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Encouraging Bicycling as a Means of Sustainable Urban Transportation in Cairo

**A Thesis submitted in the Partial Fulfillment for the Requirement of the Degree
of Master of Science in Integrated Urbanism and Sustainable Design**

by

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Disclaimer

This dissertation is submitted to Ain Shams University, Faculty of Engineering and University of Stuttgart, Faculty of Architecture and Urban Planning for the degree of Integrated Urbanism and Sustainable Design.

The work included in this thesis was carried out by the author in the year 2014
The candidate confirms that the work submitted is his own and that appropriate credit has been given where reference has been made to the work of others.

07/20/2014

Eric Puttrowait

A handwritten signature in blue ink, appearing to read 'Eric Puttrowait', with a stylized, flowing script.

Signature

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Abstract

This thesis deals with the issue of cycling as a sustainable means of urban transportation in Cairo.

Cycling is one of the healthiest and most efficient means of transportation.

However, Cairo has few cyclists and rising numbers of private cars cause congestion and pollution. This document analyzes the causes of the lack of cyclists and discusses possible interventions to raise the share of cycling trips for transportation.

It suggests that the use of bicycles provides solutions for two relevant problems: Firstly, it can help to relieve Cairo's streets from congestion, and secondly, it can provide independent, affordable mobility for people with low income, who are the majority in Cairo.

The document analyses the status quo of Cairo's cycling culture to examine potential for development. It also discusses contemporary approaches to traffic planning and how they can influence the development in Cairo.

Because the urban fabric of this megacity is very diverse and the different districts have particular physical characteristics as well as socially and culturally distinguished populations, the possibility for a uniform cycling development vision for Cairo is limited. Limited is also the implementation of conventional approaches, which work well in European or North American cities. Instead, this thesis presents analyses of three particular districts, which are evaluated and compared by their potentials and obstacles. Finally, three specialized, integrated cycling development concepts, corresponding to the particular characteristics of each analyzed district and one general strategy for whole Cairo are offered.

by Eric Puttrowait

Key words: Cycling, Sustainability, Traffic, Transportation, Non-Motorized Mobility, Access to Mobility, Egypt, Cairo, Shubra, Al-Rehab, Ard El-Liwa

Table of Contents

Approval Sheet	2
Disclaimer	3
Acknowledgements	4
Abstract of the Thesis in English	5
Table of Contents	6
List of Figures	9
0. Foreword	13
1. Introduction	15
2. Methodology	19
2.1 Introduction.....	19
2.2 Three Case Studies	19
2.3 Interviews	22
2.4.Counting Observation	23
2.5 Mapping	23
3. Theoretical Background	25
3.1 Introduction	25
3.2 Vision of the Equitable and Healthy City	25
3.3 Demand-oriented Planning vs. Supply-oriented Planning	27
3.4 Avoid - Shift - Improve	27
3.5 Cycling as a Transportation Mode in the `Human Scale´	28
3.6 Intermodality/Transit Oriented Development	29
3.7 The Role of Social and Behavioral Psychology for Cycling in Cairo	30
3.7.1 Introduction	30
3.7.2 Factors Influencing Behavior	31
3.7.3 The A.I.D.A. Model	32
3.7.4 FBM	33
3.8 Conclusion	34
4. Analysis	37
4.1 Introduction	37
4.2 Cairo traffic: Status Quo	37
4.2.1 Public Transport	38
4.2.2 Cars	38
4.2.3 Delivery Services	39

4.2.4 Conclusion	40
4.3 Cycling in Cairo: Status Quo	43
4.3.1 Prerequisites	43
4.3.2 Existing Types of Cyclists	44
4.3.3 Bicycle Business	52
4.3.4 Attitudes, Mentality and Image	52
4.3.5 Obstacles and Threats	54
4.3.6 Advantages	55
4.3.7 Conclusion	55
4.4 Analyses of the Three Case Study Sites	57
4.4.1 Introduction	57
4.4.2 Analysis of Shubra	57
4.4.3 Analysis of Al-Rehab	70
4.4.4 Analysis of Ard El-Liwa	82
4.5 Comparison of Case Studies	94
4.6 Conclusion	100
5. Concept	107
5.1 Introduction	107
5.2 General Strategy to Encourage Cycling as a Means of Transporta- tion	107
5.2.1 Introduction	107
5.2.2 Challenges	108
5.2.3 Limitations	109
5.2.4 Prospects	110
5.2.5 The Four Phases	110
5.2.6 The Bike Café	119
5.2.7 Conclusion	121
5.3 Concept for Shubra	122
5.4 Concept for Al-Rehab	123
5.5 Concept for Ard El-Liwa	124
5.6 Conclusion	125
6. Conclusion	129

References	133
Appendices.....	135
A. Report from Participation in a Group Ride with `Bescletta´	135
B. Report from Participation in a Group Ride with the `Bike Zone´	
Initiative	136
C. Interviews in Shubra	138
D. Interviews in Al-Rehab	145
E. Interviews in Ard El-Liwa	153
 Summary of the Thesis in Arabic	 163
Disclaimer in Arabic	164
Approval Sheet in Arabic	165

List of Figures

figure 1	Highlighted on the map are the three case study sites and the central Business District of Cairo: 1: Shubra, 2: Al-Rehab, 3: Ard El-Liwa. Areas with similar characteristics are purple for Shubra, green for Al-Rehab and yellow for Ard El-Liwa.....	21
figure 2	The comparison of the transport modes common in Cairo show their advantages and disadvantages. Bicycles' benefits are high flexibility, affordability, high speed compared to cars in congested streets, no emissions, and low space demand. The same applies for an imaginary bicycle sharing system, which is potentially even more affordable.....	41
figure 3	In congested streets like this one in Downtown, the bicycle can be the fastest mode of transport. However, planning authorities do not consider its potentials.....	43
figure 4	Categories of cyclists in Cairo.....	45
figure 5	Oldschoolers: A transporter in Downtown.....	46
figure 6	Oldschoolers: A gas vendor at Ramsis Square.....	46
figure 7	Oldschoolers: A banana vendor in Shubra. The chain, pedals and saddle are missing.....	46
figure 8	Cargo bikes can be combined with various additions for a wide array of usages. Clockwise from top left: Ice cream 'shop', closed box, food stand with stove, oven for sweet potatoes, open box, pop corn machine. The list is not complete.....	47
figure 9	Delivery bikes have robust racks, which usually carry a box in addition to the storage frame in the front. On special constructions, gas bottles or even milk churns can be attached.....	47
figure 10	Oldschoolers: A bread carrier on his way through a congested downtown street.....	48
figure 11	Lifestylers: Participants of a group ride by the 'Bike Zone' group on the Corniche near Manial, on a friday morning.....	48
figure 12	Kids: Cycling for enjoyment on rented bikes in Shubra.....	49
figure 13	Lifestylers: He uses his bicycle for training rides, but also to go to university regularly. Thus, he is both athlete and conscious cyclist.....	49
figure 14	The rapidly rising numbers of 'facebook' users, who like cycling initiatives and bike shops, illustrate both the importance of social media for Cairo's cycling community and the success of the initiatives' promotion efforts. Bescletta, the project with the most 'likes', is a commercial bicycle shop, which offers weekly group rides at its four branches. The other groups are all non-commercial.....	50
figure 15	Rushdy street in Downtown is known for having the highest concentration of bicycle shops. Most of them offer cheap Chinese models.....	51
figure 16	Street types: El Toraa El-Boloqia Street, one of the main entrance streets from south, is intensely used.....	58
figure 17	Street types: Narrow alleys in the dense neighborhoods are virtually free of car traffic.....	58
figure 18	Map of Shubra with the Nile in the west, Ismailia Canal in the north and train tracks along the south and east borders. Red crosses indicate the loactions of observations. The list of relevant places, especially bike rental shops, is not complete.....	59
figure 19	Road surface qualities in Shubra differ. Often, the pavement has damaged parts or uneven passages. Debris covers the roads' edges.....	60
figure 20	Side streets in residential areas have trees, which provide shade. The surface is in excellent condition and car traffic is very rare, which are good prerequisites for cycling.....	60
figure 21	Rod El-Farag street, one of Shubra's main streets, with construction materials on the side of the road, obstructing pedestrian movements.....	60
figure 22	On El Teraa El-Boloqia Street, a strip of the barrier between the lanes was cut out to ease crossing for wheelchair users, motorbike and cyclists.....	60
figure 23	Many tuk-tuks are circulating in Shubra, filling the gap between the lack of other short-distance transport modes and residents' demand for mobility.....	61
figure 24	Several residential areas, especially between Rod El-Farag street and the Corniche, have extremely narrow streets, which are not accessible by car. Surfaces tend to be of lower quality here, and certain streets are occupied by markets, making cycling difficult.....	61
figure 25	105 bike users were counted during 4 observations á 45 minutes in Shubra. More than half of them were deliverers, but the diversity of types is high. All were male and all except one were pure oldschoolers.....	62
figure 26	A deliverer is preparing his load for the trip. Deliverers account for about half of the cyclists in Shubra.....	62
figure 27	Children with rented bikes play in the quiet side streets of the residential areas.....	62
figure 28	The most common customers of such local bike rental shops are kids. Private bicycles are also repaired here. Between 20 and 40 of them are expected to exist in Shubra.....	62
figure 29	This high class bicycle shop belonging to the 'Bescletta' company closed due to lack of customers in Shubra.....	62
figure 30	A shop for cheap Chinese new and used bicycles, usually combined with an assortment of childrens' toys.....	63
figure 31	These junk traders belong to a company with 20 bikes, according to their statements. They cycle through the streets and call the inhabitants to give them their old items to trade with.....	63
figure 32	Some little enterprises buy damaged cargo bikes like these, repair them and reuse them.....	63
figure 33	The street vendors, especially banana sellers, are a common sight in Shubra.....	63
figure 34	The main actors and their needs and interrelations indicate the potential of development for the cycling situation.....	64

figure 35	View over Shubra from Imbaba Bridge. The second level of the bridge could enable a safe and stress-free Nile crossing for cyclists, according to urban activist Yahia Shawkat (Viney, 2011).....	64
figure 36	cyclist rate observation spot 1	66
figure 37	Photo of spot 1 facing north-east	66
figure 38	cyclist rate observation spot 2	67
figure 39	Photo of spot 2 facing south into Al Toraa Al-Boloqia	67
figure 40	cyclist rate observation spot 3	68
figure 41	Photograph of spot 3, facing south into Gesr El-Bahr	68
figure 42	cyclist rate observation spot 4	69
figure 43	This map of Al-Rehab shows the different land uses and the traffic infrastructure, as well as locations related to cycling or mobility.....	71
figure 44	The pedestrian areas inside housing compounds are characterized by silence and well-maintained gardens.	72
figure 45	The streets within the villa neighbourhoods are quiet and empty. When their inhabitants are at work, almost no cars are present.....	72
figure 46	Streets in the apartment house clusters are wide and very rarely used.	72
figure 47	The main streets, which have vegetated curbs to separate the directions, become crowded with cars in the afternoons. Shopping malls, the food court, banks, schools and other urban services are aligned along this street. How many people can you see compared to how many cars?.....	72
figure 48	Bus stops are installed along the five lines within Al-Rehab. However, few people ever use them. In the background is one of the car parking spaces, which belong to each housing compound.	73
figure 49	The bus station at gate 13 is the terminal for the buses connecting Al-Rehab with Nasr City and Heliopolis, as well as the departure point for all buses, which circulate within the district.....	74
figure 50	Quads are used by children and adults for transportation within Al-Rehab. These motor vehicles are extremely noisy.....	74
figure 51	The branch of the bicycle shop ‘Bescletta’, attached to Al-Rehab Mall 2.....	74
figure 52	The local branch of ‘Abou El-Goukh’	74
figure 53	Abou El-Goukh’s maintenance workshop in a passage way next to the shop.....	74
figure 54	Most of the 18 cyclists observed were children. Almost equally high was the number of deliverers. Two unexpected natives and only one lifestylel were spotted.	75
figure 55	This group of four girls and one boy is cycling around the neighborhoods for fun.	75
figure 56	Apart from children, most cyclists are deliverers working in the shops of the market. Since around 2007, bicycles are being increasingly replaced by motorbikes.....	75
figure 57	This lifestylel has a modern high-quality bicycle. The bags on the rack suggest, that he is cycling not only for fitness and fun, but also for transportation.	75
figure 58	A Deliverer on his return to the shop. Note the numerous red delivery scooters in the background, which belong to Kentucky Fried Chicken and McDonald’s.....	75
figure 59	A flat tyre and the front wheel overgrown by plants give a hint to how frequently this bicycle is being used.....	76
figure 60	Some rather unconventional ways of parking can be observed as well. Did the bicycle user himself put it this way or stair users, who were annoyed of the obstructed handrail?.....	76
figure 61	A common sight is bicycles being locked around the handrails of entrance stairs in residential areas. Some are also stored in the spacious entrance halls of the buildings. In most cases, these are children’s bicycles.	76
figure 62	Another popular parking opportunity is offered by lamp posts. There, bicycles are exposed to the sprinkler irrigation systems, which leads to rusty chains, brakes and other parts.....	76
figure 63 & 64	The only dedicated bicycle parking installations are at the entrance of the sports club, to which many children come with their bicycles. However, the majority of the found specimens have apparently not been moved for a while.....	76
figure 65	This figure lists the actors and their specific needs based on the interviews conducted in Al-Rehab.....	77
figure 66	cyclist rate observation spot 1	78
figure 67	Photo of spot 1, facing east along Talaat Mostafa Street	78
figure 68	cyclist rate observation spot 2	79
figure 69	Photo of spot 2, facing northeast	79
figure 70	cyclist rate observation spot 3	80
figure 71	Photo of spot 3, facing southwest towards Mohamed Abd El-Wahab Street.....	80
figure 72	Photo of spot 3, facing northwest	80
figure 73	cyclist rate observation spot 4	81
figure 74	Photo of spot 4, facing southwest	81
figure 75	This map of Ard El-Liwa shows the particular street pattern characteristic for Cairo’s informal settlements, different land uses and the traffic infrastructure, as well as other relevant locations.....	83
figure 76	Houses adjacent to the main streets and some bigger secondary streets typically have shops of all kinds in their ground floors and apartments above. In consequence, those streets are very vital.	84
figure 77	Some of the fields, on which Ard El-Liwa is built, still exist. Step by step, they are being filled by new cheap residential buildings.....	84
figure 78	The satellite images of Ard El-Liwa from 2003 (left) and 2013 (right) illustrate the fast expansion towards the west. Within only ten years, most of the remaining farmland has been consumed by new constructions.....	84
figure 79	Towards the west, the busy Toraa Al Magnouna Ali Ibn Abi Taleb Street leads to the Rind Road and Motamidia. It is not paved, however, pavement is under construction.	85
figure 80	The eastern part of Toraa Al Magnouna Ali Ibn Abi Taleb Street is already paved and in good condition.....	85
figure 81	Even some main streets are covered with a thick layer of mud, mixed with rubbish.....	85
figure 82	Secondary streets are very narrow and unpaved. Trees do not exist there, but the high buildings provide more than enough protection from the sun.....	85

figure 83	Tuk-tuks bring passengers into and out of the web of narrow streets, while minibuses transport them from	
& 84	Ard El-Liwa to other districts and vice versa. On this spot close to the railway crossing at El-Zomor Canal Street, the transfers between the two modes take place.....	87
figure 85	A big plot of land in the south-east of Ard El-Liwa has been reserved for parking 300 to 400 cars, since most streets are too narrow to accommodate them.....	87
figure 86	Main streets are shared by all kinds of road users. Sidewalks do not exist and the poor quality or absence of pavement forces vehicles to drive slowly.....	87
figure 87	91 cyclists were counted in Ard El-Liwa during the 4 times 45 minutes of observation, which is a high number for Cairo. The dominant type were kids. All other cyclists were oldschoolers with most of them being deliverers.....	88
figure 88	Most shops have their own delivery bicycle(s), which are also used to purchase supply materials, tools etc for the shop. This restaurant alone has at least five delivery bikes.....	88
figure 89	Bicycle corpses like this one are not a common sight in Ard El-Liwa, since people try to make the best use of their resources. Most bicycles are used frequently and for heavy duty.....	88
figure 90	This figure lists the actors and their specific needs based on the interviews from Ard El-Liwa.....	89
figure 91	cyclist rate observation spot 1	90
figure 92	Photo of spot 1 facing north into Al Motadimia street.....	90
figure 93	cyclist rate observation spot 2	91
figure 94	Photo of spot 2 facing north-west	91
figure 95	cyclist rate observation spot 3	92
figure 96	photo of spot 3, facing north into Mahmoud Asran Street	92
figure 97	cyclist rate observation spot 4	93
figure 98	photo of spot 2 facing south into Al Toraa Al-Boloqia Street	93
figure 99	The figure shows the results of my surveys mismatching with the tracked rides of Strava's cycling heatmap. Al-Rehab, where few cyclists were counted during surveys, is the most active cycling district, according to Strava's map.....	95
figure 100	Sidewalks exist in most of Al-Rehab's streets, but there are extremely few pedestrians. Generally, traffic intensity is low. Most road users drive cars and car parking spaces exist in most streets. Although vegetation exists in most streets, too, their width and the low buildings cause high sun exposure. The road surfaces are in excellent condition. Some main streets have additional separated service lanes and can be extremely wide. Separated directions are common.....	96
figure 101	Sidewalks exist, but are not often used. Walking is the dominant transportation mode and in side streets, usually all road users share the street. Dense building development and trees provide shade. Most streets have car parking spaces. Main streets have a moderate width and most of them have a pavement in good condition.....	97
figure 102	Ard El-Liwa's local streets are narrow and shady, the same surface is shared by all road users. Sidewalks do not exist. Obstructions are common (vendors or material on the street) and car parking spaces do not exist. Surfaces are not paved and in poor condition. In stark contrast, 26th July Corridor is walled, wide, paved with asphalt, used by high-speed vehicles only.....	97
figure 103	This table gives an overview of some of the significant differences in the observed districts.....	98
figure 104	This diagram shows the grouped stakeholders and their interactions with each other. Governmental authorities should interact with most other stakeholders, but in fact, they are passive. Most activity emanates from the civil society and bicycle shops.....	102
figure 105	The decision whether to use a bicycle for transportation or not is determined by a network of the factors showed in the diagram. Their characteristics have consequences for the attractiveness of cycling and affect behavior in different ways.....	104
figure 106	This scheme illustrates the formation of the interdisciplinary work group and the ways of communication between the stakeholders.....	111
figure 107	The table lists recommended projects with their characteristics and the periods of their activity.....	112

0. Foreword

Cairo, adorable as it is, is seriously sick. The whole city as a system is suffering from diseases, as well as its individual citizens do. Big streets are often called arterials, in reference to the existential human blood vessels carrying oxygen to the cells of its body. Imagine the oxygen being stuck in your arterials for hours; this is what happens to vehicles on Cairo's arterials. People waste precious time of their lives, surrounded by other people doing the same, but everyone on her or his own. And they do not only waste their own time, but the rich people who travel in their own cars and cause this terrible congestion waste the time of the poor people who sit and stand in crowded buses stuck in the same streets. Ambulances and fire fighters, meant to save lives by fast operation, actually proceed slower than walking pace and fail to reach their destinations in time. The responsible ones are the car users and the planners and governmental authorities who fail totally to take urgent action in order to relief the streets from the cars. The symptoms as well as the causes and solutions for those diseases are as obvious as they could be and known to the responsible people, yet no wholehearted and intelligent attempts are being taken by powerful authorities. Instead, it is getting worse by more and more cars adding to the streets. People are blinded, deaf, and blunt for the situation, or in a kind of trance. It is not possible to talk to each other on a normal street due to awful engine noises and car horns. Every day the air is many times more polluted than standards of European cities would allow. The houses are full of dust from inside and outside. Facades, no matter whether they were once white, pink, blue, green or whichever color, become grey after some time. Big streets cut neighborhoods and people apart, and if they want to cross on foot, they must wait a long time and risk dying. All these problems are caused by cars. Cars are the evil of this city. A city should not be like this, and there is no reasonable excuse for Cairo's situation. It should be noisy, but the noise should come from laughing children and singing birds. It should be clean and colorful. It should be friendly and safe for people to walk. The aim of this thesis is to present solutions for the fight against the private car by encouraging the use of bicycles.

1. Introduction

Traffic is one of the most apparent urban problems of the fast growing mega city Cairo. The needs for mobility and urbanization are strongly interconnected. People move to cities, because they offer the full extent of social life, jobs, public and cultural services such as education, health care, consumer goods, entertainment, social diversity etc. All these entities are usually situated in different places, initiating the need for mobility. In addition to the commuters, who already live in the city, almost 2 million people commute in and out Cairo each day, according to a speech of Khaled Abbas, the head of the National Institute for Transport, held at the Cairo Climate Talks workshop on April 15th 2014. The negative effects of congestion are manifold and include health risks due to poor air quality and a high level of noise pollution, increased temperature, deterioration of public space and loss of time for work and leisure. Abbas also states that the cost of congestion in Cairo could equal 4% of the GDP, or EGP 50 billion a year, and cost of accidents could account for 2% of the GDP. In the psychological dimension, people affected feel stress, aggression and despair.

The causes for this situation are as diverse as the problematic consequences. They include unfavorable land use and urban planning schemes resulting in long distances between destinations of regular trips, as well as heavily subsidized fuel prices leading to the event of unnecessary car trips, the lack of intelligent and effective traffic management, the insufficient quality and capacity of public transport and the high prestige level of the private car.

Another major problem related to traffic is the unfair distribution of access to mobility. Regular mobility is a common and basic need for most citizens. How-

ever, the development of infrastructure supporting private cars has been prioritized in Egypt for decades, excluding the vast majority of the population. At the workshop mentioned above, The urbanism expert David Sims pointed out, that only 15% of the households in Cairo proper have a private car, only 3% in the peri-urban Greater Cairo Region. This little part of the society is privileged to use the biggest part of the road space, which is not fair. Formal public transport, which should be available for every citizen, in fact mostly disregards informal areas, even though they accommodate the majority of Cairo's inhabitants. Equity in mobility is relevant, because the access to mobility is a key feature for many aspects of life. Lack of access to mobility can cause financial problems for the affected by not having access to jobs or spending a big share of income for commuting. Also, social problems like exclusion and isolation arise from the disability to move in a comfortable and effective way. Furthermore, the sheer existence of massive infrastructure elements accommodating cars and separating neighborhoods contributes to this factor.

Using bicycles for transportation can lead to relief from both mentioned problems. Firstly, it consumes only a fraction amount of space used by cars, causing less congestion. Secondly, it is a more affordable means of transportation, thus it could provide access to citizens with low income. It has numerous further acknowledged advantages, in social aspects as well as for health and the environment. Cycling can enhance the life quality because it is noiseless, clean and healthy, prevents congestions, thus saves time and enables easy and spontaneous interaction with other road users and the physical surrounding. The aim of this thesis is to develop ways to foster the use of bicycles and enhance bicycle culture in Cairo. The term 'bicycle culture' describes a lifestyle, which includes the bicycle as a tool for daily usage rather than a lifestyle focused on cycling as a means of identification or profiling.

Cairo is composed out of very different parts with peculiar characteristics, which shape the mobility demand and opportunities. The historical urban core, for instance, is heavily stressed by private car traffic, but also well served by buses and the metro. Residents of the new desert towns, which were planned in the second half of the twentieth century to actually relief Cairo's center, rely almost totally on private cars to commute to downtown and thus even aggravate congestion there. Informal areas, as another component, reach extremely high population densities while having poorly developed transportation infrastructure. Due to the grave differences between those districts, also socially, they need specific mobility concepts, which accommodate the actual conditions

inside the areas and within their contexts.

Cycling has a strong potential for fast transport between distances around maximum five to ten kilometers, which means within the district or not far beyond. There, it can avoid unnecessary car trips. Demands, obstacles and potentials for bicycle-based mobility will be analyzed in this thesis and possible solutions will be suggested. These concepts will not only focus on poor people, but also, and particularly on the rich Cairenes, who already have cars. A special regard will be taken on the mentality and the public image of cycling in the Egyptian society. This factor is crucial for the development of cycling culture, since it is strongly bound to attitudes, emotions and cultural habits.

This thesis observes potential reasonable solutions within a concept of an integrated, intermodal traffic system with spaces and hubs for different modes. The integration of bicycles in intermodal transportation systems can make different modes benefit from each other.

Moreover, the relevance of cycling for urban life quality will be examined to reinforce the argument, that cycling is not only an efficient mode of transportation, but also an activity that can enhance life quality in various dimensions.

