction.	28. Koo mueng road	27. Around Rajchapreuk and around Doi Suthep	28. In the temple
29. Traffic crossings	30. Anywhere that doesn't have cycle lanes	29. I don't know where	30. When there are less cars on the street
31. Super Highway	32. Super Highway	31. On the cycle lanes	32. Near parks
33. Around the main city	34. On the main streets around the city	33. In the city after 9pm	34. Mae Hia
35. On the roads that has too many cars but no police to patrol	36. On the main street	35. Main Municipal area	36. Rajchawang road
37. Nimmanhaemin, and Canal road	38. No parking in the market	37. Everywhere	38. Exhibition hall [international hall]
39. Around home	40. Around the moat	39. Park next to CMU hall	40. In Chiang Mai University (CMU)
41. Inside the main city there are too many cars	42. Super Highway	41. Huay Ting Tao	42. Koo Mueng
43. There isn't a lane for bicycle and trying to overtake other bicycles is not safe. It has pollution that is not good for our health.	44. Royal flora (Rajchapreuk) and Huay Ting Tao	43. Canal road	44. Doi Suthep, Rajchapreuk, Doi Kum and Samoeng
45. On the main street	46. In the main city	45. Around Canal road, the way to 700 years stadium because the road is wide and safe, and also around Rajchapreuk area	46. Outskirts of the city
47. Super Highway		47. Out of the city, royal flora (Rajchapreuk) and small roads	48. In the main stadium [700 years stadium]
		49. The Centre for cyclists	50.Out of the city and at Doi Suthep
		51. I don't think they have it	52. The way up to Doi Suthep
		53. Chiang Mai University	54. In the main city
		55. On smaller roads	56. Roads in the countryside that have not too many cars and have a good natural condition or the roads that have bicycle lanes
		57. Canal road, 700 years stadium, Huay Ting Tao and Rajchapreuk	58. Klung Kong road