2. Methodology

2.1 Introduction

The general aim of the analysis is to understand mechanisms concerning mobility in the first step and design according to mechanisms in the second step. These mechanisms exist in the dimensions of the mentality of the Egyptian society, existing networks, traffic flows, etc. They can be beneficial, neutral (do not yet relate to cycling) or disadvantageous (threat or hinder the development of cycling as a means of transportation). The first type must be supported. Mechanisms of the other two types might be turned into beneficial ones, if they have the potential. This means, that existing structures can be developed further and enhanced or improved. If they are disadvantageous and have no potential to be turned into advantageous ones, ways to stop these mechanisms can be searched. Apart from that, the introduction of new and innovative mechanisms can be stimulated. A way to deal with this system is to imagine innovative, surprising or unconventional solutions. This means the introduction of new ideas and connections between cycling and formerly not related processes and mechanisms generating new movements. The analysis is observing different scales, namely Cairo's general traffic situation, its specific cycling situation and finally the cycling situation in specific districts, which are then compared with each other. This is backed up by a review of contemporary approaches to traffic planning and basic theories of social and behavioral psychology.

2.2 Three Case Studies

This thesis focuses on three different case study sites, which are districts of Cairo. This is due to two reasons. Firstly, an overall strategy for Cairo in general

makes sense only to a certain extent, due to the diversity of urban fabric patterns and parameters. These are in themselves complex, as a result of factors like historical development or geographical situation. It is logical, that a planned new settlement in the desert has totally different features and characteristics than a rather central, informal neighborhood which developed in an uncontrolled way over agricultural land. Therefore, needs, obstacles and potentials must be regarded accordingly.

As the second reason, cycling as a transport mode is most suitable for distances of maximum ten kilometers, as Hook and Diaz (2003, p. 21) suggest. This might be the way to school, to work places, to public transportation access points, to shops or to the market. Therefore, most cycling trips will not go far beyond the boundaries of a district and an analysis of infrastructural conditions and movement patterns within this scale makes sense.

After getting introduced to several places in Cairo, I selected three areas, according to the following criteria: They should have differences in street and land use patterns, distances to the city center, the connection to public transport, the planning status, population densities, inhabitants' income groups, street conditions (network, state of surfaces, road hierarchies), existing cycling practices and potentials as well as a clearly defined boundary. The sizes and locations of the selected districts, Shubra (1), Al-Rehab (2) and Ard El-Liwa (3), can be seen on figure 1. To some extent, their characteristics are representative for other areas in Cairo, which are also marked on the map.

Shubra is a densely populated district just north of downtown. It is bordered by railway tracks in the south and east, while the Nile defines its western border and the Ismailia Canal its north border. It is located close to the city center and well connected by one metro line, big streets and numerous buses. Most of its inhabitants have middle or low incomes and a traditional bicycle culture is still vital. The district developed formally, mostly around the end of the nineteenth and the beginning of the twentieth century, according to the website Touregypt (n.d.). Since then, it is fully developed and not being densified anymore. Shubra had 550.000 inhabitants in 2006, according to the website City Population (n.d.). It has a size of nine square kilometers.

Al-Rehab is a part of New Cairo, thus one of the desert cities with little population and low density. The area attracts people with higher incomes who can afford a car, by offering high-class residences but almost no public transport. Thus, car dependence is a crucial factor there. According to the 2006 Census, only 118,678 people live in New Cairo (City Population, n.d.), which was plan-

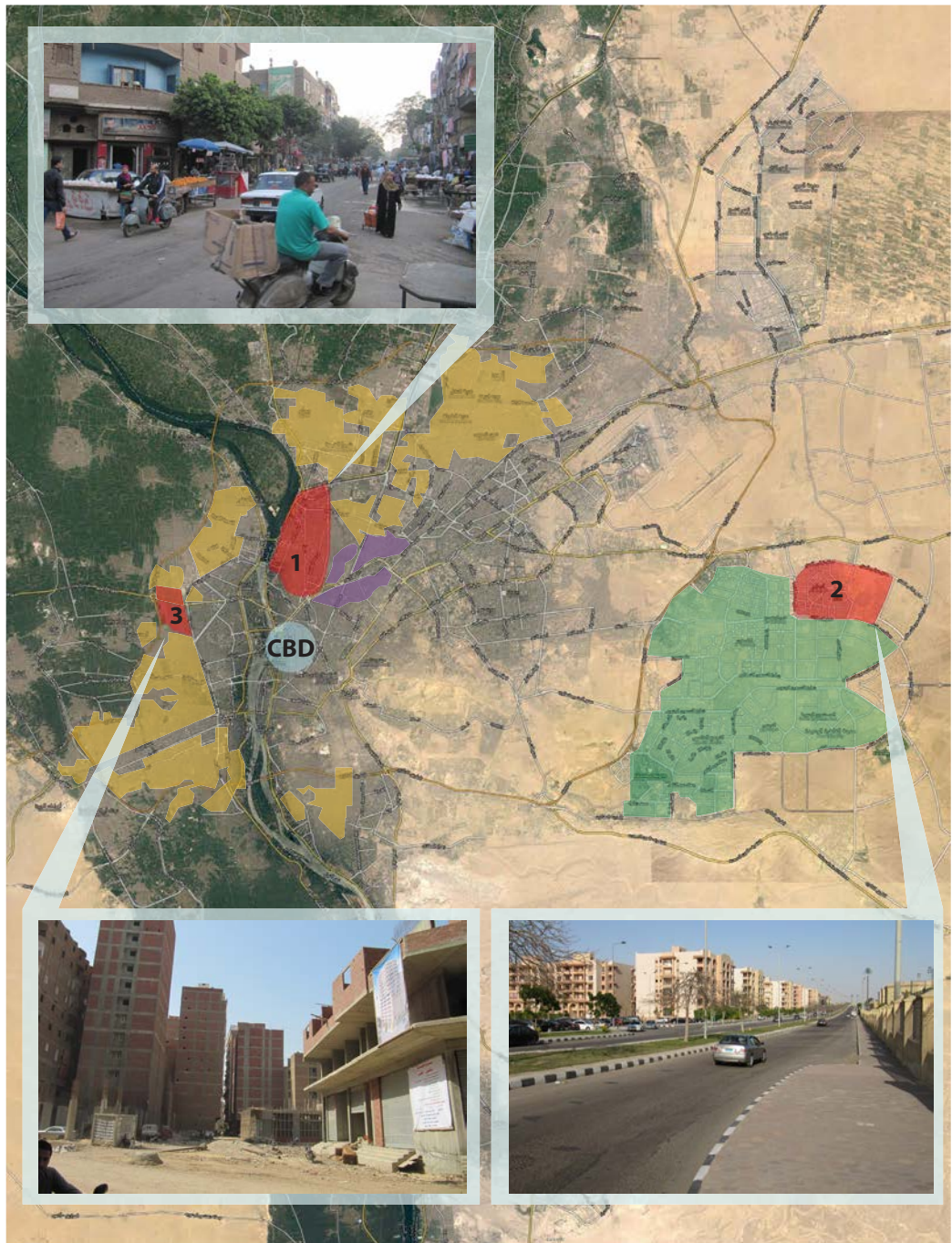


figure 1:
 Highlighted on the map are the three case study sites and the Central Business District of Cairo:
 1: Shubra, 2: Al-Rehab, 3: Ard El-Liwa. Areas with similar characteristics are purple for Shubra,
 green for Al-Rehab and yellow for Ard El-Liwa.
 Source: Author, map from Google Maps

ned to house more than 300.000. This results in population densities as low as 5000 to 7000 persons per square kilometer (Sims, 2012). However, the high car ownership rate makes this area relevant. Most formal development in Cairo is currently happening in new desert towns with characteristics similar to those of Al-Rehab, even though it is an extreme case. On big billboards advertising these new retort cities built by private investors, cyclists and cycle paths in a green, quiet environment belong to the standard elements. Since cycling is part of a modern and healthy lifestyle, it is gaining popularity among young, well-off Egyptians. It will be worthwhile to watch, to which extend the visions on these billboards will turn into reality.

Ard El-Liwa is an informal area in the Giza governorate. The majority of the city's population - 63 percent according to Sims (2012, p. 96) - lives in informal settlements, even though they cover only 17 percent of the surface of the metropolis. In addition, the informal sector is still booming in Cairo, which makes the study of such a settlement important. Ard El-Liwa is built on former agricultural land, which is the most common type of informal settlements and results in some specific typological characteristics. There are substantial differences between different informal areas, but they have some features in common: These areas mostly suffer from poor connection to public transport with a high demand for mobility at the same time. Road infrastructure is usually in bad condition. The population densities are extremely high. Car ownership is not affordable for most people and the usually narrow streets do not allow high car traffic anyway. Ard El-Liwa has a size of nearly two square kilometers and about 300.000 inhabitants (Nagati & Elgendy, p. 4). Thus, it is a rather small informal settlement. It borders to the formal district Mohandeseen, other informal settlements and farmland.

To understand the situation in the case study areas, mainly three methods were used: firstly, interviews with cyclists were supposed to explain their experiences, motivations to cycle, problems and wishes. Secondly, street observation aimed to get an overview of the existing cycling activity and traffic in general. In particular, several spots were chosen to count the cyclists passing by. The third method was to map relevant elements.

2.3 Interviews

To understand the motivations and opinions of Cairo's cyclists of different categories, interviewing them was the most important research method. I chose to conduct qualitative interviews, aiming to get insight to personal stories and un-

predictable motivation reasons. Due to the wide diversity of types of cyclists, a unified questionnaire would have led to unsatisfactory results. It is logical, that a male delivery cyclist has other needs than a young female student. Therefore, I prepared questions as a guideline, but the interviews were semi-structured and thanks to this, open for spontaneous dialogue. This gave the opportunity to ask more deeply and flexibly about individual, unpredictable stories. Direct translation by an assistant enabled me to react on statements and ask more precisely about particularly interesting details. Questions asked for demographic information and statements about the individual's cycling behavior, including data about usual trips, the origin, ownership and maintenance of the bicycle and finally, their attitude towards cycling, including motivation, experiences and problems. Before conducting the interviews, questions were discussed with different people and refined. Interview partners were spontaneously approached in the street or in shops they work for. They were not prepared. The selection criterion was that they were bicycle users.

2.4 Counting Observation

The aim of this observation was to collect data about the numbers of cyclists in the case study areas, the shares of different types of cyclists and their driving behavior. This includes the analysis of whether they prefer smaller or bigger streets, respect the directions of one-way streets, and which turns they take. For a thorough study, an observation of cyclist presence in different day-times, weekdays and seasons would have been needed. Due to my limitations in time, I restricted the survey to one set of 45 minutes in the afternoon at each spot. Four spots were chosen in each district at street intersections, to enable the analysis of turns and crossings. The following criteria were important for the selection:

- an intersection of two minor neighborhood streets
- an intersection of a main street and a minor neighborhood street
- a spot each in the middle and at the edge of the area
- one-way streets as well as bidirectional streets.

2.5 Mapping

The collection of data about the area by desktop research, interviews and discussions, as well as observation was used to create maps to illustrate transport and cycling relevant data. They contain spots of the observations, transport infrastructure like street types, hierarchies and typologies as well as Metro stops and bus hubs, bike shops and rentals and specific land use features.

3. Theoretical Background

3.1 Introduction

When dealing with a problem related to transportation, several contemporary approaches towards sustainable traffic development are available. A few relevant theoretical concepts will be regarded in this chapter. Furthermore, the activity of cycling depends on many psychological factors. In the context of Egypt, especially social psychology and models of behavior determinants are worth being considered, since they can explain what leads to the motivation to use a bicycle for transportation.

3.2 Vision of the Equitable and Healthy City

Every human being is equal and deserves a right to safe mobility, at least in terms of walking, the most natural and affordable way to move. This means, where streets exist, sidewalks should be provided within walkable distances to enable all people, including elderly and young children a safe and pleasant trip to their destination. They should be in good condition and kept maintained. Due to low car ownership rate, walking has a big share among the transportation modes in Cairo. Nevertheless, many of the few existing sidewalks are damaged, blocked by extended kiosks, street vendors or cafés, cluttered with objects like lamp posts, electricity boxes and the like. Although being exposed to the danger of being hit by a vehicle, pedestrians find it more comfortable to walk on the road. Ironically, the sidewalks in good condition are misused by motorcyclists on notoriously congested streets like the Corniche, before el-Qubba Bridge or Nahdet Masr Street. All this is important, because, according to Gehl (2010),

a pedestrian-friendly city is most likely also a bike-friendly city.

Regarding mobility, people have different needs and capabilities, depending on their age, gender, income, health situation etc. Thus, the equitable city should aim to provide the same mobility opportunities for all of these different people and support the less wealthy.

Congested streets, caused by a minority of the population, also block police, fire fighters or ambulances in case of emergencies. Those services, which are supposed to save lives, have to be able to move fast in a city, which cares about the well-being of its inhabitants. Considering the air quality, the inequality in Cairo is even more severe, since many of the wealthy car owners, who are accountable for bad air quality in central areas of the city, live far out in the new clean desert communities. The citizens in the central parts suffer physically from the poor air quality and the noise coming from vehicle engines.

Less wealthy residents are forced to select their residence according to what they can afford, and the cheapest apartments are often situated at the edges of the city. They are forced to accept long commuting distances to jobs and other destinations. However, many Cairenes, mainly those living in dense informal areas with no officially organized transportation infrastructure, have physical and financial limits to access mobility.

Cycling is energy efficient, healthy and causes no noise and no greenhouse emissions. It should be prioritized before the car, which is also far more expensive. At the moment, however, Cairo's streets clearly prioritize motorized traffic, dominated by private cars of wealthier citizens.

Crossing one of the numerous busy high-speed multi-lane streets by foot is dangerous and limits the freedom of pedestrian movement, especially vulnerable groups like elderly, in favor of the rich in their cars. This unfair distribution of priorities ironically nurtures the desire to use a car, which the majority cannot afford. A city with the density and compactness of Cairo can hardly accommodate car ownership rates on levels of European cities.

The former mayor of Bogotá's capital, Enrique Peñalosa states that: „An advanced city is not one where even the poor use cars, but rather one where even the rich use public transport“ (website of TED Ideas worth spreading, n.d.). His message is, that traffic systems reflect political theories and that in democratic societies, where theoretically everyone has equal rights, all people should have the possibility for safe, enjoyable and affordable mobility. Therefore, he also advocates the three-step sustainable hierarchy of:

1. Facilitate pedestrians first
2. Develop bicycle and pedestrian infrastructure before roads for cars. In his opinion, just the existence of bicycle paths raises the social status of the cyclist. Moreover, using a bicycle means preserving public spaces from deterioration by car usage. It should not only be tolerated, but encouraged.
3. Provide effective high quality Public transport (website of TED Ideas worth spreading, n.d.)

3.3 Demand-oriented Planning vs. Supply-oriented Planning

The rising rates of car trips are partially due to the supply-oriented transportation planning strategies on Cairo's authorities. This means, that if the demand for more road space is high, the authority will just react with a supply of this, no matter what would be the most sustainable or rational solution. Opposed to this, a demand oriented strategy would seek to regulate the demand, by offering a set of incentives for desirable modes of transport and disincentives for not desirable ones. Thus, demand-oriented infrastructure planning offers options to prioritize those, who would otherwise remain underprivileged in terms of mobility. An example is the progressive reduction of car parking spaces in central Copenhagen over years, accompanied by an extension of the bicycle path network throughout the city (Gehl, 2010). These interventions did not only react to mobility trends controlled by an external power, but took control of shaping mobility behavior in a desirable, i.e. environmentally friendly and pedestrian-friendly way.

3.4 Avoid - Shift – Improve

This approach aiming for sustainable solutions considered a demand oriented approach. It is used by the United Nations Environment Programme (UNEP) and the German Agency for International Cooperation (GIZ). According to a factsheet of the GIZ, the approach is based on the following three principles (Deutsche Gesellschaft für Internationale Zusammenarbeit, n.d.). Cycling is related to all three principles, but the scheme excludes many important factors, such as image, social acceptance, climatic conditions etc. It rather focuses on efficiency of the traffic system, the trip and the vehicle itself.

1. Unnecessary trips should be avoided. This can happen by working at home or close to home instead of a distant workplace. Unnecessary redistribution of goods, for the sake of profit in an economic system defined by capitalist rules,

should actually be avoided. Collective (bicycle) delivery services can be an option to avoid individual trips for shopping. Thus, avoiding (long) trips is a matter of efficiency of the whole system, including land-use planning.

2. Shifting the mode of transport from motorized to non-motorized, from individual to mass transport etc. It refers to the efficiency of the trip.

2. Improve: This aspect is focusing on the vehicle efficiency. This could be a bicycle, which can be ridden more easily thanks to light-weight and more gears or a car with a more efficient engine, which consumes less fuel than others. According to the GIZ factsheet, using vehicles powered by electricity instead of fossil fuels is linked to this principle.

3.5 Cycling as a Transportation Mode in the ‘Human Scale’

The concept of the human scale, according to Gehl (2010), is based on the limited ability of perception of spaces by human physiology and the resulting emotional perception. There are certain boundaries defined mostly by the size of the human body, the ability to see the environment and to hear it. Another factor is the limited speed and distance of moving by foot. Urban environments are being perceived as uncomfortable, if the scale of their components does not correspond to the human scale, e.g. distances beyond walkability, wide streets, huge squares, massive buildings etc. Such elements cause the feeling of being overwhelmed or lost and unable to survey or control the environment sufficiently. Only from a distance of around one hundred meters, body movement and gestures can be comprehended, and from about seventy to fifty meters, it is possible to identify people’s faces, as Gehl points out (2010). Since cities designed according to the human scale contribute to inhabitants’ comfort, development in this scale should be prioritized.

A strong cycling culture contributes to human scaled cities, if the replaced cars reduce the need for big car parking spaces and big numbers of high-speed roads. Apart from its health benefits, cycling has effects on the way of experiencing the environment during the trip. It is characterized by modest travel speeds, direct contact to environment, the chance to stop spontaneously and park almost everywhere. It enables to perceive the city in a particular way, by choosing whether to go slowly and observe every detail, like shops, squares, parks etc. or to go faster and reach the destination quickly.

Cycling is only a slight enhancement of walking, the most human way of mobi-

lity. Since pedestrians and cyclists have sometimes the same or similar needs, it is logical to link pedestrian and bicycle infrastructure. They are both unmotorized and exposed to the open air and weather conditions. They have both demands to cross wide roads safely. In case of trips including mass transportation, they need safe and user-friendly stations.

As Gehl states, "the relative energy consumption ratio of biking to walking to driving a car is one to three to 60 energy units" (2010, p. 105). Moreover, moving in a car with speeds of fifty kilometers per hour in cities increases the risk to oversee traffic and react accordingly to sudden dangers. This raises the need for protection and segregation of roads at the expense of pedestrian mobility freedom.

According to Gehl (2010, p. 23), the expression 'Man is man's greatest joy' illustrates the ancient attraction of humans towards watching other humans, comparing themselves, looking for potential friends, witnessing interesting stories etc. Although this point must be treated carefully in the context of Egyptian society, due to issues like sexual harassment, the curiosity about other people in the street scenery becomes evident, especially for a cyclist. However, curious regards from strangers are often innocent and harmless, and the presence of visible humans contributes to the attractiveness of the public space. Cars reduce this attractiveness in two ways, firstly by obstructing views and secondly because their drivers and passengers are usually less visible themselves than cyclists and pedestrians.

On the other hand, this limitation of visibility might exactly be the reason to motivate people, women in particular, to driving in a car, where they can be safer from men's views. Thus, driving a car to escape from harsh looks would be both a symptom of an unhealthy society and a factor contributing to further gender segregation. This means, women riding bicycles would represent emancipated, self-confident, and equally leveled members of society, while women in cars could in certain cases represent fear and the lack of equality and social acceptance of moving in public. Interviews with females, who cycle in Cairo, show a tendency, that they are positively surprised from the friendly encouragement of passengers, predominating some rare negative comments and looks. They sense, that since the number of female cyclists fortunately has increased recently and the sight becomes more common, people get used to it and react less often in unpleasant ways.

3.6 Intermodality/Transit Oriented Development

In terms of efficiency, cycling is most suitable for distances around five kilometers to ten kilometers. Beyond this, motorized transportation modes such as BRT or metro, which involve waiting times at stops, but higher travel speeds, become more efficient in terms of the relation of required time per travelled kilometer. Of course, this depends on the fitness level of the individual and the type of bicycle. Bicycle trips can start immediately, without waiting time, and average cycling speeds are between 12 and 16 kilometers per hour, according to the GTZ (Hook & Diaz, 2003). A big part of the travel time for trips by public transport is spent walking to the station and from the station to the final destination. Intermodal solutions aim to combine advantages of different modes of transportation to create synergies between those optimal for small distances and the ones more suitable for longer trips. For example, buses become more attractive, if the way to the bus stop can be covered in a convenient, fast and easy way, e.g. by bicycle. Therefore, bicycle parking facilities should exist at the station.

This integration can reach high levels. In the French city Bordeaux, for example, a bicycle sharing system has stations on most bus stops and the provider offers subscriptions of a combined ticket for the bicycle sharing and all regional public transport services. This will improve the mobility situation for the majority, including less wealthy citizens.

The term ‘transit oriented development’ (TOD) describes the idea of connecting public mass transit to a well-organized and pleasant infrastructure for non-motorized transportation within mixed use neighborhoods (Gehl, page 107). This should optimize the conditions for travelling with public transport, especially light rail systems. High population densities are to be reached in proximity to stations, to cater for short walking or cycling distances to access points to a high performance and high quality mass transit service.

3.7 The Role of Social and Behavioral Psychology for Cycling in Cairo

3.7.1 Introduction

Since the issue of cycling in Cairo is highly influenced by psychological and social factors, it is important to understand, how these factors, which influence human behavior, work. Social psychology and behavioral psychology offer a range of models, which firstly help to understand the current mobility behavior of Cairo’s citizens and are secondly useful for the development of solutions. Cycling is performed by individuals, but the decision whether to cycle or not is

to a high degree driven by social circumstances. The mentalities and attitudes of Cairenes have specific origins and reasons, and concepts to encourage cycling will be more successful if they correspond with them. Firstly, I will present an overview of factors, which influence behavior, as they are summarized by Budge et al. (2009). After this, I will present two behavior change models, which were selected to illustrate different possible approaches, and to be able to design a more comprehensive strategy. The first one is the so-called A.I.D.A. model, which originates from marketing theory, and the second one is the FBM, by BJ Fogg, which he describes as a behavior model for persuasive design.

3.7.2 Factors Influencing Behavior

Numerous factors influence behavior and most models classify them into personal, social and environmental factors. A strategy to encourage change of behavior is likely to be more effective, if factors from all three categories are included (Budge et al., 2009).

Personal Factors

Behavior is influenced by the following internal factors, which depend on the individual's personality.

- Knowledge and awareness: Rational decisions are based on the intention to maximize personal profits and minimize personal costs. Providing information and raising awareness influences behavior on this level. However, many other factors can thwart rational decisions.

- Attitude: Attitudes describe an individual's beliefs about issues. Those basic convictions, like prejudice or sympathy, can cause behavior, which is contradictory to rational knowledge, but justified by irrational sentiments.

- Habit and routine: Actions become habitual, i.e. automatic and more unconscious, after being repeated numerous times.

- Self-efficacy: This factor is the conviction of an individual to be able to perform a certain behavior successfully. A lack of self-efficacy can block behavior change, independent from the actual ability and will. Examples of other successful individuals can help to increase self-efficacy.

- Emotions: Emotions are unstable factors, which can change quickly, but have a strong influence on many behaviors. In fact, they can be the only driving force in certain (extreme) situations. Examples are fear, love, joy, anger.

Social Factors

Behavior is also connected to how other people perceive it, according to their personal norms, attitudes, knowledge etc.

- Descriptive Norms: These norms define the social acceptance of behavior within a group. Behavior different than described by these norms may lead to exclusion from the group.

- Injunctive Norms: Injunctive norms are concrete rules, like laws and regulations. It is possible that they contradict descriptive norms.

- Social Proof: In unfamiliar situations, individuals assume, that others know better how to behave than themselves. If others perform a behavior, it is perceived as the proof for its social acceptability.

- Diffusion of Responsibility: Diffusion of responsibility occurs in situations, when action is needed. Individuals may not act or feel responsible, believing that others have done so or actually are more responsible. With an increasing group size, the diffusion also increases.

Environmental Factors

- Local (exo) Environment: These factors are conditions beyond an individual's control, which enable or disable, ease or complicate behavior. These could be the availability of service facilities, physical barriers or climatic conditions.

- Wider (macro) Environment: This includes factors on the national or even international level, such as legislation, technology or economy.

3.7.3 The A.I.D.A. Model

From the field of marketing, the A.I.D.A. strategy helps to raise people's desire for things to be sold (AIDA: Attention-Interest-Desire-Action, n.d.). The letters stand for attention, interest, desire, action.

These four steps are supposed to make a person get to know a product or a service, get curious about it, want it and finally buy it. The extended model, 'A.I.D.E.A.', includes the step 'Evidence', which is supposed to convince people on a rational level to strengthen the irrational desire.

In the context of marketing, persuading people to buy things, which they do not actually need, by creating a desire based on illusions is highly questionable, especially since commercial advertising is invading almost every part of people's lives in physical and virtual spaces. However, applied to cycling in Cairo, the A.I.D.A. model would be useful to convince people of a sustainable solution,

which is brought forth by individuals, but benefits the whole society.

Grabbing attention of the target group can be done with the help of tricks like addressing people personally. The short moment of superficial attention opens the opportunity to raise interest in the product or service by targeting their problems and needs. In the case of this thesis, such problems could be long trips due to congestion or the lack of fitness. At the same time, the explanation, how the product or service to be sold will help to solve those problems, is creating a desire by the audience to have or use it. Therefore, features should be described and the respective benefits for the user explained. After raising desire, it is important to tell the target group what to do in order to get this solution.

3.7.4 FBM

The social psychologist Fogg (2009) created a behavior model, which mentions three essential elements to stimulate a certain behavior: Motivation, ability and trigger. The first two elements are prerequisites, while the trigger actually induces the behavior happen. To persuade people to a certain behavior, Fogg mentions the following steps:

1. Ensure a high level of motivation
2. Ensure a high level of ability
3. Issue the trigger

Motivation, according to Fogg, is a result of three different couples of factors. Pleasure or pain are immediate factors, with no or almost no anticipation done by the individual, while in the second couple, hope and fear, the individual does anticipate an outcome. The third one, social acceptance and social rejection becomes increasingly important with social media, where social acceptance and respect become visible.

Fogg argues, that increasing the ability of an individual to perform a behavior by making him or her learn more requires effort, which makes it actually less easy. Instead, he suggests to design the circumstances as simple and easy as possible. Easy behaviors also require less self-efficacy. He mentions six factors, which determine the level of ability: These are time, money, physical effort, brain cycles (which is the thinking effort required to perform a behavior), social deviance (breaking norms of society, which makes a behavior less easy), and non-routine (people tend to find it easy to follow habits and routines). These factors vary by each individual's characteristics and context.

Fogg categorizes the triggers into three groups: a 'facilitator' increases easi-

ness, while a `spark` increases motivation. A `signal` indicates or reminds that a behavior is at the moment appropriate. The trigger must be noticed, associated with the behavior and occur at a time when motivation and ability are at sufficient level. To make them more effective, triggers can be linked to existing habits. If the motivation is high, a lower level of ability is possible, and vice versa. It is usually more effective to reduce barriers than increasing the motivation, because simplicity is naturally attractive for humans.

3.8 Conclusion

A.I.D.A is a model from a different thematic context and time than FBM, and both represent different approaches to stimulate a desired behavior. To encourage cycling as a mode of transportation in Cairo, A.I.D.A. seems more suitable for non-spatial interventions, since it is based on communication. It will be helpful for the development of concepts dealing with events, marketing campaigns, raising awareness and mass media or social media. Also, it is effective in small scale interventions, but not in complex strategical systems. In contrast, FBM works very well for the design of such systems and concepts, since it is a comprehensive model not limited to any scale. Also, by including external circumstances with considering the `ability` to perform a behavior, it is applicable for concepts, which include spatial interventions. Therefore, FBM seems to be the more promising model to contribute to the development of all-encompassing concepts in the present case.

4. Analysis

4.1 Introduction

This chapter deals with the detailed analysis of the research problem, including the general traffic situation in Cairo, the status quo of the cycling culture in Cairo and the analysis of the selected case study sites for insight into differences of districts within Cairo. Furthermore, the case studies will be compared with each other in the end of the chapter. The aim of this chapter is the determination of problems, obstacles, needs, opportunities and potentials for encouraging the development of cycling culture in Cairo.

4.2 Cairo Traffic: Status Quo

Traffic incorporates two components, which are personal transportation and freight transportation. Personal transportation represents the biggest share in Cairo, however, there is a significant quantity of small scale goods deliveries between shops and private homes, some small transporters and a small share of big trucks.

As Gehl states (2010), from the early 1970's on, the global city development focused mainly on car-friendly street design. This is also the case in Cairo. Cycling, the most energy-efficient means of transport, and walking, the most ancient and natural one, became literally suppressed by this car-oriented paradigm, introducing extensive parking lots, fenced inner-city highways, the 'modern' city of separated functions, engineered street intersections etc. Sidewalks, however, are often in poor condition with damaged pavement, construction debris, kiosks or parking cars blocking the passage. The busy streets of Cairo create

inhospitable conditions for socializing: stress because of danger of being hit, noise making conversation difficult, and poor air quality. On the road, weak and unintelligent policies lead to careless behavior of drivers. Ridiculously, many taxis circulate in the streets without a customer while burning fuel and occupying road space. Figure 2 provides an overview over the characteristics of the transport modes available in Cairo.

4.2.1 Public Transport

The quality and effectivity of Cairo's public transportation network are insufficient in many ways. Informal settlements are excluded from the service, despite the fact, that the majority of the inhabitants live there. Fares are affordable, thanks to heavy subsidies, but vehicles are usually crowded and some women try to avoid it due to the risk of harassment. With only two and a half operating metro lines, Africa's biggest Metropolis has a seriously undersized metro network coverage and capacity. Work on the extension, however, consumes immense amounts of time and money. Experts like Dr. Khaled Abbas from the Egyptian National Institute for Transport suggest the implementation of a BRT system, which, according to him, would cost only about 10 per cent of a subway system per kilometer. Construction would proceed much faster, as well, but concrete plans do not exist.

The World Bank (2006) criticizes the need to subsidize public transport, since it is considered not directly profitable. However, if the indirectly saved costs for fuel and treatment of health problems caused by air pollution in comparison to private individual car transport per person were included in the calculation, the result would be more favorable for public transport.

4.2.2 Cars

Private cars have become more affordable recently and even after a significant rise in July 2014, the highly subsidized fuel is still very cheap, with around 2LE per liter (Benzinpreis-Schock in Ägypten, 2014). But private cars are still a luxury, prioritized on the street. As Lydon et al. (2012, p. 11) state, cars have „detritmental effects on the urban living“. This becomes very evident in the congested streets of central Cairo, where exhaust gases cause appalling air quality and raise the urban heat island effect. Car noise and consumption of space for parking impair the quality of public space. The fuel prices, however, will increase, which will make car driving again more exclusive than it is today.

The way to the dominance of the private car began during the rule of Sadat in

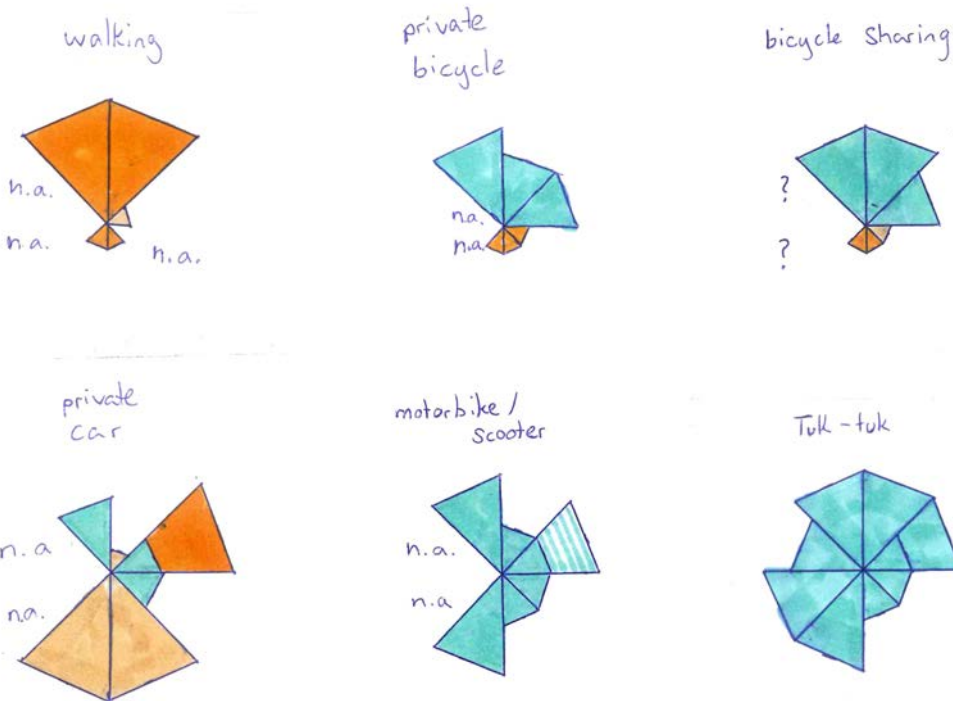
the 1970s, whose aim it was to provide every Egyptian with a private car (On Cairo's dying trams, 2012). During this time, more than half of the existing 120 kilometers of tram tracks were replaced by road surfaces for cars. The results are car prioritization and the loss of a more democratic mode of transportation. According to this attitude, the state began to subsidize fuel in the same time, with steadily increasing expenses up to currently more than LE 144 billion in 2013 (Egypt cuts spending on energy subsidies by a third in new budget, 2014). This encourages inefficient car use, for short trips or with only one person in the vehicle, for example. The exceptionally high grade of fuel subsidies is meant to ease the access to mobility for less wealthy people. But the more wealthy benefit from the low prices as well. They contribute to careless mass-consumption and account for the profitability of the high amount of taxis circulating around unoccupied, filling the streets without transporting passengers. However, the low prices also enable the operation of private minibuses, which are currently among the most important modes of mass transport with a share of 28% (Sims, 2012).

Owning a private car is seen as luxury in Egypt, which makes it desirable for many. According to my interviews, it is still associated with freedom, high life quality, power and social status. Despite the low car ownership rate, some sidewalks in Cairo are totally occupied by parking cars or cannot be reached because they are surrounded by tightly parked cars. Drivers themselves, often occupying a car alone, are isolated from the other road users and through reflecting glass, they are hard to see.

By an expansion of roads, they will attract and legitimize even more cars instead of relieving the traffic. They encourage people to obtain more cars so that they will become as congested as before, just wider. Furthermore, road capacities are not the main source of congestion, but rather the intersection capacities are, according to the World Bank (2006). However, Cairo's government sticks to plans of increasing road space and encountering the increase of private car ownership as a phenomenon, which needs to be facilitated.

4.2.3 Delivery Services

Cairo has the particularity of an extensive availability of delivery services. Nearly every good can be ordered via phone or internet to be delivered to the home of the customer. The delivery is increasingly done by scooters or motorbikes, while the share of bicycle deliverers diminishes.



4.2.4 Conclusion

Cairo's traffic is stressful, dangerous, health-threatening and anti-pedestrian. Cairo provides a lot of space for driving and parking cars, logically limiting space for social gathering, like parks and gardens or cafés. But pedestrian-friendliness is not only a matter of safety and proper infrastructure, but also of the feeling of an interesting environment to walk in. This is provided by public space filled with other people, greenery, art and shops, but not parking lots. However, beautification of the public realm is not among the most urgent issues in Cairo; road safety and affordable mobility are. Luckily, these factors can be combined and reinforce each other. The most sustainable means of transportation are also the most affordable, and, assuming appropriate conditions, the safest. These are walking, cycling and public transport, and they need to be intelligently connected. It is not enough to think of a one-dimensional solution. Rather, a well functioning integrated intermodal transportation concept can be the solution.

An often mentioned potential relief for the congestion in Cairo is the implementation of a BRT system, which would be up to 90 per cent cheaper than new subway tracks and would take less time to implement, as well. Furthermore,

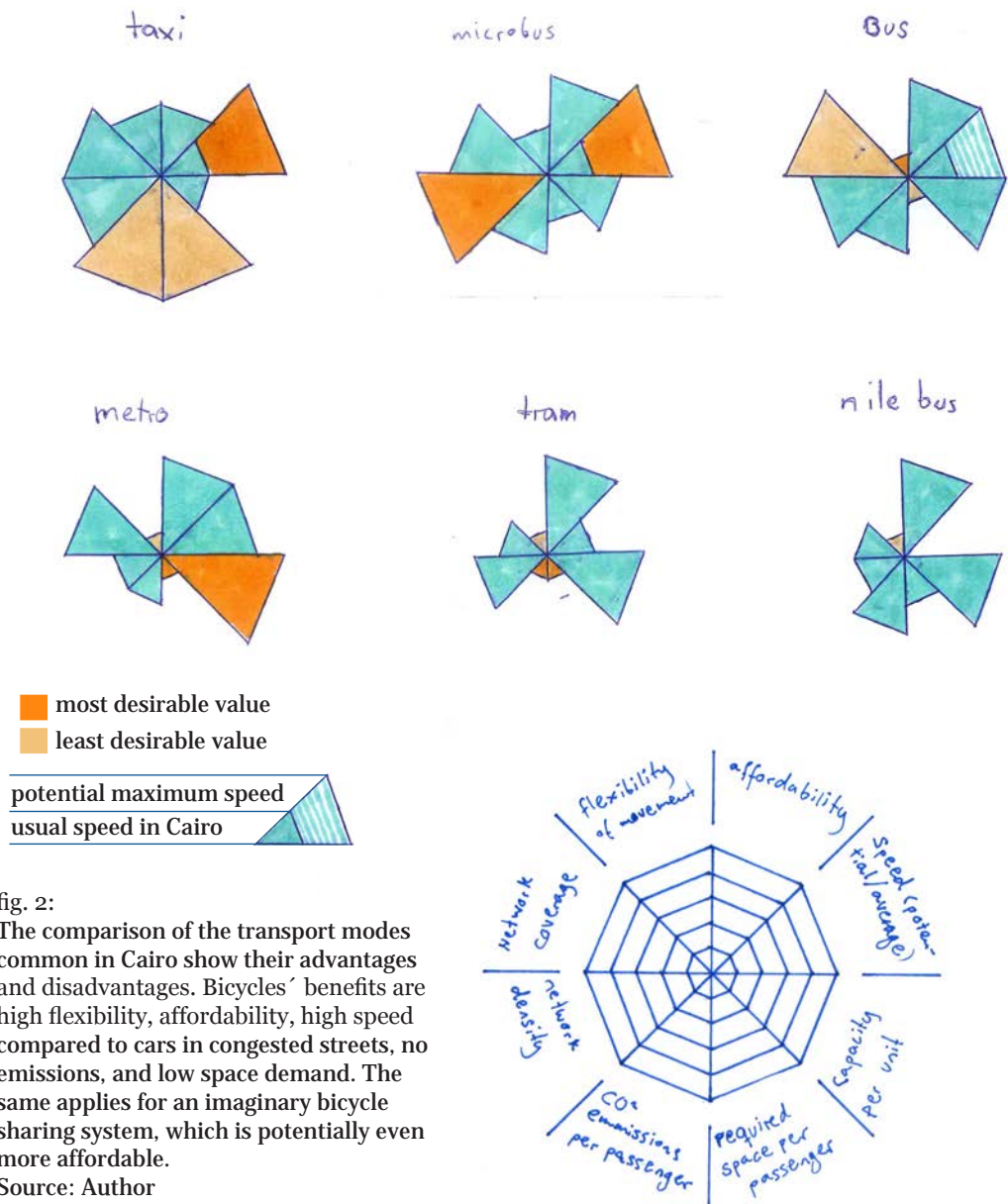


fig. 2:

The comparison of the transport modes common in Cairo show their advantages and disadvantages. Bicycles' benefits are high flexibility, affordability, high speed compared to cars in congested streets, no emissions, and low space demand. The same applies for an imaginary bicycle sharing system, which is potentially even more affordable.

Source: Author

many potential routes exist, for example along the old tram tracks in Heliopolis or the wide strips in the middle of main streets of Nasr City. Reducing parking spaces in Downtown for the sake of a high quality and high performance rapid bus is a promising idea.

Road traffic is the sector which consumes the biggest share of energy worldwide and the conversion to regenerative energy sources will be a critical challenge for the future of urban traffic. In Cairo, the use of fossil fuels for transportation is still increasing, which increases both their consumption and the dependence on

them. The idea of cycling, despite its independence from fossil fuel, is highly disregarded at the moment. Certainly, an extensive use of bicycles will not be the ultimate solution for this problem, if trips longer than five to ten kilometers will remain common for commuting. Therefore, new alternative mass transit systems should be based on renewable sources of energy, especially the sun. After decades of observing how plans and initiatives about solving Cairo's traffic problems appeared and disappeared, while the situation got worse and worse, David Sims is expecting the collapse of the traffic system in one or two decades, when the number of cars might have doubled once more (Cairo in Motion, 2014). He does not expect any serious attempt by the authorities to implement the far-reaching, radical interventions, which would be necessary to achieve a substantial improvement. On the contrary, he estimates, that the „doom“ is actually the solution in the long run. This means, only when even the decision makers themselves will feel the unbearable situation, they will initiate profound measures.

4.3 Cycling in Cairo - Status Quo

4.3.1 Prerequisites

Some characteristics of Cairo are truly beneficial to the development of cycling culture: cheap bikes are available (second hand bikes from local shops can be bought for circa LE 250, new ones from around LE 800), the topography is mostly flat, narrow side streets are usually quiet, shaded and easy and safe to ride. Furthermore, Cairo is among the densest cities in the world, with a high grade of usage mix in densely populated neighborhoods, which theoretically results in relatively short distances. The growing amount of private cars causes traffic jams, in which cycling, due to its flexibility, can be the fastest way of moving through the city (fig. 3). Last but not least, Cairo already has a historically grown and still active, though threatened, cycling culture.

However, conventional cycling infrastructure, such as bike lanes, parking racks, etc. does not exist in Cairo. The existing road network is not intended to facilitate cycling at all, but rather motorized traffic. Therefore, it can be assumed that the low level of cycling activity is partly caused by the neglect of the issue by planning authorities. Despite the existence of a history of bicycle use and the staggering experiences from other cities demonstrating how bike-friendly



fig. 3
In congested streets like this one in downtown, the bicycle can be the fastest mode of transportation. However, planning authorities do not consider its potentials.
Source: Author

city design can help to solve traffic problems, authorities do simply not consider cycling as a mode of transportation. Reading the 100 pages of recommendations of the World Bank (2006) for Greater Cairo traffic planning illustrated this attitude: It focuses a lot on public transportation and includes the prioritization of pedestrians to a certain little extent, but it does not even mention one word about cycling at all.

4.3.2 Existing Types of Cyclists

Against some local 's views, Cairo does indeed have something that can be called a cycling culture. Though it is not as present as in the usual prominent examples of bike-cities, it has a very particular character. The use of bicycles in fact comprises a great diversity and interestingly, cyclists can be divided into two independently coexisting general categories (fig. 4). Apart from them, children form another third category on their own. This categorization described in the following pages is based on my own observations and interviews.

The first one, the traditional group of cyclists, is characterized by a rather rational approach to bike usage and will be called 'oldschoolers'. Either they use bicycles because it is the most practical, or the only affordable way. It is subdivided into people who cycle for their personal transportation, the 'natives', and those, whose income generation is based on bikes, the 'professionals'. Natives cycle, because they cannot afford a car, motorbike or scooter, or because they are still used to do it from the times, when there were less cars, and keep doing it. Their bicycles, usually several decades old, are remainders from this era and either owned by the native or rented from a local bike rental shop. The purposes of trips include all kinds of errands. Natives are exclusively males. The group of professionals consists of 'deliverers', 'vendors' and 'transporters'. Some deliverers use the same old bicycles like the natives, but with heavy duty racks on the rear and/or on the front, or some special delivery bicycles with a smaller front wheel diameter. Often, boxes are mounted on the racks, enabling easy transportation of goods to customers (fig. 9). Virtually any kind of shop, from fish shops to pharmacies, potentially has a delivery service and many small shops have one or two delivery bicycles belonging to them. Other businesses have independent deliverers, who use their own bikes to bring goods to their customers, mostly in concurrence with motor scooters, which have in some areas on Cairo already become more common for this purpose. Since motorbikes and scooters imported from China became available and affordable,

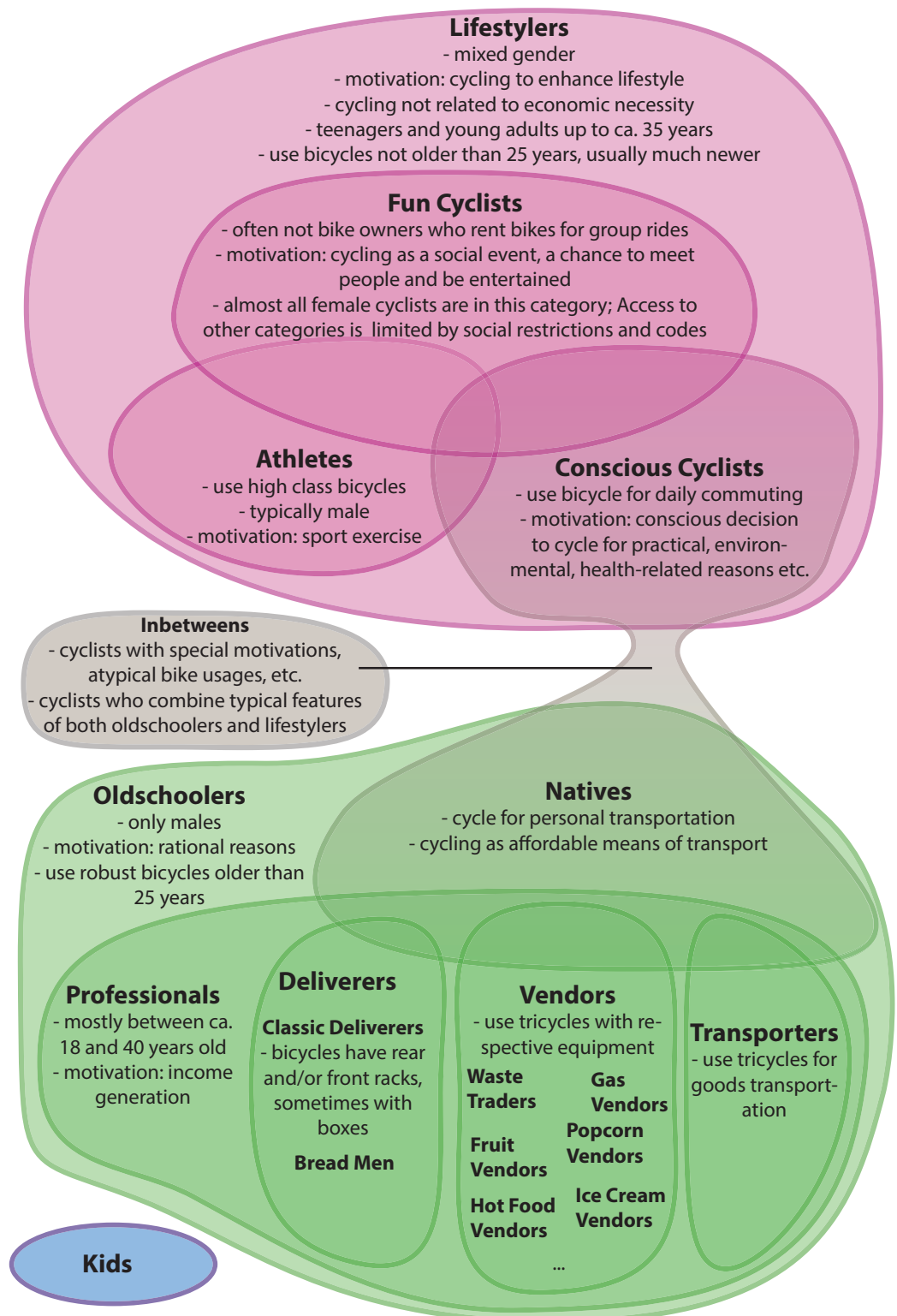


fig. 4
Categories of cyclists in Cairo.
Source: Author

the relevance of bicycle deliverers is drastically decreasing. Many deliverers would switch to motorbikes, if they could afford it. Others are too young to get a motorbike license. The so-called ‘bread carriers’ use the bicycle as an affordable, while efficient way to transport big trays with fresh bread balancing on their heads from the bakeries to the shops (fig. 10).

Transporters use cargo bikes suitable for the transport of bulky objects or simply big amounts of goods (fig. 5). This transport is not for the purpose of home delivery, but rather to distribute products from stores to small street side kiosks.

The vendors use bikes to transport the things, which they sell in the streets. Still widely in use are Cargo tricycles for an impressive range of purposes: as mobile kitchens, ice cream, fruit or popcorn stands etc. (fig. 8). Even gas bottles –up to 5 pieces - are being transported with bicycles to be sold on the street (fig. 6). Some of these vehicles include unusual individual add-ons for specific purposes, which illustrate the importance of the bicycle as a flexible and adjustable vehicle. They are also popular among waste traders, who buy old household equipment and transport it with bikes.