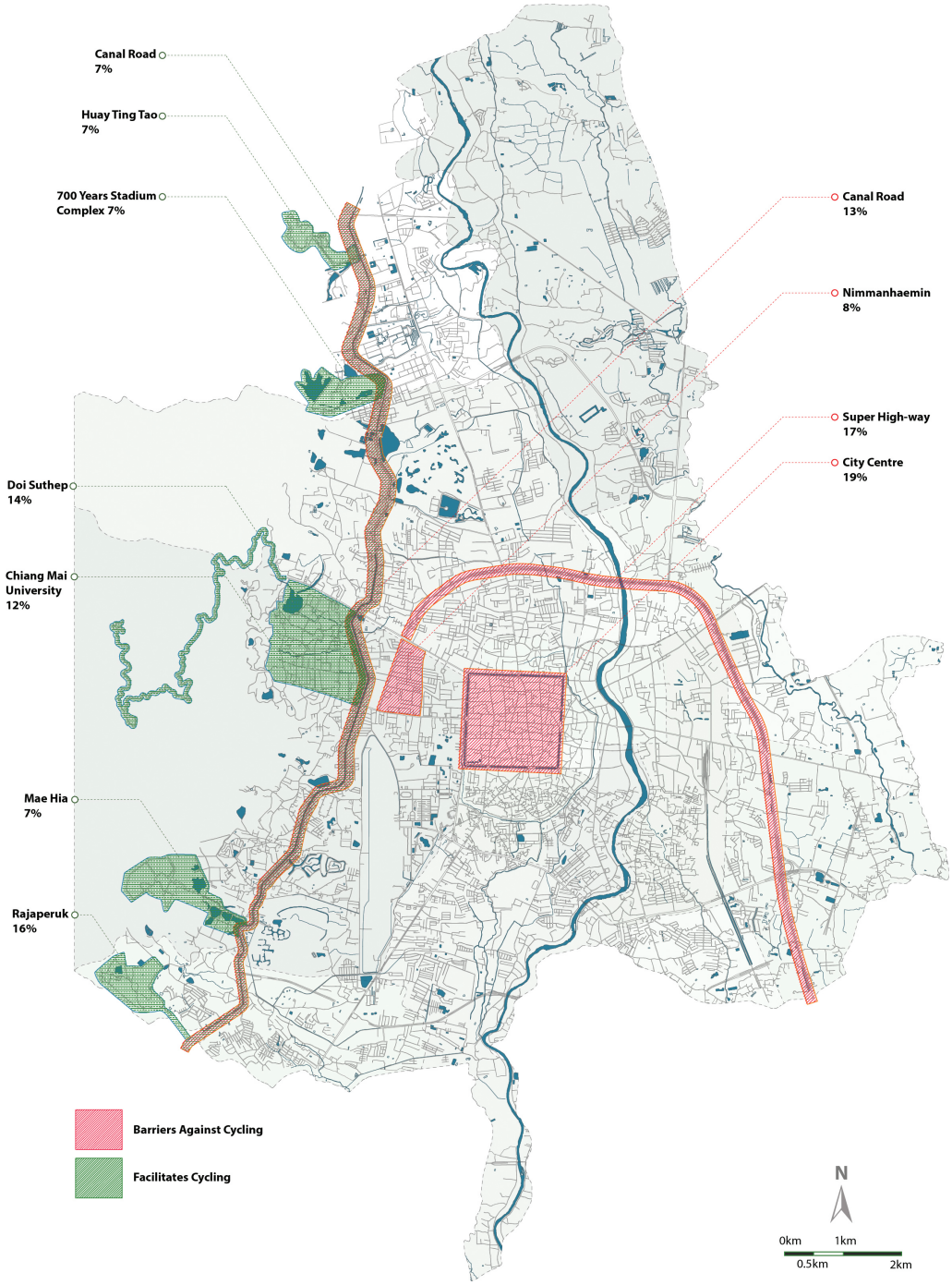


Figure 8, Spatial mapping of different parts of the city that facilitates and hinders cycling.

On the contrary, 58 participants (57%) responded to which areas facilitate cycling, and have identified around Rajapreuk (Royal Flora) to be one of the most suitable places for cycling with 9 responses (16%); the mountainous trail up to Doi Suthep is the next most popular with 8 responses (14%); Chiang Mai University is next with 7 responses (12%), Huay Ting Tao, Mae Hia, 700 Years Stadium and Canal road all share 4 responses (7%) (see table 2). Lastly, these areas were spatially mapped in order to examine their relationship with the wider context of the city. Looking at the outcome (see fig. 8), it's evident that areas which facilitate cycling are all situated towards the west side of the city, under the shadow of the mountains and in close approximation to the city's natural backdrop; interestingly, these parts of the city have experienced little modernisation in the second half of the 20th century. Meanwhile, the places that hinder cycling, are found to be situated more towards the centre of the city, and along two of the major arterial roadways that straddle some of the most densely populated parts of the urban fabric. In contrast to the west side of the city, these areas cyclists have identified correspond with more recent parts of the city, which have been heavily aligned with the automobile. The results from this map on the one hand reinforces the major obstacle cyclists have to face, which is traffic jams, associated with the major road ways and the centre of the city. On the other hand, and perhaps more importantly, this map also reinforces the important relationship between the natural environment and sustainable non-motorised transport, which in this instance, have been demonstrated to be highly important in order to facilitate a successful and sustainable cycling infrastructure.

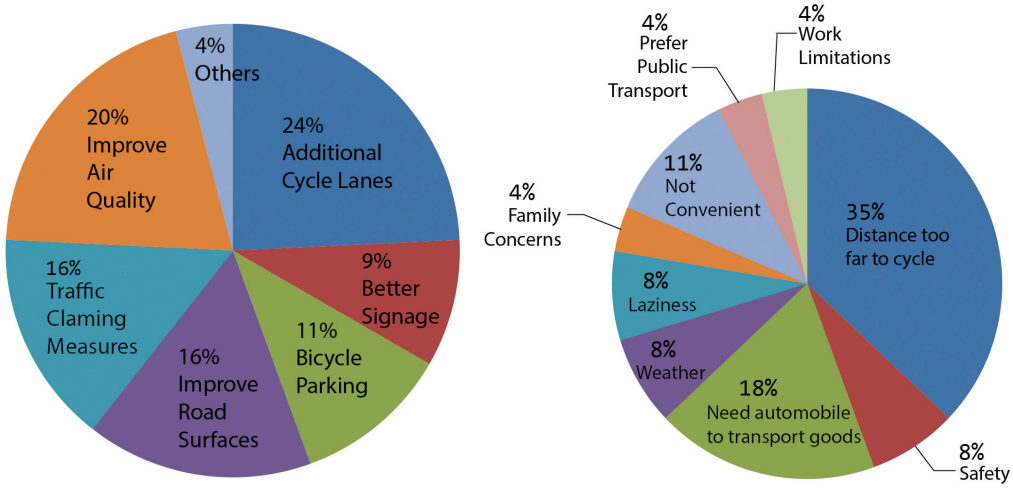


Figure 9 (left), prerequisites to increase the mode share of cycling in Chiang Mai. **Figure 10** (right), reasons for not giving up the automobile for residents in Chiang Mai.