Most of these bikes are relatively old and their conditions vary between well usable and very poor. Flat or entirely missing tires, missing or partially damaged saddles, chains, pedals etc. make them sometimes unrideable, leaving it the



Left

fig. 5

Oldschoolers: A transporter in downtown.

Source: Author

Bottom left

fig. 6

Oldschoolers: A gas vendor at Ramsis Square.

Source: Author

Bottom right

fig. 7

Oldschoolers: A banana vendor in Shubra. The chain, pedals and saddle are missing.

Source: Author



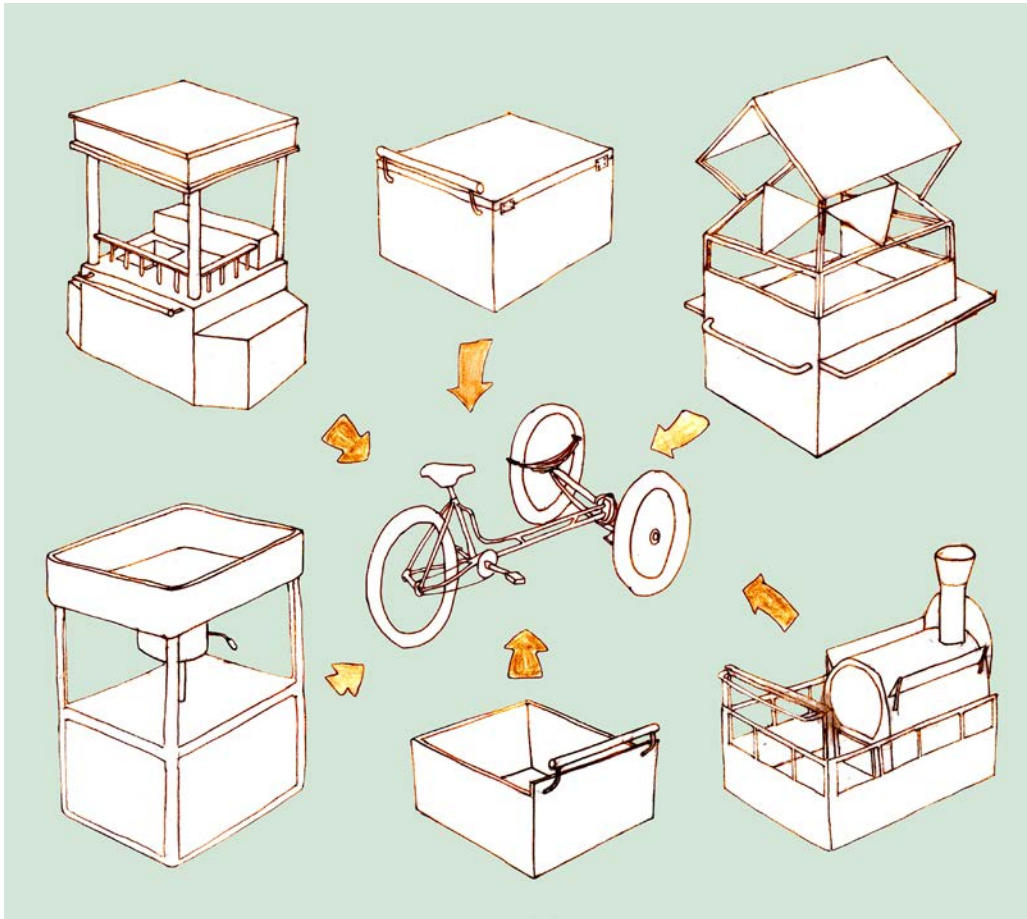


fig. 8
Cargo bikes can be combined with various additions for a wide array of usages. Clockwise from top left: Ice cream `shop`, closed box, food stand with stove, oven for sweet potatoes, open box, pop corn machine. Several further configurations exist.
Source: Author



fig. 9
Delivery bikes have robust racks, which usually carry a box in addition to the storage frame in the front. On special constructions, gas bottles or even milk churns can be attached.
Source: Author

function of being a container on wheels that needs to be pushed (fig. 7).

Many damaged or half-disassembled cargo bikes can be seen at street corners, between parking cars or in alleys, apparently abandoned or used as an immobile storage. Could these be renovated and reconfigured into a front loader bike taxi fleet?

In contrast to the oldschoolers, the second main category of cyclists is rapidly growing currently. Members of this group, the 'lifestylers', are mostly between 10 and 30 years old and do merely not cycle due to economic necessities or practical convictions, but they see it as an enjoyable activity, which enhances their lifestyle. Also, they tend to consciously consider environmental aspects and the sustainability of cycling. According to this, a growing movement of independent cycling initiatives is active in Cairo. Many of them share the same strategy: by organizing free weekly group rides, they persuade people to cycle for fun within a community (fig. 11). Later, some of them would get used to it and begin to cycle for their daily commute as well. These cycling groups attract females, since they provide the security of a big group and thus, they are one of very few opportunities for safe urban outdoor activities for females. Apart from those factors, a major aim of the group rides is to demonstrate presence of cyclists in the streets. This is supposed to raise awareness among other road users, make them curious and establish a higher degree of acceptance for cyclists.



fig. 10
Oldschoolers: A bread carrier on his way through a congested downtown street.
Source: Author



fig. 11
Lifestylers: Participants of a group ride by the 'Bike Zone' group on the Corniche near Manial, on a friday morning.
Source: Author

Most of these initiatives follow no commercial interests. However, some bicycle shops like `Bescletta` or `Euro Bike` organize their own group rides to attract more customers. Some groups include a sponsoring system to finance bikes for participants; some are specialized on girls, night rides, etc. Certain initiatives also arrange special cycling events, like festivals and fairs to promote cycling, while others rather provide connections and information for interested people. The length of rides ranges from 2 hours to full-day tours combined with visits to historical sites, parks etc. Usually, between 50 and 100 participants join the rides. At least, the number of participants without own bicycles is limited by the availability of bikes for rent from the organizers.

Social media, especially the online-network `facebook` play an important role in the organization and communication of this community; nearly all events and news are published there and a high identification of the users with this kind of `cycling and socializing` mechanism becomes obvious from member rates, `likes` and photos of the group rides. New cycling groups appear on facebook frequently, and the numbers of followers, members are also increasing rapidly.(fig. 14). Paradoxically, the participants of such rides perceive cycling as a trendy, fashionable activity, which they are proud of. For some of the participants, it is very important to document their joint tours and share the photos online.

A big part of them, the `fun cyclists` is only cycling during the weekly group rides, thus, many do not own a bicycle and appear on the street only once a week for a few hours. Most of them use rented bicycles provided by the organizers of the ride, which are robust, simple mountain bikes or city bikes and might be not well maintained. however, most of the lifestylers never take part



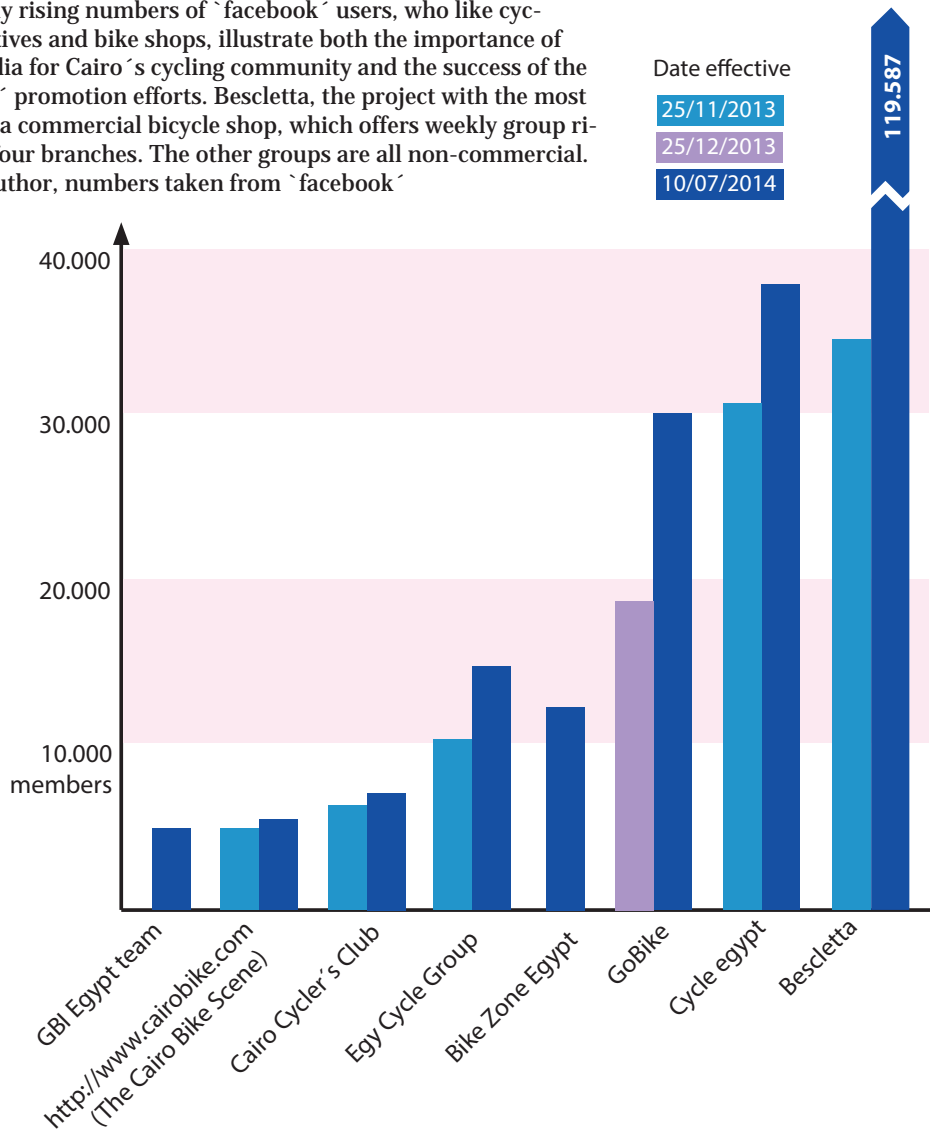
fig. 12
Kids: Cycling for enjoyment on rented bikes in Shubra.
Source: Author



fig. 13
Lifestylers: He uses his bicycle for training rides, but also to go to university regularly. Thus, he is both athlete and conscious cyclist.
Source: Author

fig. 14

The rapidly rising numbers of `facebook` users, who like cycling initiatives and bike shops, illustrate both the importance of social media for Cairo's cycling community and the success of the initiatives' promotion efforts. Bescletta, the project with the most `likes`, is a commercial bicycle shop, which offers weekly group rides at its four branches. The other groups are all non-commercial. Source: Author, numbers taken from `facebook`



in such events. They cycle regularly to their destinations with a strong affection to cycling, but less desire to expose this. These `conscious cyclists` are cycling for transportation, for reasons connected to environmental awareness, health, fun and convenience. They could be students, teachers, salespersons etc., convinced that the bicycle is a good mode of transportation for any of the numerous acknowledged advantages. This group uses modern bicycles in good condition. By getting used to cycling through the group rides, fun cyclists could turn into a regular `conscious cyclist` and/or an `athlete`, who is cycling for fitness or sports competition. Athletes have semi-professional or even professional bicycles and maintain them carefully. Some also have an additional `commuting

bicycle´ next to their `training bicycle´.

This categorization is mostly based on the cyclists´ motivations and used bicycles, but results in some trends: educational and income levels of lifestylers tend to be higher than those of oldschoolers. Apparently, two antithetical paradigm changes are in progress in Cairo: the quantity of lifestylers is growing, switching from motorized transport to bicycle, and vice versa in the case of the oldschoolers. Between natives and conscious cyclists is a grey zone, in which some of the characteristics can be mixed, e.g. an individual uses the bicycle because of his or her environmental awareness and fun, but uses an old-generation bicycle from one of the rental shops. Some overlappings also exist, as professionals can be natives in one person, and some conscious cyclists are athletes as well. The spatial distribution of the different categories is strongly determined by the spatial, social-cultural and economic characteristics of Cairo´s districts and their historic development. Their shares vary significantly between different areas.



Fig. 15

Rushdy street in downtown is known for having the highest concentration of bicycle shops. Most of them offer cheap Chinese models.

Source: Author

The ‘kids’ cycle, either with their friends or alone, merely for fun. They own bicycles or rent them, depending on the financial capabilities of the family. Children cycle in every part of Cairo. However in lower or middle income areas, where bike rental shops are more common, the ownership rate is logically much lower. Some parents send their children to do some small errands by bike, as well.

4.3.3 Bicycle Business

There are different categories of bicycle shops. The most traditional ones are small rental shops in historical neighborhoods, such as downtown, Shubra, Abdeen and so on. They rent out bicycles for three to five pounds an hour, usually also repair private bicycles and some of them also sell bicycles. According to my observations, these shops were popular in the 1950s and 60s, when cars were not dominant yet. Nowadays, mostly children rent bikes there to play. More rarely, other shop owners, like shoemakers, use such rental bikes to buy materials for their work. The bicycles in these shops are robust, but they are around 40 to 50 years old and their conditions can be ghastly. Recently, some of these businesses switched to motorbike repair, which attracts more customers and generates more income for the same amount of work. In some districts with intense bicycle activity, shops for new bicycles also appear, mostly offering cheap Chinese brands.

The bicycle shop hotspot in Cairo is Rushdy Street in downtown (fig. 15) with eleven bicycle shops in one street, which have been existing for up to fifty years. They use the sidewalk as a showroom or maintenance space. Most shops belong to the category, which sell the cheap Chinese products coming from different independent importers. The high quality bicycles are being offered by a shop called ‘Abou El-Goukh’, which is also selling European brands for prices from roughly LE3.000 to LE10.000 and beyond for high-end models. The name Abou El-Goukh is used by around seventy shops all over Egypt, many of them located in Cairo. However, the single shops belong to independent companies with only one to three branches. These companies only share the name and buy their articles at the Abou El-Goukh ‘today’-shop in Rushdy Street to sell them in their own local shops later. The common name accounts for the popularity of these shops. Another relevant provider is Bescletta, which has four branches in Cairo. Bescletta offers the same high-class range, but receives replaceable equipment from Abou El-Goukh as well.

Bicycles, spare parts, and equipment like tools or pumps can also be obtained

at certain markets, such as the one in Imbaba or the Friday market in the city of the dead, where lots of stolen bicycles end up being sold again.

4.3.4 Attitudes, Mentality and Image

Cycling in Cairo is perceived as dangerous by many locals. Some parents want to discourage or stop their children from cycling, even if they are already adults, believing it would be too dangerous. The danger of having accidents is real and evident. Cyclists must generally share streets with all kinds of motorists due to the total absence of dedicated bicycle infrastructure. Traffic conditions are chaotic and unregulated. Most car, taxi and bus drivers have an attentive driving behavior and usually encounter cyclists in a respectful manner, trying to make some room in a traffic jam etc.

Nevertheless, the cyclist is the most vulnerable part of road traffic, thus the minority of unpredictable racing microbus drivers and incautious car conductors using their mobile phones are the real threat, which must not be underestimated. Poor road conditions marked by holes and cracks or debris on the side stripe of major roads are another problem.

Unawareness among cyclists and lack of cycling skills add to the risk of accidents. They might be inexperienced, rushing, careless regarding other road users. Although people interviewed perceive cycling solo more dangerous, since one cyclist is less noticeable than two or more, they are likely to distract each other from concentration on the road and the traffic.

The second stigma is that cycling is supposed to be for kids. Many Cairenes, also females, learn cycling in their childhood and use it as a fun activity and to a small extend for transportation to school or to do some shopping for the parents. The bicycle is a popular toy among children and thus the status of cycling among young adults, who want to dissociate with the children's lifestyle, is quite low. During their adolescence, Egyptians grow a consciousness of expressing their social status with symbolic goods, particularly the car.

Thirdly, cycling has the connotation of a transportation mode for the poor and is associated with the disability to afford a car. One of the interviewed stated, joking: "you cannot marry a woman in Egypt when you have no car." Even though strongly exaggerated, the statement illustrates the common sense about the car as a status symbol.

The belief, that cycling would be too exhausting, is another part of the misconception about cycling shared by many Egyptians, who never actually tried. In fact, it is the most energy-efficient of all transportation modes (Gehl, 2010, p.

105).

A change in the image of cycling, which is being pushed by the activities of civil society initiatives and bike shops intending to increase their customer base, can prevent teenagers from quitting cycling for prestige purposes, or motivate those who already quit to begin again. The key strategy is to turn the image of cycling from a poor man's low status habit into a fashionable and modern activity, that one can even be proud of. The general affection of Egyptians to 'western lifestyle' promoted by popular culture, architecture, fashion, music etc., and cycling as actually being a part of this lifestyle, is perhaps a helpful factor in this process. The main tool, however, is community. Cycling is being promoted as something, that can be done together with friends or can lead to finding new friends. The mentality of many Egyptians is strongly oriented towards joint activities and the socializing force of cycling is a powerful argument.

4.3.5 Obstacles and Threats

The statements in this chapter are based on interviews I conducted with cyclists and bike shop owners in and outside the case study areas, as well as discussions with local experts. The results of a survey conducted by Mai Ezzat, a student at the German University in Cairo, support my findings. She received 30 responses to an anonymous online questionnaire about their transportation behavior.

Most of the 19 females and 11 males, who completed the questionnaire, were students. According to the results, most middle and upper middle class Cairenes between 20 and 30 years would like to use a bicycle for commuting, including females. These (potential) lifestylers perceive mainly three obstacles: dangerous streets, sweating, and risk of harassment. All these problems are multi-causal and interrelated.

The problem of lacking safety has already been discussed above. The demand for a clean and fresh appearance is very important for the social strata of the lifestylers, but showers are not often available at destinations. However, cycling is a demanding activity and Cairo's climate is hot, thus sweating is normal most time of the year. But the temperature conditions differ significantly between narrow side streets shaded by trees or buildings, and big main streets, exposed to the sun and surrounded by heat emitting cars. The perceived temperature while cycling can be more comfortable than while walking, due to the increased airflow.

Sexual harassment has become a major problem for females in Egypt in general and the social acceptance of females riding bicycles is particularly low. Female

cyclists are extremely rare and in many areas not present at all. Mostly, they are concentrated in high-class districts like Maadi or Zamalek, where inhabitants tend to be open to western lifestyles. Nevertheless, they have to face comments or even physical harassment, which can lead to accidents and injury.

The problems of the oldschooners are almost totally different: They mainly face discomfort due to the bad condition of their bicycles, and, in case of the deliverers, the long working times. The bikes are often old and have only one gear.

Working shifts are often 12 hours long and deliverers spend about half of the time cycling. The Image of cycling as an exhausting necessity that is desirable to be replaced by motorbikes is widespread among the oldschooners and their social environment, as interviews have revealed.

4.3.6 Advantages

Apart from the cost for buying or renting a bike, cycling is a costless means of transportation. Interviewed people witnessed their fitness increase from regular cycling, which also raises self-confidence. A part of the interviewed oldschooners perceives cycling as a safe transport mode compared to riding a motorbike or scooter. Being able to move even through congested streets and avoiding waits at public transport stations saves time. One of the interviewed cyclists has impressive regular commutes of 40 kilometers between various spots spread over the city, and he believes that using a bicycle is the only way to be able to cover them at all. Numerous self-performed tests support this point. Even in a relaxed pace, it is often faster to cycle to destinations than using a taxi for the relevant distances of about 5 kilometers. Depending on the traffic, this applies for longer distances as well. For the case of a private car, even more time for searching a parking place and for walking from this place to the actual destination must be added. Due to the increasing number of private cars in Cairo, it becomes increasingly difficult to find a parking space in most areas without reserved parking. Finding a parking space for a bicycle is never complicated, disregarding its security. On Thursday afternoons, streets are usually extremely congested, due to the beginning weekend. A trip from Saad Zaghloul Street to Al-Azhar mosque, which is a distance of 3.8 kilometers, took roughly 15 minutes with the bicycle. The synchronously started taxi ride, however, took about 45 minutes. People interviewed also see the benefit of avoiding congestion for other citizens. The effects of air pollution for cyclists are complex. To summarize it, cycling lowers the risk of cardiovascular diseases, which, together with the other health benefits, raises the life expectancy about nine times more than the negative

factors lower it (Gefahr durch Abgase: Stadt, Rad, Ruß, 2012). Even in a city with such a poor air quality like Cairo, the positive effect of physical exercise still has more weight than the threats caused by air pollution.

4.3.7 Conclusion

A cycling culture exists in Cairo and the cyclists can be classified into two categories. In the first category, individuals cycle due to an economic necessity and for practical reasons, and in the second one, they do it to enhance their lifestyles. The group of lifestylers is growing, while the oldschooners increasingly shift to motorbikes and scooters. Apart from several advantages and disadvantages, which influence the individuals' motivation to use bicycles, the image of cycling and its social acceptance are important determinants.

4.4 Analyses of the Three Case Study Sites

4.4.1 Introduction

To understand the situation more deeply and collect concrete and comparable data about urban environmental conditions for cycling, cyclists prevalence and personal motivations and problems of individuals, three case study sites were selected to be analyzed and compared with each other. These areas, Shubra, Al-Rehab and Ard El-Liwa, represent a part of the differences in social and physical environments, which can be found in Cairo.

4.4.2 Analysis of Shubra

Overview

Shubra, a formally planned district in the north of central Cairo, is characterized by a big share of dense residential land use with most residents belonging to middle or low income groups.

According to the 2006 census, about 550,000 people lived then in Shubra (City Population, n.d.). This results in a population density of circa 55,000 inhabitants per square kilometer, which is about three times as dense as the city average. The construction of a palace for Muhammad Ali in 1808 and the construction of Shubra Street initiated the development of the area, which accelerated in the beginning of the 20th century with the connection to the tram network (Murad, n.d.). In the middle of the 20th century, the district became very crowded. Nowadays, the population is decreasing with a rate of one to two per cent per year (City Population, n.d.), supposedly in favor of more new available apartments, mostly in informal areas.

Situation within Cairo

Shubra is a big district, measuring almost 5 kilometers from north to south, and about 2.5 kilometers from west to east on its widest section. It covers an area of about 9.1 square kilometers. The district is bordered by the Nile in the West, the Ismailia Canal in the north, and railway tracks in the south and east. Bulaq, a former port area, follows to the southwest along the river, and Azbakeya, the northern part of downtown, lies on the southeastern boundary. Thus, Shubra is close to the city center.

Land Use

Apart from Shubra's northern edge and a 200-meter wide strip of land east from the Corniche mainly used for industry and warehouses etc., the district is almost entirely built up with residential houses. In those residential areas, many buildings have mixed uses, usually with shops in the ground floor. This guarantees short distances for daily errands of inhabitants and contributes to a diverse scenery, thus adding to the attractiveness of the streets. The district's commercial center is Shubra Street, where shops are aligned on both sides without interruption. Generally, the main streets are the commercially and traffic-wise most active places and activity decreases with increasing distance from them. Exceptions are some local markets, which can cover entire streets, such as the one in and around Nasr El-Horieni Street.

Street Typologies

Within the district, most main streets (Shubra street, Gesr El-Bahr/Abu Farag, El Toraa El-Boloqia, Ahmed Helmy, Abdel Gamid El-Din) run in north-south direction, some as one-way streets. They have four to six lanes and are served by buses and minibuses (fig. 16). Regular grid-like street patterns form the residential neighborhoods between these arterial roads. The streets there are mostly narrow, with about ten meters or less in width, calm and shaded by trees. The network is in many areas very tight, with street intersections every 25 to 50 meters. In some areas, especially in the south and on the western edge of the district, the streets are very narrow, between circa four and six meters (fig. 17). An exception from the prevailing grid-like street patterns is the old village core



fig. 16:
Street types: El Toraa El-Boloqia Street, one of the main entrance streets from south, is intensely used.
Source: Author



fig. 17:
Street types: Narrow alleys in the dense neighborhoods are virtually free of car traffic.
Source: Author

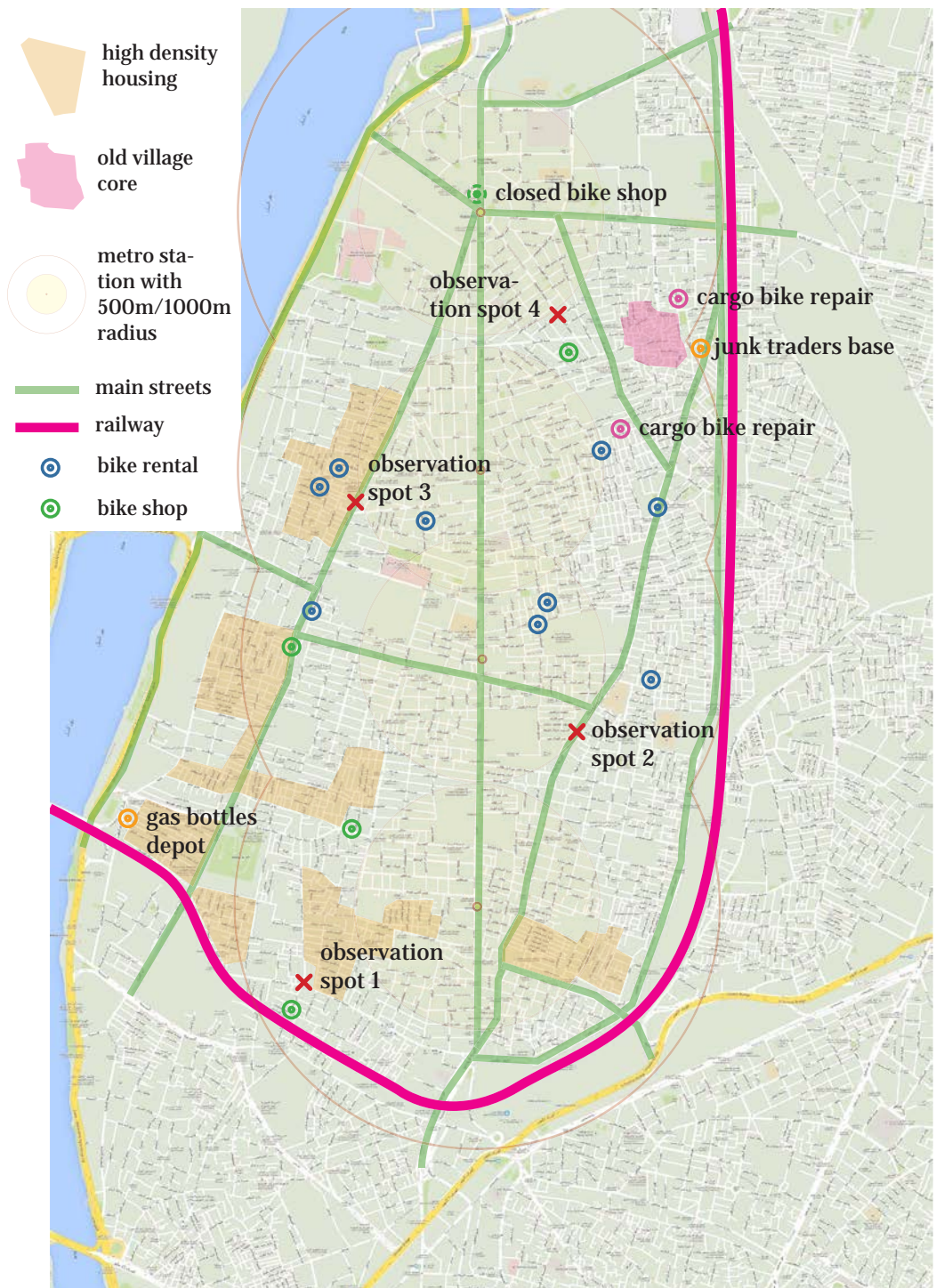


fig. 18:

Map of Shubra with the Nile in the west, Ismailia Canal in the north and train tracks along the south and east borders. Red crosses indicate the locations of observations. The list of relevant places, especially bike rental shops, is not complete.

Source: Author, map from Google maps

in the northeast of the district, which has a diameter of about 200 meters and irregular street configurations.

Road Conditions

Most streets have a flat asphalt surface (fig. 20). However, cracks and holes are frequent, especially in side streets. Many secondary streets are not paved or their pavement is damaged. Frequently, construction debris, rubbish or glass shards lie on the streets (fig. 19 and 21). Main streets are divided by a barrier with the height of a sidewalk in the middle, which makes it more difficult to take turns. In some places, a gap has been cut out of the barrier to enable wheelchair



fig. 19:
Road surface qualities in Shubra differ. Often, the pavement has damaged parts or uneven passages. Debris covers the roads' edges.
Source: Author



fig. 20:
Side streets in residential areas have trees, which provide shade. The surface is in excellent condition and car traffic is very rare, which are good prerequisites for cycling.
Source: Author



fig. 21:
Rod El-Farag street, one of Shubra's main streets, with construction materials on the side of the road, obstructing pedestrian movements.
Source: Author



fig. 22:
On El Teraa El-Boloqia Street, a strip of the barrier between the lanes was cut out to ease crossing for wheelchair users, motorbike and cyclists.
Source: Author

users, motorbike riders and cyclists to cross more easily (fig. 22).

Traffic Situation

Most trips are done by foot and pedestrians are present in every street. Cars and minibuses share the streets with motorbikes and tuk-tuks. The prevalence of tuk-tuks is high throughout the district, especially in the smaller streets, to fill the gap between mobility demand and the lack of public transport as well as low rate of car ownership (fig. 23). Four Metro stations are aligned along Shubra Street in relatively regular intervals of about 800 meters. Almost every place in Shubra is within one kilometer distance from a metro station. Despite this advantage, the main streets and some of the important smaller streets become heavily congested at certain times of the day. The worst of them is probably Shubra Street, the district's central north-south axis. Being connected to Cairo Gateway, a major hub for buses to enter and leave Cairo, the southern edge of Shubra has an utterly active and dense road traffic. The minor streets are much quieter and dominated by pedestrians and, in some areas, cyclists (fig. 24).

Cycling Situation and Infrastructure

The traditional bicycle culture is in Shubra still vital and cycling has a consid-



fig. 23:
Many tuk-tuks are circulating in Shubra, filling the gap between the lack of other short-distance transport modes and residents' demand for mobility.

Source: Author



fig. 24:
Several residential areas, especially between Rod El-Farag street and the Corniche, have extremely narrow streets, which are not accessible by car. Surfaces tend to be of lower quality here, and certain streets are occupied by markets, making cycling difficult.

Source: Author

erable relevance for goods delivery and personal transport. In 4 different spots all over Shubra, the movement of cyclists was observed for 45 minutes each. In these 3 hours, 105 cyclists with a big diversity of usages were counted (fig. 25). Deliverers, which were more than half of the cyclists, used side streets as intensely as main streets. Virtually all kinds of shops have bike deliverers, who do between 5 and 15 deliveries a day with trips between 10 and 45 minutes length (fig. 26). Kids and natives have the second biggest shares. However, kids were usually found in side streets, which are quiet and more suitable to 'play' with the bicycle. The kids often use bikes from a local bicycle rental shop to play.

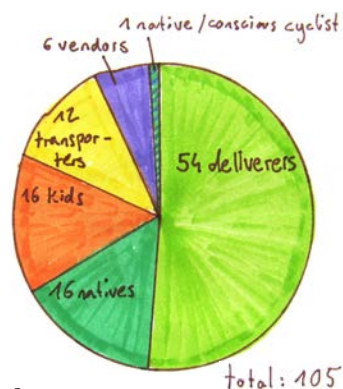


fig. 25:
105 bike users were counted during 4 observations à 45 minutes in Shubra. More than half of them were deliverers, but the diversity of types is high. All were male and all except one were pure oldschoolers.
Source: Author



fig. 26:
A deliverer is preparing his load for the trip. Deliverers account for about half of the cyclists in Shubra.
Source: Author



fig. 27:
Children with rented bikes play in the quiet side streets of the residential areas.
Source: Author



fig. 28:
The most common customers of such local bike rental shops are kids. Private bicycles are also repaired here. Between 20 and 40 of them are expected to exist in Shubra.
Source: Author



fig. 29:
This high class bicycle shop belonging to the 'Bescletta' company closed due to lack of customers in Shubra.
Source: Author

These also include special constructions, like tricycles with an additional seat in the back (fig. 27). Transporters mostly moved on main streets. Lifestylers were not seen during the observations. According to estimations of locals, between 20 and 40 local bike rental and repair shops exist in Shubra (fig.28). They are up to 60 years old and now belong to the sons of their founders. Their business is threatened by the increasing availability of scooters. An owner stated, that the number of his renters decreased drastically from 20-30 per day in the past to presently 5-6. In the northern part of Shubra, there is a closed 'Bescletta' branch (fig. 29). This shop, which sells high-quality bicycles, did not have enough customers in the district. Some other shops, which sell cheaper bikes, are successful in Shubra (fig. 30). Shubra has a base of junk goods collectors with twenty transport bikes, according to the employees (fig. 31). Furthermore, a business, which renovates and then uses damaged transport bikes bought in



fig. 30:
A shop for cheap Chinese new and used bicycles, usually combined with an assortment of childrens' toys.
Source: Author



fig. 31:
These junk traders belong to a company with 20 bikes, according to their statements. They cycle through the streets and call the inhabitants to give them their old items to trade with.
Source: Author



fig. 32:
Some little enterprises buy damaged cargo bikes like these, repair them and reuse them.
Source: Author



fig. 33:
The street vendors, especially banana sellers, are a common sight in Shubra.
Source: Author

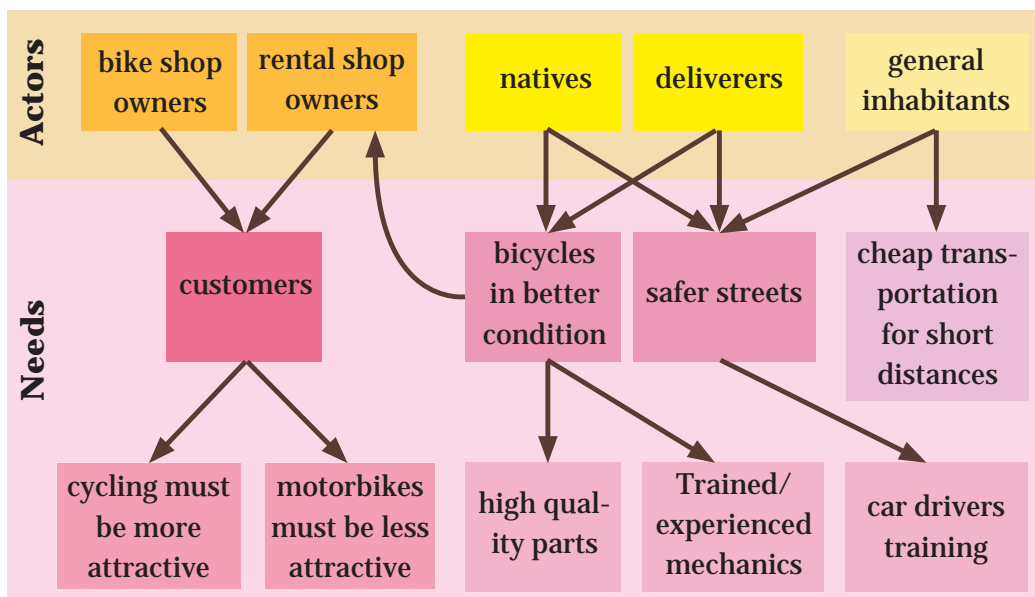


fig. 34:

The main actors and their needs and interrelations indicate the potential of development for the cycling situation.

Source: Author

downtown, exists in north Shubra (fig. 32). At the beginning of Imbaba Bridge in the southwest of Shubra, a depot for gas bottles exists, from where gas bottle vendors cycle through Shubra and even other districts. The bikes belong to the company and are parked in the yard, when not in use. Vendors of bananas, ice cream, clothes, etc. use cargo bikes as mobile kiosks (fig. 33).



fig. 35:

View over Shubra from Imbaba Bridge. The second level of the bridge could enable a safe and stress-free Nile crossing for cyclists, according to urban activist Yahia Shawkat (Viney, 2011).

Source: Author

Conclusion

For different reasons, Shubra is a liveable district. Distances to goods and services are short, neighborhoods are quiet and neighbours know each other. Walking is comfortable and enjoyable, to a certain extent even on the few main streets. The connection to the metro and the proximity to the center are big benefits. All these factors and the presence of many bike rental shops and other related businesses make Shubra generally bike-friendly. Problematic is the poor condition of many old and sluggish bicycles, and the increasing availability of cheap motorbikes, which both threaten the traditional cycling culture. To counteract this development, ways to make cycling more attractive and comfortable must be found. The metro stations provide good potentials for TOD approaches.

Observation Spot 1

Saturday, 29.03.2014
between 14:20 and 15:05
Shubra

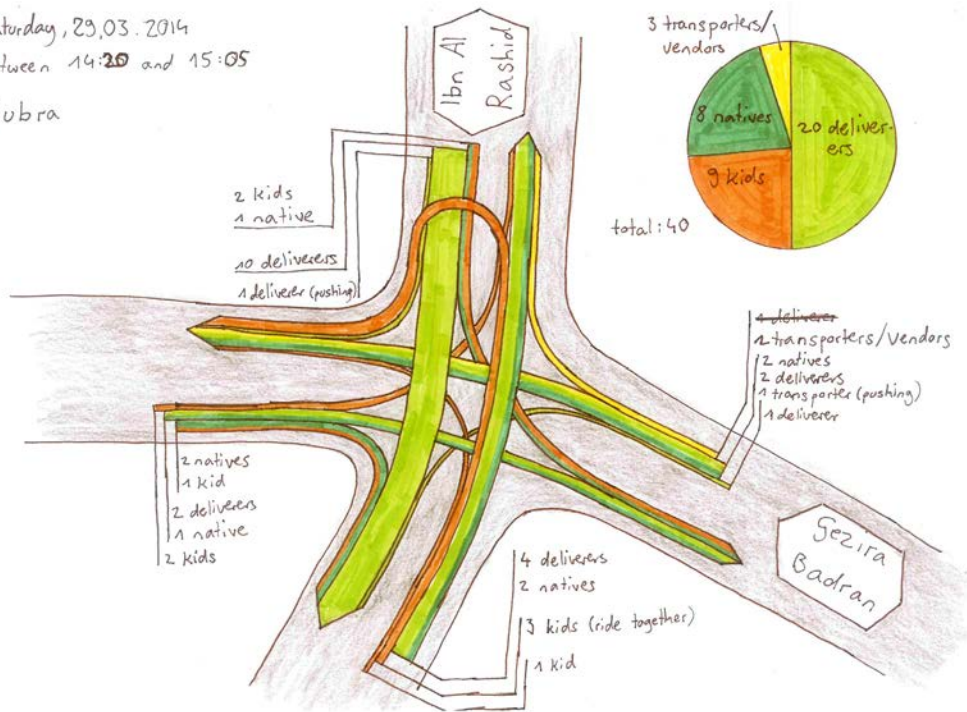


fig. 36:
cyclist rate observation spot 1
Source: Author

fig. 37:
Photo of spot 1 facing north-east
Source: Author

With 40 cyclists in 45 minutes, this spot was the highest frequented of all observations in the three districts. Especially children had a big share, which might be due to the small street size, only allowing low car traffic. Trips in the north-south direction were dominant, suggesting that cyclists leave Shubra on this route across the railways.

Observation Spot 2

Sunday, 30.03.2014
between 14:54 and 15:39
Shubra

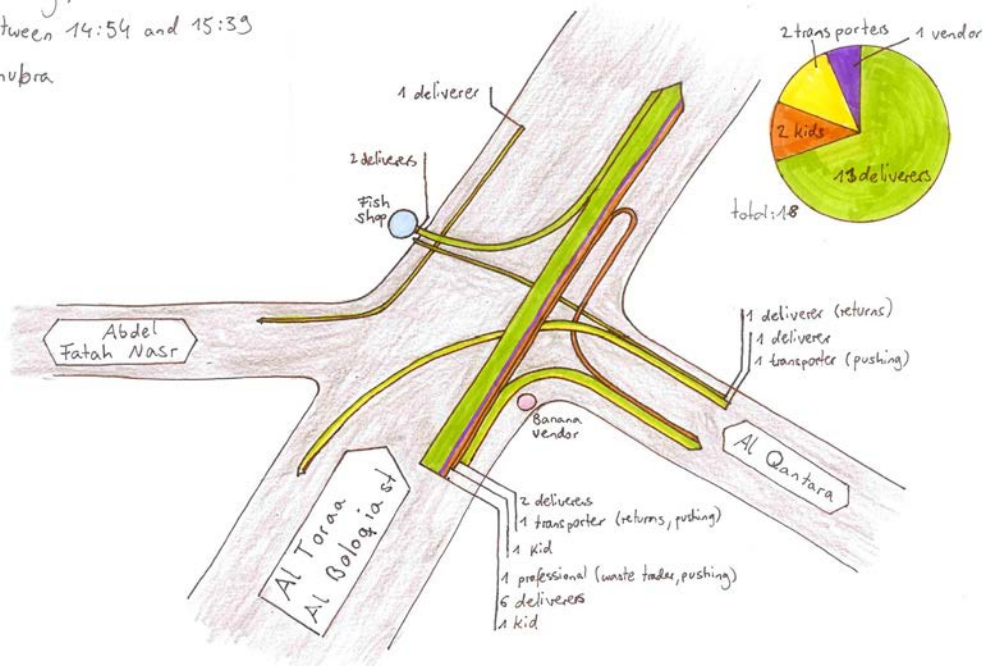


fig. 38:
cyclist rate observation spot 2
Source: Author

fig. 39:
Photo of spot 2 facing south
into Al Toraa Al-Boloqia
Source: Author

Most cyclists on this spot followed the main street on its permitted direction to north. The big majority were deliverers, of whom some started and ended deliveries at a fish shop right at the spot.

Observation Spot 3

Monday, 14.04.2014
between 16:35 and 17:20
Shubra

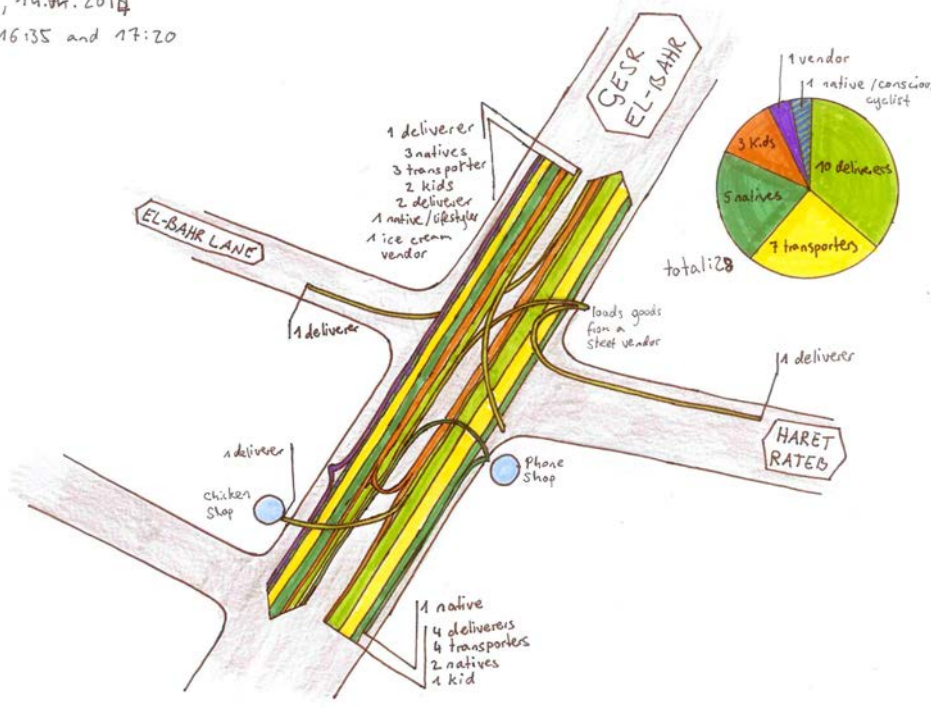


fig. 40:
cyclist rate observation spot 3
Source: Author



fig. 41:
Photograph of spot 3, facing south into Gesr El-Bahr
Source: Author

This spot was frequented by a high diversity of cyclist types, almost all of them using the main street, equally in both directions. Only two of the 28 cyclists chose the narrow side streets. An unusually high number of transporters suggests the importance of Gesr- El-Bahr for goods transportation on bikes.

Observation Spot 4

Tuesday 06.05.2014
between 14:43 and 15:28
Shubra

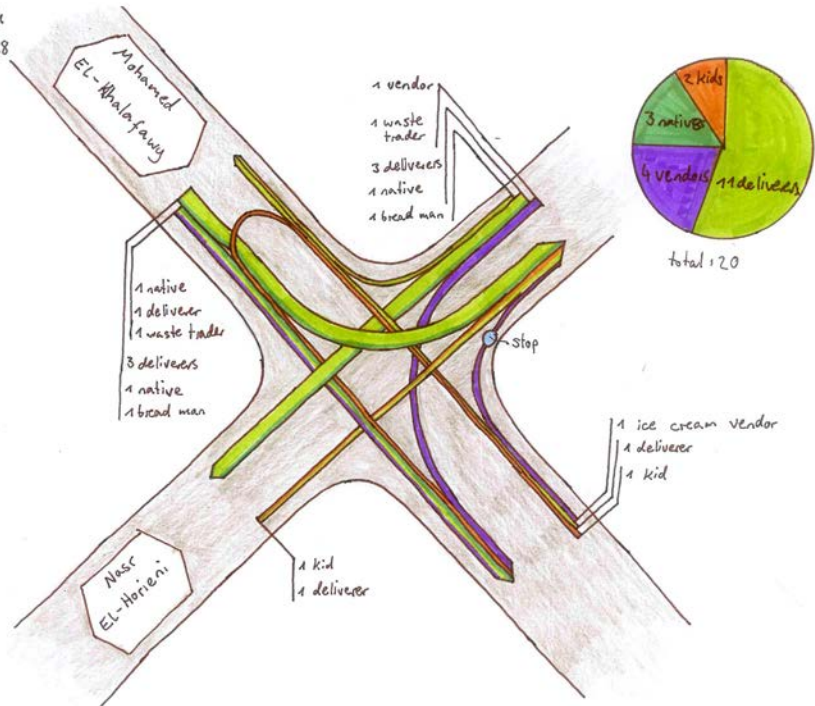


fig. 42:
cyclist rate observation spot 4
Source: Author

Although this spot is also an intersection of small neighborhood streets, the kids accounted for only ten percent of the cyclists counted. The absence of bike rental shops cannot explain this, because there is one only two blocks away. Even though the streets are bidirectional, some directions were clearly less frequented. The big amount of deliverers turning left from Mohamed EL-Khalafawy Street is conspicuous. Photographing the spot was not possible.

4.4.3 Analysis of Al-Rehab

Overview

Al-Rehab is a privately developed district built by the largest real estate developer in Egypt, the Talaat Moustafa Group Holding, to accommodate 200.000 residents. According to the 2006 census, in whole new Cairo, of which Al-Rehab is part of, lived only around 120,000 people (City Population, n.d.). Al-Rehab is still under construction and developed rapidly since the last census. New Cairo had then a density of 5000 to 7000 persons per square kilometer (Sims, 2012), which is very low compared to Cairo's central districts. Al-Rehab is subdivided into 10 phases, with either an apartment house area or a villa area or both. In any Case, residents belong to the upper middle class or high class. No industry is near New Cairo, thus the air is clean. Services, like two shopping malls, a food court, schools and medical services are aligned on a ring going through the phases. A sports club is located in the center of the district. The appearance of Al-Rehab is characterized by a monotony of repeating houses, car parkings, inner gardens and parks, and very little pedestrian activity.

Situation within Cairo

Al-Rehab is a part of New Cairo, one of the new desert towns in the east of Cairo. It is almost 30 kilometers away from downtown. The community borders on desert land on the north and the east, to the south and west, other districts of New Cairo adjoin. These are the 'North Investors Area', 'El Yasmeen' and 'El Banafseg'. Al-Rehab is entirely fenced and can only be entered through secured gates. At gate 13, there is a bus terminal, from which a few public buses go to

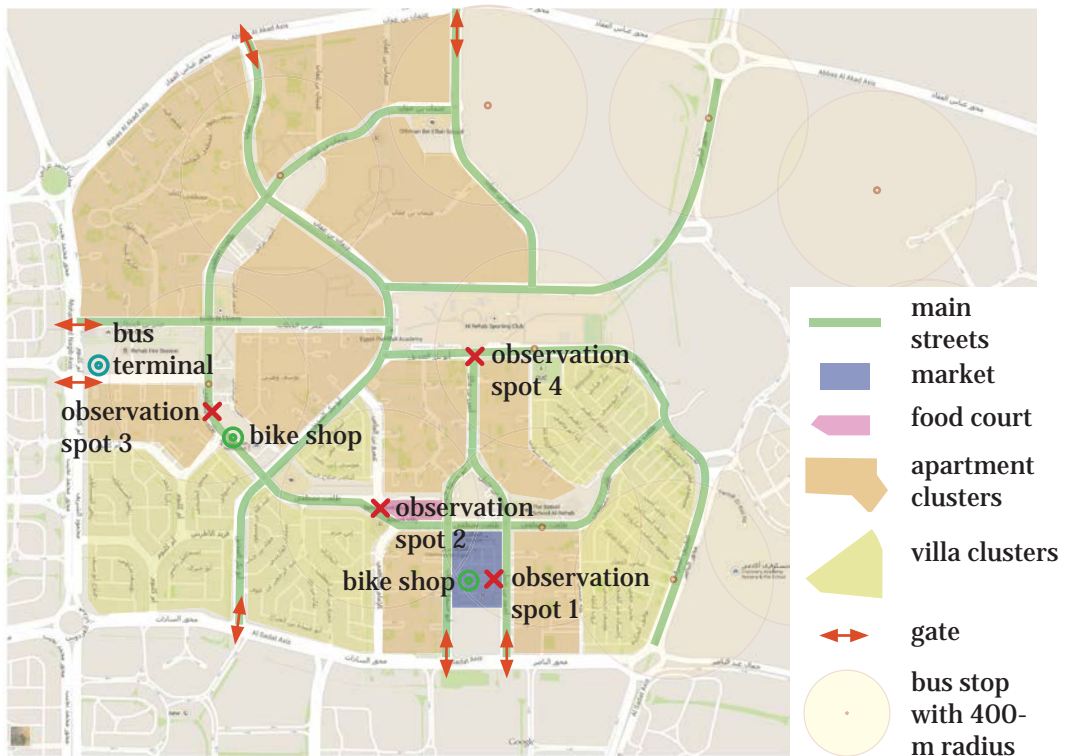


fig. 43:

This map of Al-Rehab shows the different land uses and the traffic infrastructure, as well as locations related to cycling or mobility.