The CM-MTS survey revealed the bicycle mode share in Chiang Mai which currently stands at around 6% (Jittrapirom and Emberger, CM-MTS, 2012; p.41), far behind cities with more established cycling cultures such as in Amsterdam or Copenhagen. Thus the last part of the questionnaire attempts to identify the prerequisites of a future framework to increase the mode share of cycling in Chiang Mai. Firstly it identified the drivers that would encourage respondents to increase the use of bicycles, either through the improvements of adding more cycle lanes, better signage, dedicated bicycle parking, improving road conditions, traffic calming measures or improving air quality. 24 respondents (24%) pointed to the addition of more dedicated cycle lanes to be the most important improvement, 20 respondents (20%) pointed to improve air quality, 16 respondents (16%) improve road conditions, 15 respondents (15%) on improvement of traffic jams, 11 respondents (11%) on parking for bicycles and 9 respondents (9%) for clearer signage (see fig. 9). The final question asked if the participants would sacrifice their automobile for the bicycle. 32 participants (32%) responded with 27 (85%) of those responded said they would not give up their automobile. Of those 85%, 9 (35%) respondents pointed to travel distance being too far for cycling, 5 responded (18%) they need the automobile in order to transport goods and 3 (11%) commented it's not convenient to cycle all the time, safety, weather and laziness all have 2 responses (8%), and the preference for public transport, family concerns and work limitations all share 1 response (4%) (see fig. 10).

Conclusion

This study firstly looks at the different driving forces behind the resurgence of the bicycle in Chiang Mai. It has highlighted what was a Western initiated trend, is now infiltrating into Thailand and Chiang Mai though both environmental and as a popular cultural phenomena. Particularly in Chiang Mai, the growth of cycling is supported by the combination of a favourable climate and ideal conditions creating suitable settings that encourage a wide range of cycling disciplines. As a result the city over the past few years has emerged as an international cycling hub catering for both avid amateurs and professional riders.

At the same time, using statistics gathered from the latest transport survey as a basis, parts of the reality of cycling in Chiang Mai have been further unravelled. Firstly, the analysis highlighted while there is an increase of bicycle owners in the city during the past few years, this growth however did not translate into the same scale and number of bicycle

trips on the streets. In fact, this study revealed a high proportion of 'bike-sized' journeys taken in the city each day that can be converted from the automobile to the bicycle.

Further characteristics and behaviour of cyclists in Chiang Mai have been uncovered through a series of questionnaire surveys specifically targeting local riders. The findings suggest age and purpose for cycling appears to be shifting from an older, captive riding basis to a younger, fitness and environmentally orientated riders who cycle more frequently and for longer distances in general. Moreover, for the first time the obstacles cyclists experience have been identified and spatially mapped. The results found traffic jams posed the biggest hurdle for cyclists, this finding correlates with the spatial mapping that depicts two major roadways as one of the biggest hindrances for cycling; on the other hand the areas that facilitate cycling are found to be mostly located towards the west side of the city where it's less developed and contains more natural backdrops of the urban fabric. This finding significantly reinforces the relationship between the natural environment and sustainable non-motorised transport.

This investigation would benefit from further research using more complex and sophisticated study methods. But nevertheless, together with the statistics gathered from the city transport survey, the findings from this study highlight more accurate accounts of the experiences of cycling in Chiang Mai, where perceptions and different obstacles of cycling have been identified. These outputs hopefully could support both transport policy makers and planners on developing a more integrative cycling infrastructure in the future for the city, and also for other researchers on carrying out further studies on the cycle-scape of Chiang Mai, which is a multi-faceted, on-going and evolving process.

References

Images:

Images 1 and 5: **Satrabhaya B**, (2007) 'Lanna mua tawa (Yesteryear Lanna)' Bookworm Publishing, Bangkok.