Source: Author, map from Google maps

Heliopolis and Nasr City. The Airport is only 16 kilometers away and New Cairo is connected to the ring road.

Land Use

Al-Rehab is equipped with all essential urban services and facilities, but land use is strictly separated (fig. 43). Most of the surface is used for residential uses, which are either villas with private gardens or collective apartment buildings with a big amount of semi-public garden space. Unlike in older parts of Cairo, where many shops are in ground floors of apartment buildings, the residential districts of Al-Rehab totally lack commercial activities. Schools and religious facilities, the two malls, health care, as well as a market in the southern half of Al-Rehab are aligned along a central ring road, which connects the 'phases'.

Road Typologies

The whole district is designed to accommodate motorized transportation. The



fig. 44:
The pedestrian areas inside housing compounds are characterized by silence and well-maintained gardens.
Source: Author



fig. 45:
The streets within the villa neighbourhoods are quiet and empty. When their inhabitants are at work, almost no cars are present.
Source: Author



fig. 46:
Streets in the apartment house clusters are wide and very rarely used.
Source: Author



fig. 47:
The main streets, which have vegetated curbs to separate the directions, become crowded with cars in the afternoons. Shopping malls, the food court, banks, schools and other urban services are aligned along this street. How many people can you see compared to how many cars?
Source: Author

road network of Al-Rehab follows the idea to create quiet neighborhoods with parks and walking paths within their cluster (fig. 44), but allowing perfect car accessibility at the same time. Streets in the villa neighborhoods are very quiet, but they are still much wider than Shubra's narrow alleys (fig. 45). Cars can park on either side and, although this case is very unlikely, two cars could easily drive next to each other. Secondary streets within the apartment house clusters are as wide and quiet as those in the villa compounds (fig. 46). Both these types are meant to accommodate traffic of residents and visitors, while the main streets carry all the actual traffic, including trucks and buses (fig. 47). Main streets with curbs and plantation between the different directions are accompanied by rarely used, parallel service lanes. Most intersections are round-

abouts.

Road Conditions

All streets are covered with asphalt and none have damages. Towards the east, roads are still under construction. Sidewalks do exist throughout the district and are in good condition. However, there are few pedestrians, due to relatively big distances. The width of streets and the additional distance to the houses results in most streets being not shaded most of the day. Parking areas can be found around every residential cluster, providing space for residents and their guests to park their cars and consuming enormous amounts of space (fig. 48).



fig. 48:

Bus stops are installed along the five lines within Al-Rehab. However, few people ever use them. In the background is one of the car parking spaces, which belong to each housing compound.
Source: Author

Traffic Situation

The mobility demand for citizens of Al-Rehab and those, who come to work there, are extremely high. Many residents work in other areas and have to travel out of Al-Rehab and back each day. Most people, who live in Al-Rehab, can afford a private car. This is also their preferred means of transportation. Private buses carry external pupils to schools in Al-Rehab, and vice versa. The few existing public buses, however, are mainly used by outsiders, who come from distant poorer districts, to work in Al-Rehab as gardeners, deliverers, or to do other jobs not requiring a high qualification. Due to the very generous supply of road spaces and the low population density, traffic usually flows smoothly. Even during rush hours, the main streets become not very crowded. Neighborhood streets are always very quiet. A well developed bus system exists with 5 lines

circulating in the area, starting and terminating at the bus station at gate 13 (fig. 49). However, residents prefer their own car for trips even within the district. Similar to the kids cycling for fun in older districts of Cairo, some children drive around with quads in the road traffic as a fun activity (fig. 50). Horse or donkey carts of waste traders, and tuk-tuks are not present in Al-Rehab.



fig. 49:
The bus station at gate 13 is the terminal for the buses connecting Al-Rehab with Nasr City and Heliopolis, as well as the departure point for all buses, which circulate within the district.
Source: Author



fig. 50:
Quads are used by children and adults for transportation within Al-Rehab. These motor vehicles are extremely noisy.
Source: Author

Cycling Situation and Infrastructure

As in the rest of Cairo, dedicated cycling infrastructures are inexistent in Al-Rehab. But there are some conditions advantageous for cycling: the quieter and less chaotic road traffic, flat terrain and excellent road surface quality. Generally disadvantageous are the big distances to services and shops in comparison with other districts of Cairo, even though they are within an acceptable cycling distance. Shaded streets are virtually nowhere to be found. Each of the two prestigious bicycle shop companies 'Bescletta' and 'Abou El-Goukh' has a branch in Al-Rehab (fig. 51 and 52). Although concrete figures were not available after request, both record rising sales numbers, also for women. Females



fig. 51:
The branch of the bicycle shop 'Bescletta', attached to Al-Rehab Mall 2.
Source: Author



fig. 52:
The local branch of 'Abou El-Goukh'.
Source: Author



fig. 53:
Abou El-Goukh's maintenance workshop in a passage way next to the shop.
Source: Author

were, however, not spotted during the street observations, and there was only one lifestyler seen at all (fig. 54). By far, most present categories were kids and deliverers, who accounted for more than 80 percent of the cyclists. Both had nearly the same share, though deliverers concentrate at the Market, from where they cycle to customers all over the district, while kids are spread more evenly (fig. 55 and 56). Surprisingly, around the sports club, natives were also seen. According to interviews, the activity of lifestylers should be higher than the observed rate, but concentrated in the evening, when most have finished working and the sun is weaker (fig. 57). According to Ahmed El-Dorghamy, a cycling ad-

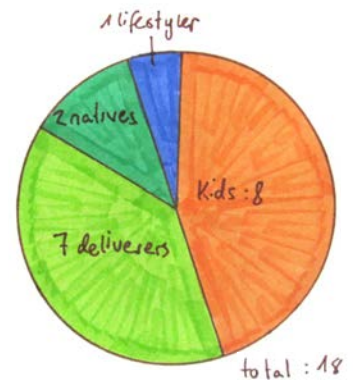


fig. 54:
Most of the 18 cyclists observed were children. Almost equally high was the number of deliverers. Two unexpected natives and only one lifestyler were spotted.
Source: Author



fig. 55:
This group of four girls and one boy is cycling around the neighborhoods for fun.
Source: Author



fig. 56:
Apart from children, most cyclists are deliverers working in the shops of the market. Since around 2007, bicycles are being increasingly replaced by motorbikes.
Source: Author



fig. 57:
This lifestyler has a modern high-quality bicycle. The bags on the rack suggest, that he is cycling not only for fitness and fun, but also for transportation.
Source: Author



fig. 58:
A Deliverer on his return to the shop. Note the numerous red delivery scooters in the background, which belong to Kentucky Fried Chicken and McDonald's.
Source: Author

vocate and co-founder of the visionary ‘Cairo Cyclers Club’, the company ‘Bescletta’ has made an agreement with the Talaat Moustafa Group to sell a bicycle with each new house being sold automatically, to motivate the residents to cycle. Indeed, in many front yards of villas, a high-quality adult’s bicycle can be seen. In the apartment house clusters, childrens’ bicycles are parked in house entrance halls, in front of the entrances and on lamp posts (fig. 60, 61 and 62). Some of them are in terrible condition and have apparently not been used for a long time (fig. 59). The ones locked to lamp posts become rusty because they are



fig. 59:
A flat tyre and the front wheel overgrown by plants give a hint to how frequently this bicycle is being used.
Source: Author



fig. 60:
Some rather unconventional ways of parking can be observed as well. Did the bicycle user himself put it this way or stair users, who were annoyed of the obstructed handrail?
Source: Author



fig. 61:
A common sight is bicycles being locked around the handrails of entrance stairs in residential areas. Some are also stored in the spacious entrance halls of the buildings. In most cases, these are childrens’ bicycles.
Source: Author

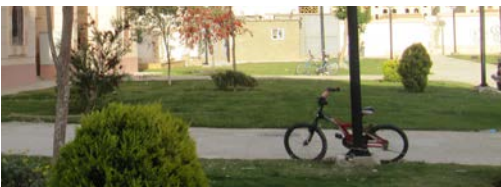


fig. 62:
Another popular parking opportunity is offered by lamp posts. There, bicycles are exposed to the sprinkler irrigation systems, which leads to rusty chains, brakes and other parts.
Source: Author

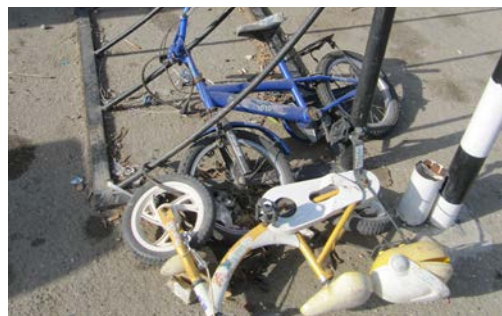


fig. 63 and 64:
The only dedicated bicycle parking installations are at the entrance of the sports club, to which many children come with their bicycles. However, the majority of the found specimens have apparently not been moved for a while.
Source: Author

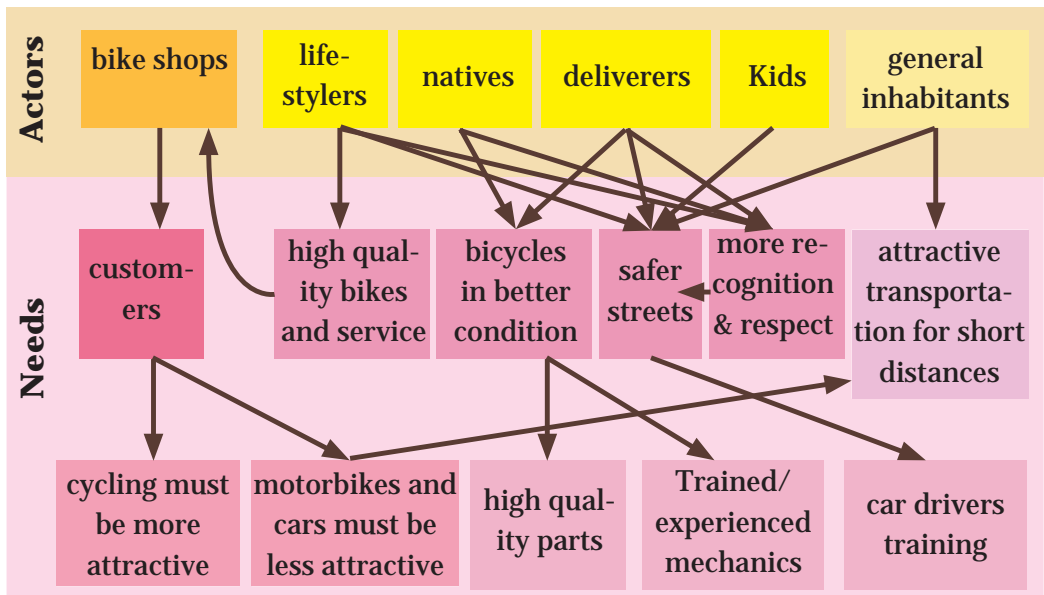


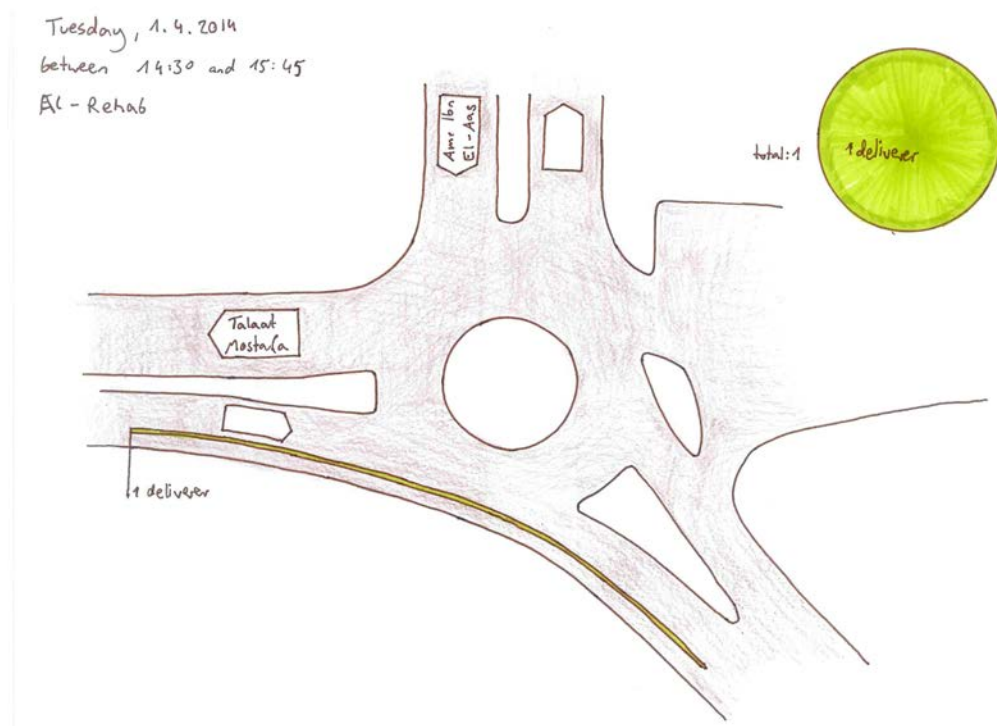
fig. 65:

This figure lists the actors and their specific needs based on the interviews conducted in Al-Rehab.
Source: Author

exposed to sprinklers of the gardens.

Conclusion

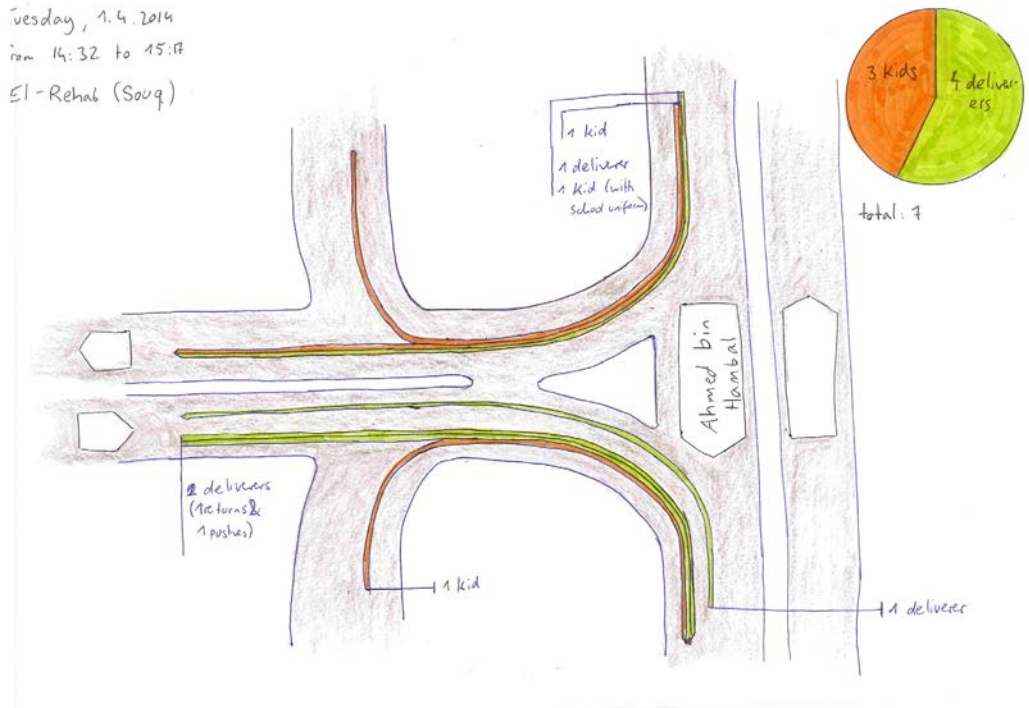
The development of Al-Rehab totally disregards principles of sustainable transportation planning and modern concepts about prioritizing non-motorized urban mobility. The plan is completely car-focused, following outdated modernist Euro-American schemes, which proved to be environmentally and socially destructive, but meeting the attitude and demands of the Egyptian high-society. The cycling intensity in this newly planned area is very low, although the conditions are mostly advantageous, apart from the strong exposure to the sun in most places. The residents of Al-Rehab prefer to travel any distance by car, which they see as the most comfortable means of transport. Cycling for transportation has the biggest chance to develop on the district scale, as most residents have long commuting distances to central districts or even further, but also need to be mobile within the district, where walking is not practicable. Rarely used service lanes along the main roads offer great opportunities for safe and easy cycling. For the workers, who come from outside by bus, an opportunity to get from the gate to their working places by bicycle would presumably be an attractive option. The connection with public transport and its improvement might play an important role for cycling concepts.



above
fig. 66:
cyclist rate observation spot 1
Source: Author

fig. 67:
Photo of spot 1, facing east
along Talaat Mostafa Street
Source: Author

The spot is right next to the busy food court and Talaat Mostafa Street is one of Al-Rehab's most important streets. The only cyclist on this spot was a deliverer on his return to the souq. However, a few hours after the end of the observation time, some kids were there with their bicycles.



above
 fig. 68:
 cyclist rate observation spot 2
 Source: Author

fig. 69:
 Photo of spot 2, facing
 northeast
 Source: Author

The souq has numerous shops with bike delivery services, which explains the presence of the deliverers. Solitary kids also cycled there. Some of them wore a school uniform, which suggests they might cycle to school.

Thursday, 08.05.2014
between 12:55 and 13:40
Al-Rehab

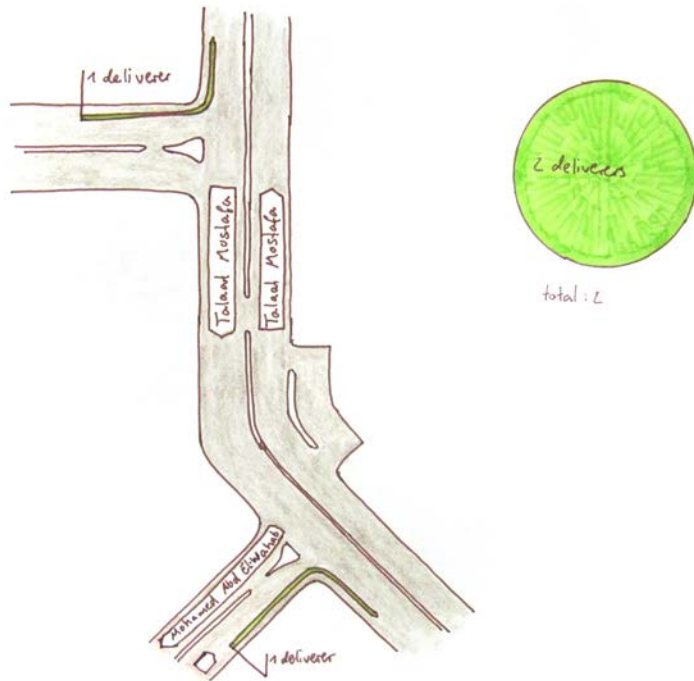


fig. 70:
cyclist rate observation spot 3
Source: Author

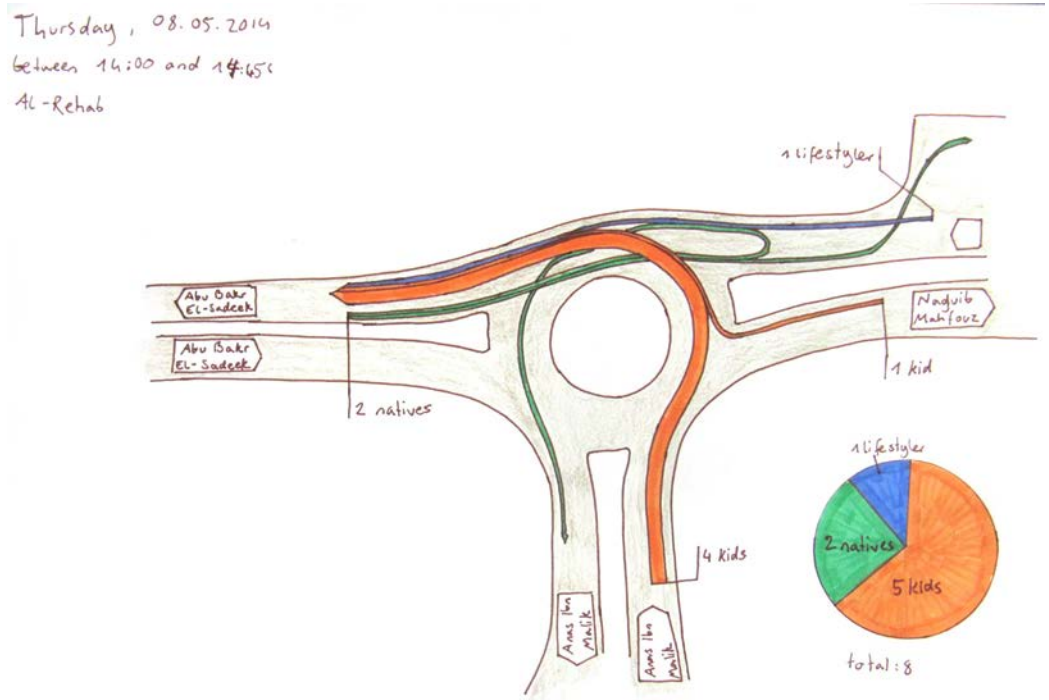


fig. 71:
Photo of spot 3, facing southwest towards Moha-
med Abd El-Wahab Street
Source: Author



fig. 72:
Photo of spot 3, facing northwest
Source: Author

This spot is in front of the 'Bescletta' bike shop of Al-Rehab Mall 2, but no customers were seen at the shop. Although the mall is a popular destination and this part of Talaat Mostafa Street is very busy with private cars, taxis and motorbikes, the number of cyclists was very low.



above
fig. 73:
cyclist rate observation spot 4
Source: Author

fig. 74:
Photo of spot 4, facing
southwest
Source: Author

The Sporting Club has bicycle parking racks at its entrance, thus it was suspected to have an intense cycling activity. The main entrance is right in front of the roundabout, where two of Al-Rehab's main streets meet. Indeed, it was the spot with the highest number of cyclists observed. However, most of them were kids, who do not cycle for transportation purposes. The only lifestyle of the entire survey was spotted here, but it was not obvious, whether he cycled for transportation or sports activity. Noticeable is the absence of deliverers at this spot.

4.4.4 Analysis of Ard El-Liwa

Overview

The unplanned area of Ard El-Liwa is part of a belt of informal districts on the western border of Cairo proper. It began to grow in the 1970s and is expanding until now. (Nagati & Elgendy, 2013) It is an informal settlement, which means, that buildings are constructed without permission and not abiding by the building codes. It is a rather small district with 300.000 inhabitants on roughly 2 square kilometers. The density is extremely high, with ca. 150.000 inhabitants per square kilometer. Ard El-Liwa measures about 1 kilometer from west to east and two kilometers from north to south. Ard El-Liwa is a small informal settlement, compared to the adjacent districts Bulaq Ad-Dakrur and Imbaba, both having over one million inhabitants each (Sims, 2012). The population consists of a big portion of low income and some middle income families (Nagati & Elgendy, 2013). The urban structure is compact, with high rise residential buildings and mostly narrow, linear streets. Basic urban services and the connection to the rest of the city are insufficient.

Situation within Cairo

Ard El-Liwa is located in the Giza governorate, between the formal middle-class district of Mohandeseen in the east and the ring road in the west. It is separated from Mohandeseen by the railway tracks, a 100 meters wide strip of farmland and Sudan Street. In the south, the large informal settlement of Bulaq Ad-Dakrur is adjacent and its north boundary is Fathy Hendawi Street. The distance to downtown is only 5 to 6 kilometers, however, the lack of effective mass transportation services limits the accessibility.

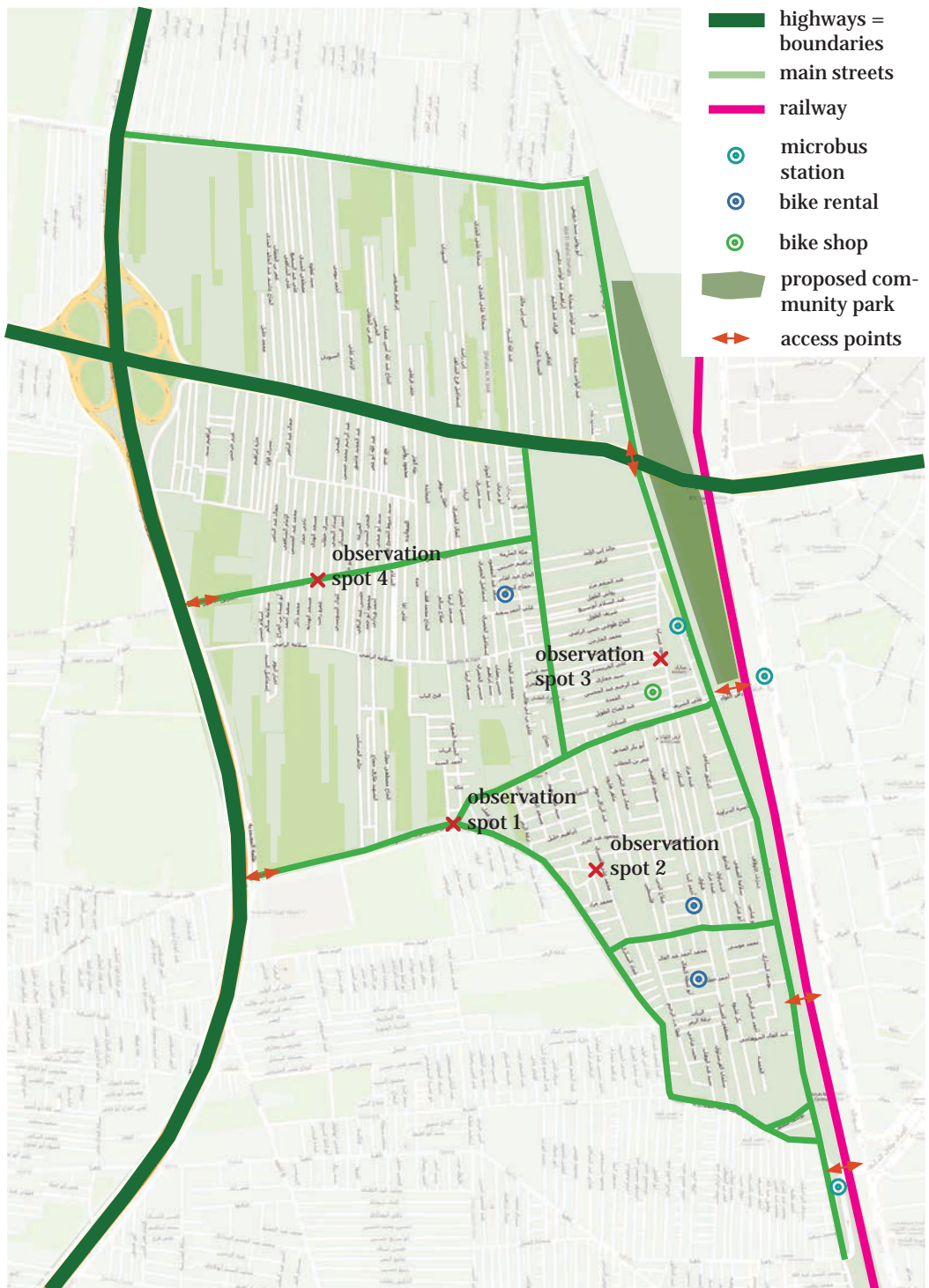


fig. 75:
This map of Ard El-Liwa shows the particular street pattern characteristic for Cairo's informal settlements, different land uses and the traffic infrastructure, as well as other relevant locations.
Source: Author, map from Google maps

Land Use

The area is very dense and consists mainly of residential buildings. Open spaces have an extremely low share and must accommodate many people. Many buildings, particularly those located on the main streets, have mixed uses with shops in the ground floor and apartments in the upper floors (fig. 75). Some of the original farm land plots still exist in the western part of the district (fig. 76). Apart from this, non-residential land use types, especially public services, are rare. Parks or other spaces for recreational uses do not exist, although a big community park in the space between Ard El-Liwa and Mohandeseen is planned.



fig. 76:
Houses adjacent to the main streets and some bigger secondary streets typically have shops of all kinds in their ground floors and apartments above. In consequence, those streets are very vital.

Source: Author



fig. 77:
Some of the fields, on which Ard El-Liwa is built, still exist. Step by step, they are being filled by new cheap residential buildings.

Source: Author



fig. 78:
The satellite images of Ard El-Liwa from 2003 (left) and 2013 (right) illustrate the fast expansion towards the west. Within only ten years, most of the remaining farmland has been consumed by new constructions.

Source: Google Earth

Road Typologies

Most roads are straight and follow the borders between the former fields. The field paths developed to the present main streets with a width of around 10 meters, while side streets are in the locations of former irrigation canals. Those are usually between 5 and 6 meters wide, but can be even narrower alleys. Hence, both types allow little car traffic. According to the former field patterns, the road network consists of a rather regular grid with side streets running perpendicular to the main streets and parallel to each other in intervals of usually twenty to thirty meters. The length of such an alley can be up to 300 meters without an intersection. An exception to this typology is Teraat Al-Magnona Ali Ibn Abi Taleb Street, which is wide and has divided directions and a curvy course through the entire district from the Ring road to Sudan Street. It is also the southern boundary of the district (fig.



fig. 79:
Towards the west, the busy Toraa Al Magnouna Ali Ibn Abi Taleb Street leads to the Rind Road and Motamidia. It is not paved, however, pavement is under construction.
Source: Author



fig. 80:
The eastern part of Toraa Al Magnouna Ali Ibn Abi Taleb Street is already paved and in good condition.
Source: Author



fig. 81:
Even some main streets are covered with a thick layer of mud, mixed with rubbish.
Source: Author



fig. 82:
Secondary streets are very narrow and unpaved. Trees do not exist there, but the high buildings provide more than enough protection from the sun.
Source: Author

80). No street has a defined sidewalk. The 26th of July corridor, which is the main connection between downtown and 6th of October City, runs through the district, cutting apart its northern and southern piece. This six-lane highway is rarely used by locals and acts as a barrier rather than a point of access. The huge and busy ring road, which goes around entire Cairo and defines Ard El-Liwa's western border is accessible by ramps built by the community, visible on fig. 79 (Cairo Urban Grass-roots, 2012).

Road Conditions

Most roads are in terrible condition. Only the few main streets are paved, but the pavement there has frequent gaps, cracks and holes (fig. 81). Some parts of the pavement are covered with a wobbly layer of compressed dirt, which developed over time by the accumulation of dust and sand in combination with the illegal habit of moistening street surfaces to create evaporation and cool the environment. Concrete speed bumps exist on the paved main streets and additionally force vehicles to slow down. The small side streets are not paved and consist of earth and rubble (fig. 82). Some are very rough, covered with rubbish, or debris materials.

Traffic Situation

Transportation hubs exist on the east edge of the district, with many minibuses stopping at El-Zomor Canal Street (fig. 83 and 84) and another stopping point at the intersection of Sudan Street and the railway crossing entering Ard El-Liwa. This connection is extremely busy and most trucks and pickups enter through the railway crossing to load and unload goods on this edge of the district.

The main streets within the district are narrow and shared by pedestrians, motorbikes, cars, tuk-tuks and few minibuses and trucks, as well as cyclists, horse and donkey carts (fig. 86). The even smaller side streets are dominated by pedestrians, but also used by few motorbike riders and cyclists and very few cars. Traffic speed is very slow, due to the narrow streets, poor surface conditions and the diversity of road users sharing the space. Poverty among residents and the scarcity of space do not allow a high number of private cars, which has two consequences: Firstly, congestion is not a problem within the district and secondly, walking is the most important mode of transport within the area and to get to transportation hubs on the edge. However, a big car park exists in the south-eastern part of the district, close to main streets connecting with the rest of Cairo (fig. 85).

Traffic lights, signs or any other kind of regulation do not exist.

Cycling Situation and Infrastructure

Cycling in Ard El-Liwa is an affordable and thus common way to move people and many kinds of goods, from shisha coal to live chicken, through the neighborhoods. Dedicated cycling paths are absent and cyclists share streets with all other users, there are some beneficial conditions, since most streets are shaded, motor vehicles are few and the topography is flat. The disastrous road conditions force potentially dangerous motor vehicles to drive slowly, decreasing the risk of accidents with cyclists. But on the other hand, the rough surfaces make cycling less pleasant, demand a lot of caution and stress the material. Despite these obstacles, cycling is perceived as comfortable and easy by the interviewed cyclists. Deliverers not only ride to destinations within the district, but also to more distant places like Mohandeseen, Zamalek or Giza. Businesses with many deliveries have up to 5 bicycles (fig. 88). Deliverers are often shop owners, who use the bicycle to bring their products to cus-



fig. 83 and 84:

Tuk-tuks bring passengers into and out of the web of narrow streets, while minibuses transport them from Ard El-Liwa to other districts and vice versa. On this spot close to the railway crossing at El-Zomor Canal Street, the transfers between the two modes take place.

Source: Eslam Abbas for the author



fig. 85:

A big plot of land in the south-east of Ard El-Liwa has been reserved for car parking, since most streets are too narrow to accommodate 300 to 400 cars.

Source: Author



fig. 86:

Main streets are shared by all kinds of road users. Sidewalks do not exist and the poor quality or absence of pavement forces vehicles to drive slowly.

Source: Author

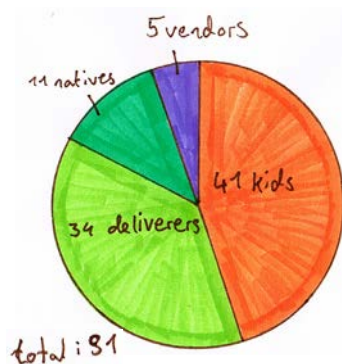


fig. 87:

91 cyclists were counted in Ard El-Liwa during the 4 times 45 minutes of observation, which is a high number for Cairo. The dominant type were kids. All other cyclists were oldschoolers with most of them being deliverers.

Source: Author

tomers or get raw materials and tools for their business. All cyclists in the area are oldschoolers or kids. At the four spots, 91 cyclists were counted during the 4 times 45 minutes (fig. 87). All spots were relatively equally frequented, ranging from 19 to 26 cyclists. Almost half of them were kids and a bit more than a third were deliverers. Slightly more than ten percent were natives and roughly 5 percent vendors. Transporters were not seen, probably due to the lack of wide streets, where they are preferably used. Some children are not cycling for fun, but are deliverers for small enterprises, which usually belong to their own families. Thus, they do not fit into the 'kids'-category and were counted as 'deliverers' in the surveys. Supposedly, a relevant number of children cycle in order to work

and support their families in informal areas, at least in the school vacancies. This phenomenon was not observed in other districts.

The surveys showed, that main streets are more intensely used by cyclists. Reasons for this are the concentration of businesses as starting points for deliverers on such streets and the higher surface quality. Also, orientation is easier there than in the side streets, which are all very similar. Often, cyclists were seen returning on the same way during the survey. Begins of deliveries from shops could be witnessed. Like in older parts of Cairo, bike rental shops exist in Ard El-Liwa. Most of their customers are children, though a portion of the kids own the bikes they ride.

According to a bike shop owner in the eastern, old part of Ard El-Liwa, his shop



fig. 88:

Most shops have their own delivery bicycle(s), which are also used to purchase supply materials, tools etc for the shop. This restaurant alone has at least five delivery bikes.

Source: Author



fig. 89:

Bicycle corpses like this one are not a common sight in Ard El-Liwa, since people try to make the best use of their resources. Most bicycles are used frequently and for heavy duty.

Source: Author

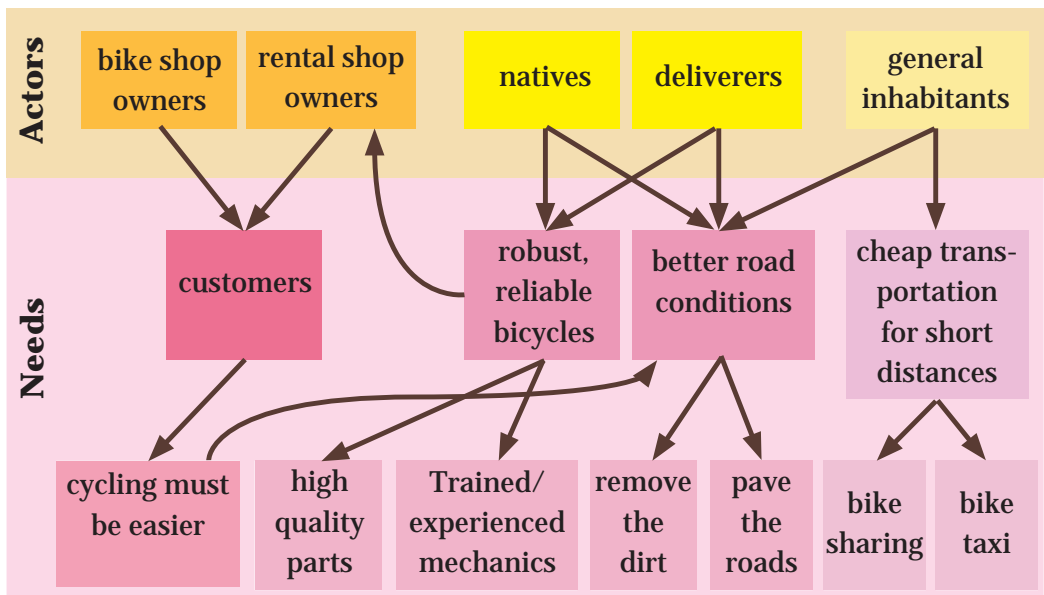


fig. 90:

This figure lists the actors and their specific needs based on the interviews from Ard El-Liwa.

Source: Author

existed since the early 1970's. If this is true, it must have been among the first businesses in Ard El-Liwa. Shops, which offer modern high quality bicycles do not exist in the district. According to Nagati & Elgendy (2013, p. 4), Ard El-Liwa depends on the adjacent upper middle-class district Mohandeseen, concerning public services and the economy. Indeed, some interviewed cyclists mentioned Mohandeseen as one of their regular destinations or even live there.

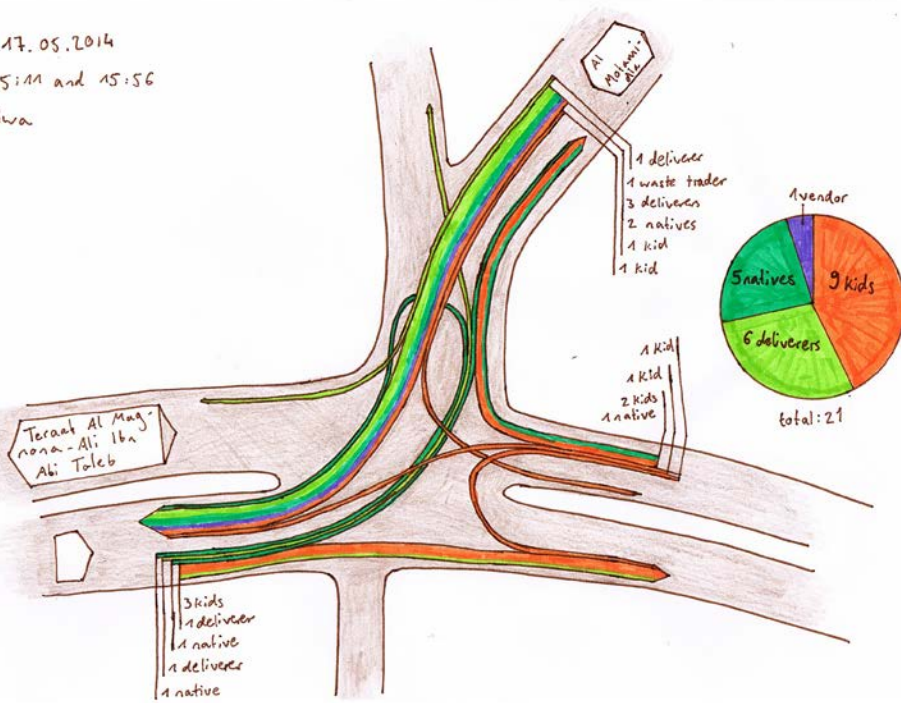
Conclusion

Ard El-Liwa is still growing and developing in an uncontrolled way and high pace. This creates potentials for interventions promoting cycling. Ard El-Liwa can be used as a rolemodel for other adjacent informal districts. Cycling has a considerable significance for goods delivery and to little extend for personal transportation. Cycling trips are usually within the district, but in some cases reach far beyond its borders. The inhabitants are in need for flexible, affordable mobility, as the strong presence of tuk-tuks demonstrates. Bicycles could fill this gap in different ways and their affordability as well as the narrow streets are beneficial for this. However the road surfaces need drastic improvement.

A park proposed by the Cairo based urbanists collective 'Cluster' in cooperation with the local community has great potentials to facilitate cycling paths. This is a potential for a route more than one kilometer long, pleasant and safe from motor vehicles. The benefits would also reach Mohandeseen on the other side of the park.

Observation Spot 1

Saturday, 17.05.2014
between 15:41 and 15:56
Ard El-Liwa



above
fig. 91:
cyclist rate observation spot 1
Source: Author

fig. 92:
Photo of spot 1 facing north
into Al Motadimia street
Source: Author

In this spot, the busy Al Motadimia Street ends in Toraa Al Magnouna Ali Ibn Abi Taleb Street, the southern border of Ard El-Liwa. The northern lane of Toraa Al Magnouna Ali Ibn Abi Taleb Street was rarely used, because its construction was in progress. Cyclists seem to have distinct common routes according to their categories. Kids mostly used the eastern part of Toraa Al Magnouna Ali Ibn Abi Taleb Street and oldschoolers its western part, coming from or going into Al Motadimia Street.

Observation Spot 2

Sunday, 18.05.2014
Between 14:33 and 15:18
Ard El-Liwa

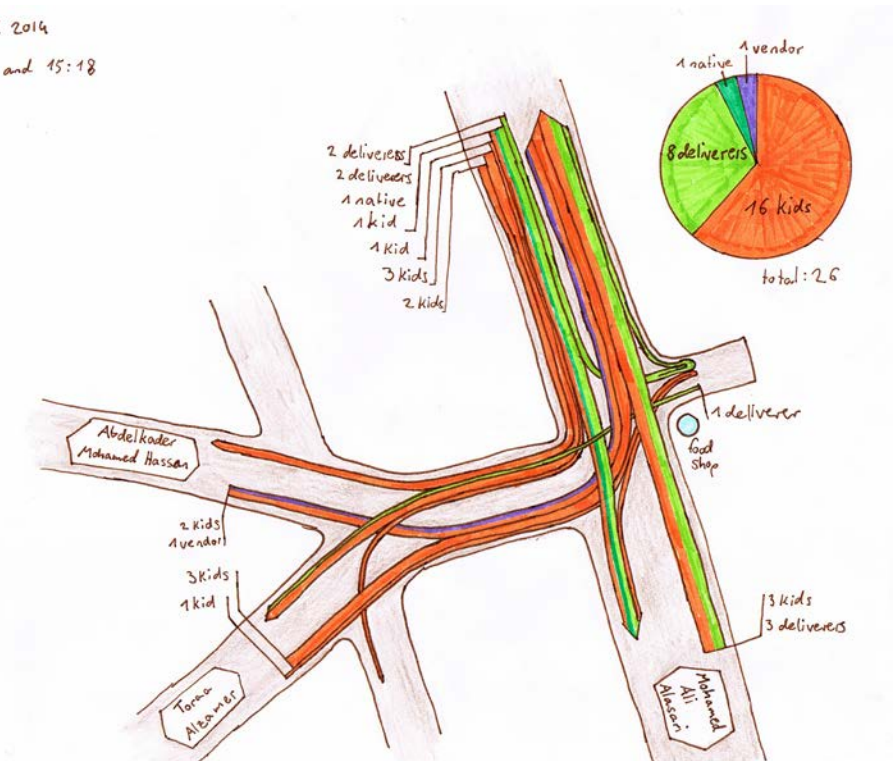


fig. 93:
cyclist rate observation spot 2
Source: Author

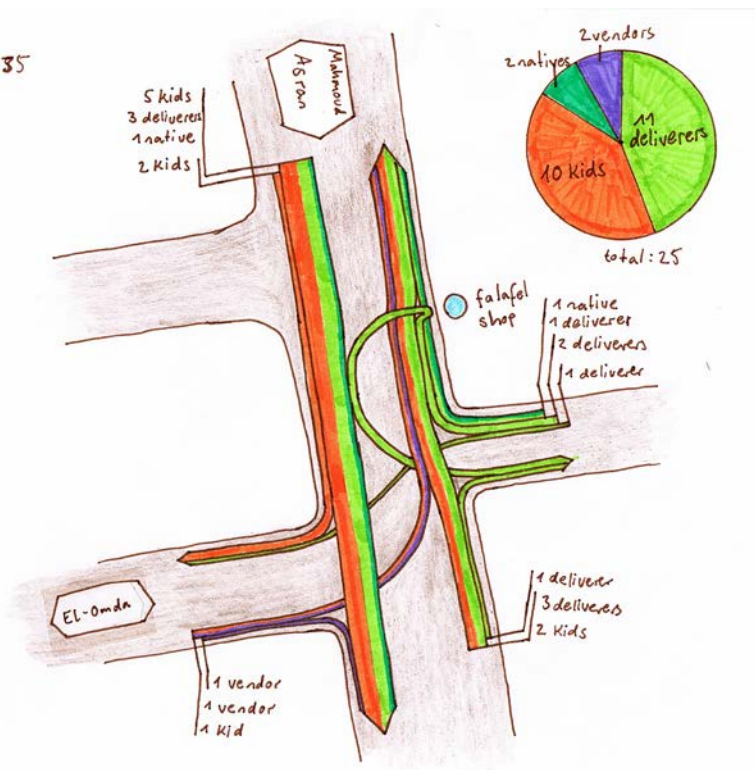


fig. 94:
Photo of spot 2 facing north-west
Source: Author

On this quiet intersection of side streets, the most cyclist were counted. Almost two thirds of them were kids. The short cul-de-sac is a suitable starting and returning point for deliverers from adjacent shops.

Observation Spot 3

Monday, 19.05.2014
between 13:50 and 14:35
Ard El-Liwa



above
fig. 95:
cyclist rate observation spot 3
Source: Author

fig. 96:
photo of spot 3, facing north
into Mahmoud Asran Street
Source: Eslam Abbas for the
author

This spot is close to the eastern border of Ard El-Liwa. Mahmoud Asran Street is not a main street, but one of the more important secondary streets with many shops and restaurants, and most cyclists used this one. Many deliverers took the nameless side street, supposedly to leave the district or to get to the bigger El-Zomor Canal Street.

Observation Spot 4

Monday, 19.05.2014
between 15:00 and 15:45
Ard El-Liwa

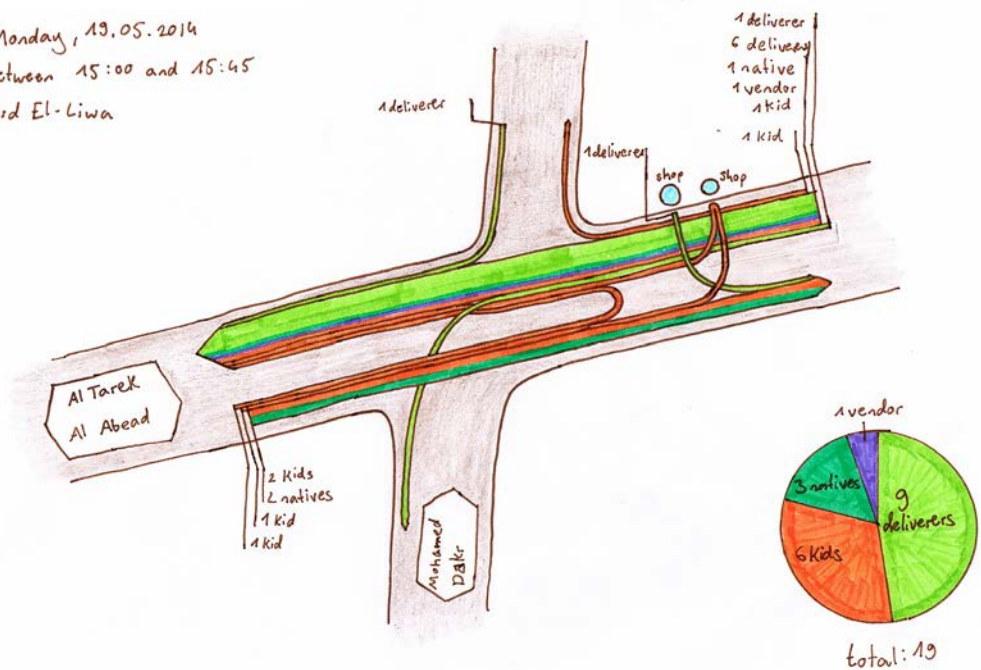


fig.97:
cyclist rate observation spot 4
Source: Author

fig. 98:
photo of spot 2 facing south
into Al Toraa Al-Boloqia Street
Source: Eslam Abbas for the
author

This spot is a typical intersection of a main street with two of the narrow secondary streets of informal settlements. Almost no cyclist used the side streets. Deliverers, who belong to adjacent shops or want to profit from the better surface, were the biggest group of cyclists.