Images 2, 3, 4 and 6: **Satrabhaya B**, (2011) 'Chiang Mai in Memories.' Chao, Bridge International Foundation, Chiang Mai.

Articles and books:

Askew, M. (2002). **'Bangkok: Place, practice and representation.'** Routledge, London.

Chiasakul, S. (2004). **Production Networks, Trade and Investment Policies, and Regional Cooperation in Asia: A Case Study of Automotive Industry in Thailand**, the 6th ADRF General Meeting, Bangkok, Thailand. Available at: http://adrf.trf.or.th/ADRF6update/Full_Papers/Trade%26Investment/Samart_Chiasakul/Fullpaper_Samart.pdf

Daniel, J. (2012). **'Sampling Essentials-Practical Guidelines for Making Sampling Choices,'** SAGE Publications. . Available at: http://www.sagepub.com/upm-data/40803_5.pdf

DeMaio, P. (2009). **'Bike sharing: Its history, Models of Provision, and Future,'** Velo-city 2009 Conference. Available at: http://www.velo-city2009.com/assets/files/paper-DeMaio-Bike%20sharing-sub5.2.pdf

Dhingra, C. & Kodukula, S. (2010). **'Public Bicycle Schemes: Applying the concept in Developing Cities, Examples from India.'** Sustainable Urban Transport Technical Document #3. Available at: http://www.cleanairinstitute.org/cops/bd/file/tnm/9-public-bicycle.pdf

Ely, M. & Brick, E. (2012). **'Bicycle Renaissance in a Shared Way.'** Journeys. Available at: http://www.ltaacademy.gov.sg/doc/J12%20Nov_p51Mageret_Bicycle_Renaissance_in_a_Shared_Way.pdf

Fleming, S. (2012). **'Cycle Space, Architecture & Urban Design in the age of the bicycle,'** nai010, Rotterdam.

Gardner, G. (1998). **'When cities take bicycles seriously.'** World watch. Available from: http://infohouse.p2ric.org/ref/37/36221.pdf

Glassman, J. & Sneddon, C. (2003). **'Chiang Mai and Khon Kaen as growth poles: Regional industrial development in Thailand and its implcations for urban sustainability,'** The Annals of the American Academy. AAPSS, 590, November 2003 P93-115

Jain, H. & Tiwari, G. (2009). **'Captive riders, informal sector and bicycling in Indian cities.'** Available at: http://www.velo-city2009.com/assets/files/paper-Himani-sub6.3.pdf

Jittrapirom, P. & Emberger, G. (2013). **'Chiang Mai City Mobility and Transport Survey (CM-MTS) 2012 report,'** Research Centre of Transport Planning and Traffic Engineering. Institute of

Transportation. Vienna University of Technology. Available at: http://www.ivv.tuwien.ac.at/forschung/projekte/international-projects/cm-mts.html

Leopairojna, S. K. & Trakulvech, S, (2008). **'APPLICATION OF PUBLIC-USE BIKE SYSTEM IN KASETSART UNIVERSITY, BANGKHEN CAMPUS: Research and reality.'** Journal of society for transportation and traffic studies (JSTS) Vol. 2. No. 1.

Madden, R. (December 15, 2003). **"London: How cyclists around the world put a spoke in the motorist's wheel".** The Daily Telegraph (UK). Available from: http://www.telegraph.co.uk/travel/729324/London-How-cyclists-around-the-world-put-a-spoke-in-the-motorists-wheel.html

Wright, L. & Montezuma, R. (2004). **'Reclaiming public space: The economic, environmental, and social impacts of Bogotá's transformation,'** Cities for People Conference, Walk21, Copenhagen, Denmark, 2004. Available at: http://eprints.ucl.ac.uk/110/

Websites:

http://bigstory.ap.org/article/bangkok-bikers-gridlock-intimidates-inspires- (Accessed on: 05.May.2014)

http://rouleur.cc/journal/riding/winter-without-thermals- (Accessed on: 28.April.2014)

http://www.adventurecycling.org/resources/blog/how-many-curves- (Accessed on: 28.April.2014)

http://www.seattleglobalist.com/2014/03/12/northern-thailand-cycSling-destination/21564- (Accessed on: 02.May.2014)

http://cyclingtips.com.au/2013/05/cycling-culture-in-chiang-mai-and-beyond/ - (Accessed on: 25.April.2014)