4.5 Comparison of the Case Study Sites

Introduction

To determine, whether a general development strategy to encourage cycling for transportation for all districts is advisable or not, the results of the analyses of different districts must be compared. If the results show significant differences, specialized solutions should be conceived for different areas.

General

The observed districts differ in their social, cultural and economic characteristics, sizes, development status, population numbers and densities, and their situation within Cairo.

Roads

Road qualities differ in all aspects between the districts. Their width, surface quality, level of sun exposure, supply with parking spaces, separation of lanes etc. vary strongly and influence the bikeability of the certain area (figures 100, 101 & 102). The sketches illustrate the different street characteristics within the observed districts. I rate bikeability, or bike-friendliness of a certain area or street, with five aspects. The first one, 'absence of motor traffic', points to the danger and nuisance coming from the presence of motor vehicles. 'Maneuvering room' describes the available space to cycle in a predictive manner and react to sudden events. It is determined by the width of the road and the intensity of its usage. 'Shade', the third criterion, increases the comfort of sensitive cyclists. Most interviewed individuals preferred to cycle in shade. The fourth aspect, 'bike-friendly surface', describes the quality of the road cover. As the last aspect, 'diversity of scenery' is determined by the presence of a multifaceted environment with vegetation, lively streets with shops, pedestrians, interesting architecture etc. It makes cycling a more pleasant experience and is thus a strong motivation factor. Other aspects, like topography, have been ignored here, because they are not relevant in the respective areas. Comparing the rating according to those factors, is it clearly visible, that the residential streets in Shubra have an almost ideal cycling conditions, while very wide streets tend to be less bikeable. Al-Rehab's streets are strong in the aspects related to safety, but perform poorly in providing shade and diverse sceneries. In Ard El-Liwa, the negative factors are poor surfaces and lack of room due to the extreme density.

General Traffic

The ways, in which the streets are used, considering intensity of usage and dominant transportation modes, are also very diverse. Shubra suffers most from congestion, especially in some main streets like Shubra Street. However, side streets can be very calm. In Al-Rehab, the low density and wide streets prevent congestion, even though car ownership rates are high. Ard El-Liwa's streets are not suitable for car traffic and vehicles have to move slowly, but main streets are used very intensely by almost all types of users, especially pedestrians.

Cycling Activity and Types of Cyclists

Most cyclists were seen in Shubra and only a few less in Ard El-Liwa. In Al-Rehab, the number of cyclists counted was clearly the smallest. In Shubra, the

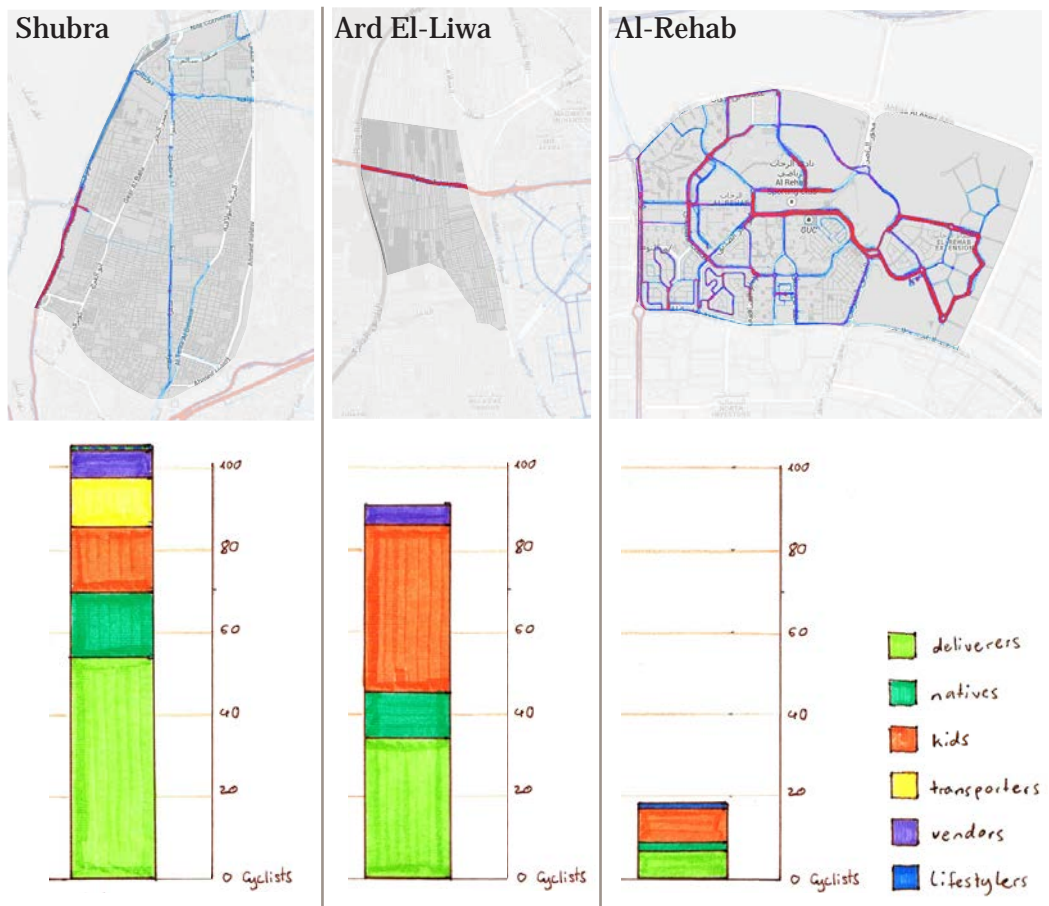


fig. 99:

The figure shows the results of my surveys mismatching with the tracked rides of Strava's cycling heatmap. Al-Rehab, where few cyclists were counted during surveys, is the most active cycling district, according to Strava's map.

Source: Author, Strava Labs (labs.strava.com)

Street Sections Comparison

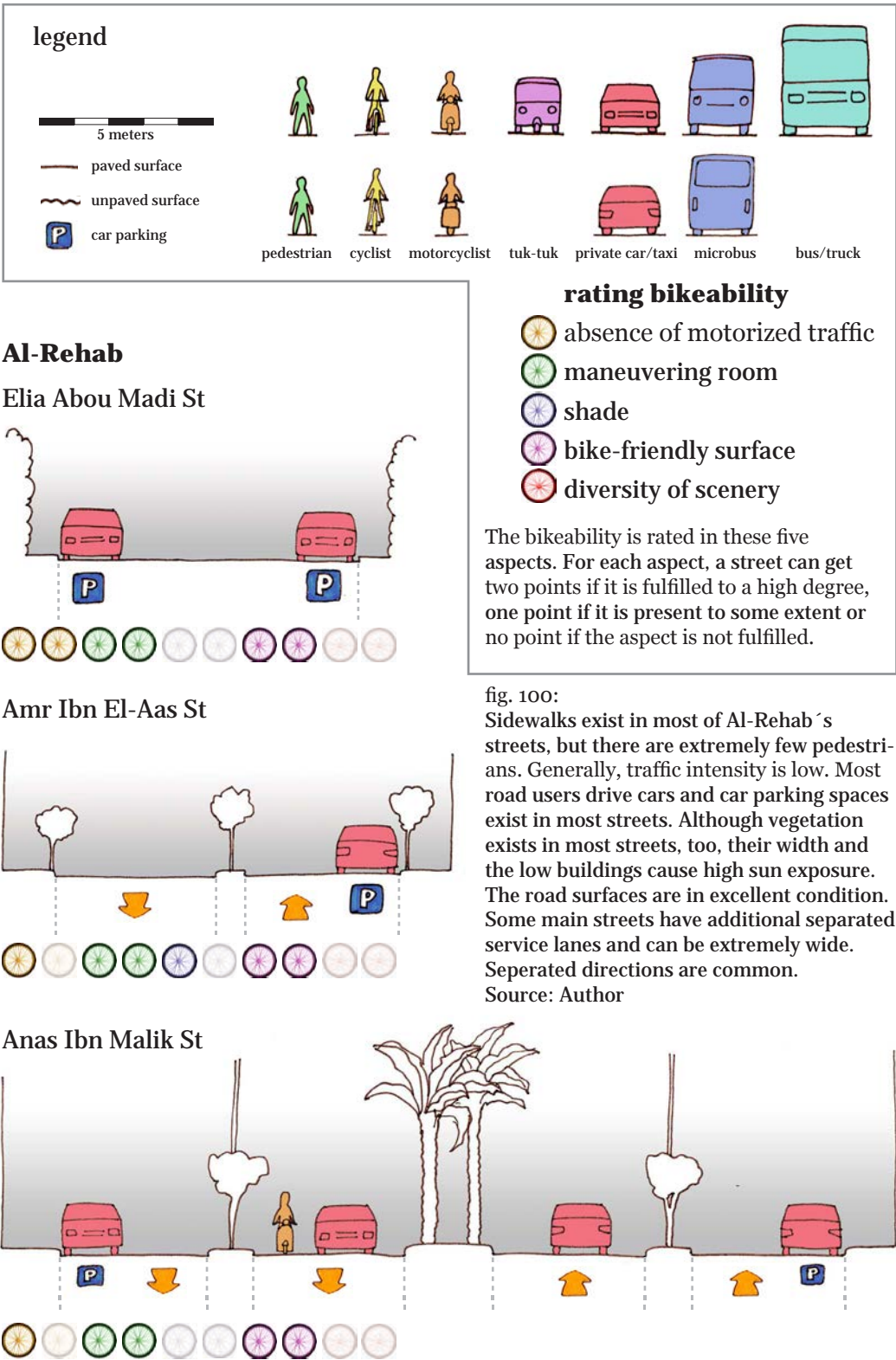
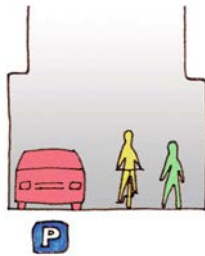


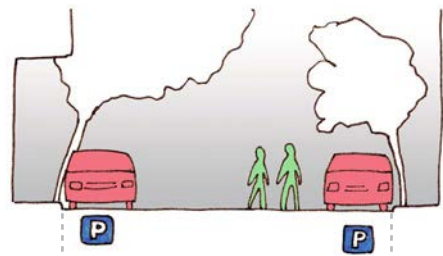
fig. 100:
Sidewalks exist in most of Al-Rehab's streets, but there are extremely few pedestrians. Generally, traffic intensity is low. Most road users drive cars and car parking spaces exist in most streets. Although vegetation exists in most streets, too, their width and the low buildings cause high sun exposure. The road surfaces are in excellent condition. Some main streets have additional separated service lanes and can be extremely wide. Separated directions are common.
Source: Author

Shubra

Ibrahim Hbshi St



Moerkous Beshara St



Al Teraa Al Bolokia St

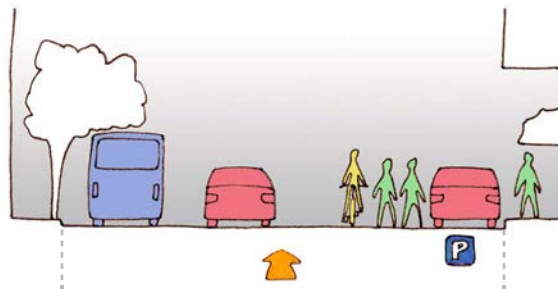
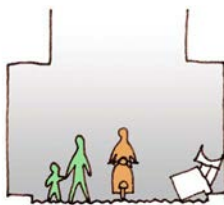


fig. 101:

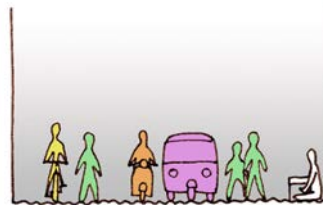
Sidewalks exist, but are not often used. Walking is the dominant transportation mode and in side streets, usually all road users share the street. Dense building development and trees provide shade. Most streets have car parking spaces. Main streets have a moderate width and most of them have a pavement in good condition. Source: Author

Ard El-Liwa

Rawash El-Taweel St



Al Motamidia St



26th of July Corridor

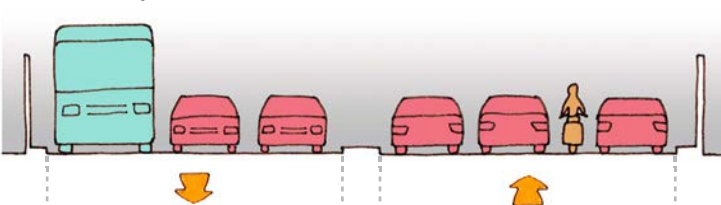



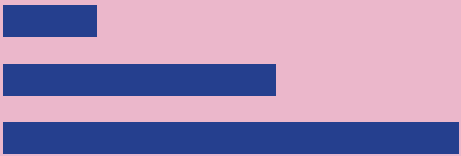




fig. 102:

Local streets are narrow and shady, the surface is shared by all road users. Sidewalks and parking lots do not exist. Obstructions are common (vendors or material on the street) Surfaces are in poor condition. In contrast, 26th July Corridor is walled, wide, paved with asphalt, used by high-speed vehicles only. Source: Author

general size population density planning status dominating social strata	Shubra <div></div> <div></div> <div></div> formal, historical middle income
road conditions shade pavement dominant users	 in side streets most streets paved, with frequent cracks and holes <div></div>
street fabric	<div></div>
 number of bike shops number of bike rentals	 circa 5 (estimated) between 20 and 40 (estimated)

fig. 103:
This table gives an overview of some of the significant differences in the observed districts.
Source: Author

diversity of cyclist types was the highest. The type-specific shares are very diverse in the different districts. E.g., Shubra has a relatively small share of kids, but is the only district, where transporters were seen. Cyclists tend to prefer main streets before small side streets in all areas, and most of them respected the directions in one-way streets. Deliverers exist in all observed areas. The website of Strava allows cyclists worldwide to upload their tracked trips and make them visual on a map (Strava Labs, n.d.). Interestingly, the map indicates high cycling intensity in Rehab, where few cyclists were actually observed. On the other hand, Shubra has almost no activity on the map. The street observati-

<p>Al-Rehab</p>  <p>formal, planned high income (residents) low to middle income (workers)</p>	<p>Ard El-Liwa</p>  <p>informal, unplanned low income</p>
<p>almost nowhere all streets paved and in excellent condition</p> 	<p>in most streets only a few main streets paved, pavement faulty and topped with dirt</p> 
	
<p>2 0</p>	<p>between 1 and 3 (estimated) circa 10 (estimated)</p>

on showed, however, that the spot with the least cycling activity in Shubra was still used by as many cyclists as all four observed spots in Al-Rehab together (fig.99). This disaccord clearly illustrates the difference between the presence of ‘oldschoolers’ in Shubra and the ‘lifestylers’, who use modern technology to track their trips, in Al-Rehab. Those, who use Strava’s ‘heatmap’, are often the same people, for whom social media play an important role in raising the motivation to cycle.

Conclusion

The main problems of each district are as special as their different characteristics. While in Al-Rehab, they are mostly related to the image of cycling, car-

friendly infrastructure and land use patterns, in Shubra the threat by motor-bikes and scooters to replace bicycles is high. In Ard El-Liwa, the motivation due to poverty is high, but the poor road conditions, especially the pavement quality, are a crucial factor.

All areas have potentials, but they are connected with the particular needs of inhabitants and the physical conditions, and thus differ tremendously. The presence of deliverers in all observed districts indicates the relevance of bicycles for goods transportation and deliveries, which should be taken up in the concepts.

4.6 Conclusion of Analysis

Cycling in Cairo is an issue, which is strongly influenced by a complex network of cultural, social, political and practical factors. Cairo's cyclists can be categorized in two big groups. Members of the first group, the 'oldschoolers', use the bicycle as an affordable way of transportation, or even to earn income with it. The second group are the 'lifestylers', who cycle to enhance their lifestyles in terms of fun, socializing, environmentally friendly mobility, fitness etc. The community of the lifestylers is currently growing, but potential for growth exists in both types. Mass media and social media are important for the promotion of cycling and the organization of the lifestylers' community.

A point of central significance is the people's mindset in various dimensions. It accounts for the adverse image of cycling in general and the emergence of sexual harassment of cyclists. The importance of image, especially prestige, cannot be overrated. The more prestigious the image of cycling will be, the more fashionable it will become, the more it will be accepted as a mainstream activity and become a usual commuting mode. The influence of the social environment has an enormous weight. Parents try to discourage their children from cycling on the one side, and members of the cycling community do the opposite with their non-cyclist friends on the other side. For many young individuals among the lifestylers, starting cycling and becoming part of a community, where a lot of new friends share their passion or simply their way of transportation, had a huge impact on their whole lifestyle.

Of course, practical and pragmatic problems like road safety and hygiene are very important and must be considered. Only the solution of them will make cycling suitable and attractive for the masses. Theoretically, a rising number of cyclists raises the level of road safety, since motor vehicle drivers become more aware of cyclists, if they are more common in the streets. This will also raise the social acceptance of cycling or even turn it into a fashionable transport mode for

more parts of the society, but at least lower incidents of harassment. Nevertheless, encouraging people to use bicycles in a dangerous environment is ethically unjustifiable. In the face of the numerous safety risks in Cairo's traffic, we must firstly focus on encouraging people to cycle in the existing safe environments, such as small and calm streets, and secondly try to find feasible measures to increase the safety for cyclists in other environments, notably busy main streets. All interviewed persons, experts as well as cyclists, agreed, that under the current circumstances, there are no expectations for the government to support cycling. Apart from the recent rise of fuel prices and the participation of the president in a cycling marathon, governmental institutions do currently not play an active role in the support and development of non-motorized transportation (fig.104). However, I believe, that only the involvement of the state could make certain very important measures possible. Convincing the Government of the benefits cycling would evoke, for instance the potential to save immense amounts of money from the national budget, would open the possibility of truly effective, large-sized interventions. A way to attract the government to such actions could be cooperation projects with foreign development agencies like the GIZ or USAID.

Nevertheless, the role of the civil society and the individual must not be underestimated. A big part of development will have to be done by the people, i.e. NGO's, initiatives, CBO's etc. Informality acts as a nutritious ground for such initiatives. Many problems can be solved and a lot of development can arise by self-organized, independent activities and the private sector. However, more enforced traffic rules and the improvement of public transport are essential to improve road safety and make cycling more attractive.

Determinants

The decision whether to use a bicycle for transportation or not is influenced by a system of circumstances, which I call determinants, and which can be categorized into four sectors: social, environmental, economic and personal. Most of the determinants can have both positive or negative influences. Comments from strangers can be encouraging or demoralizing. Wind can be perceived as comfortable refreshment or as a hindering force, making cycling more exhausting. In fig.105, the determinants are matched with the behavior influencing factors, which were presented in chapter 3.5.2. It becomes visible, which factor can influence the behavior in which dimension. For example, cycling education in school will give knowledge and self-efficacy to the children, affect their emo-

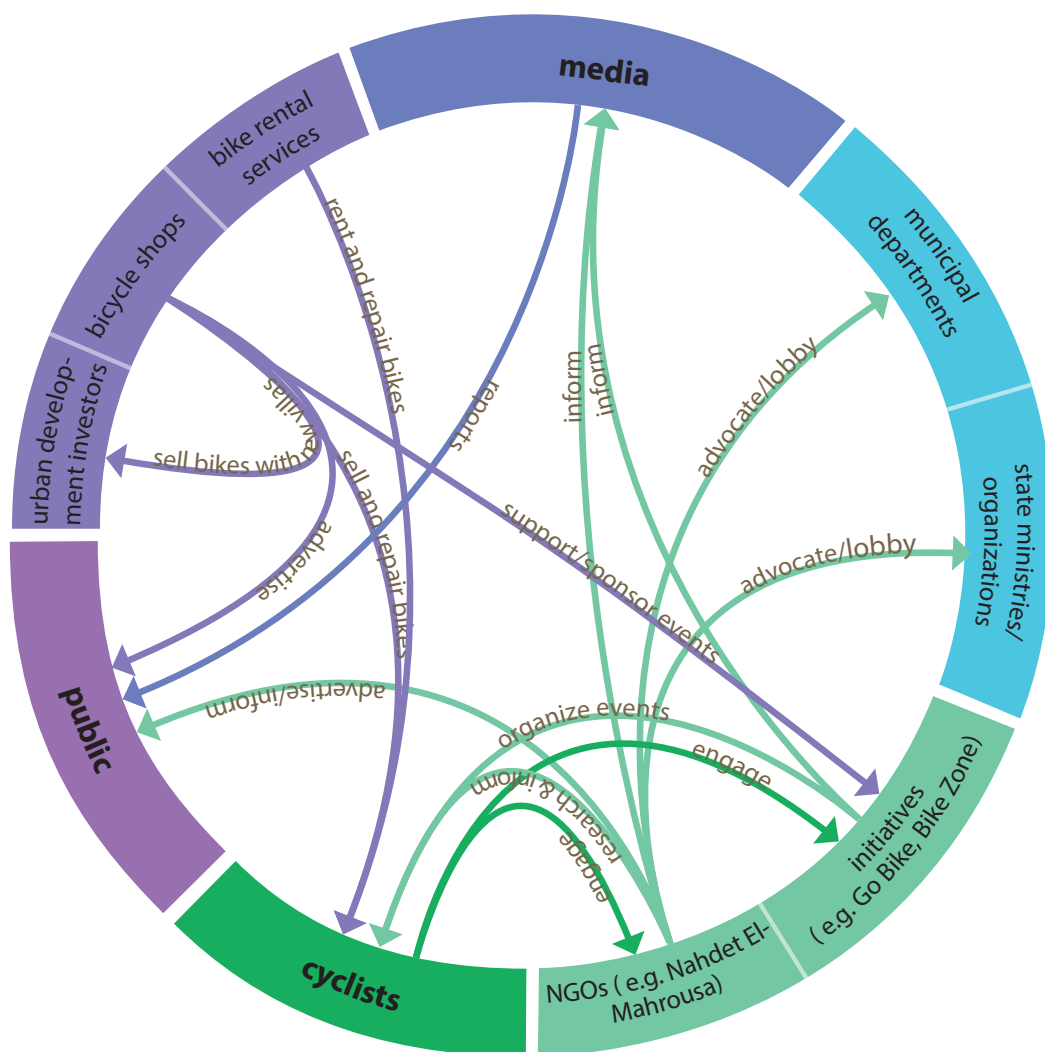


fig. 104:

This diagram shows the grouped stakeholders and their interactions with each other. Governmental authorities should interact with most other stakeholders, but in fact, they are passive. Most activity emanates from the civil society and bicycle shops.

Source: Author

tional connection and attitude towards cycling, and potentially start or support cycling as a habitual behavior. It can even change social norms. However, it does not provide a social proof itself or lead to diffusion of responsibility. Also, it does not have direct effects on environmental factors.

In order to encourage people to use bicycles for transportation, certain determinants can be modified. Some of them can be modified easier or faster than others. Therefore, quickly and easily modifiable determinants should be prioritized before those requiring much time and effort. A high number of matching factors does not necessarily make one particular determinant more relevant,

since affecting only one very influential factor could potentially have more powerful consequences than two or more factors affected by another determinant. Moreover, the modification of one certain aspect will have effects on other ones, since many of them have linkages. For instance, the road conditions directly influence the travel times by determining speed and driving behavior. This needs to be considered in order to intervene in those ones, which will trigger desirable changes in other determinants. The arrows indicate these linkages in the diagram.

According to my interviews, cycling should be safe, secure, easy, comfortable, effective and affordable. If these qualities are provided, people will be more encouraged to cycle than if not. The diagram indicates, which determinants have an influence on which of these abstract qualities, thus providing clues on how to improve them.

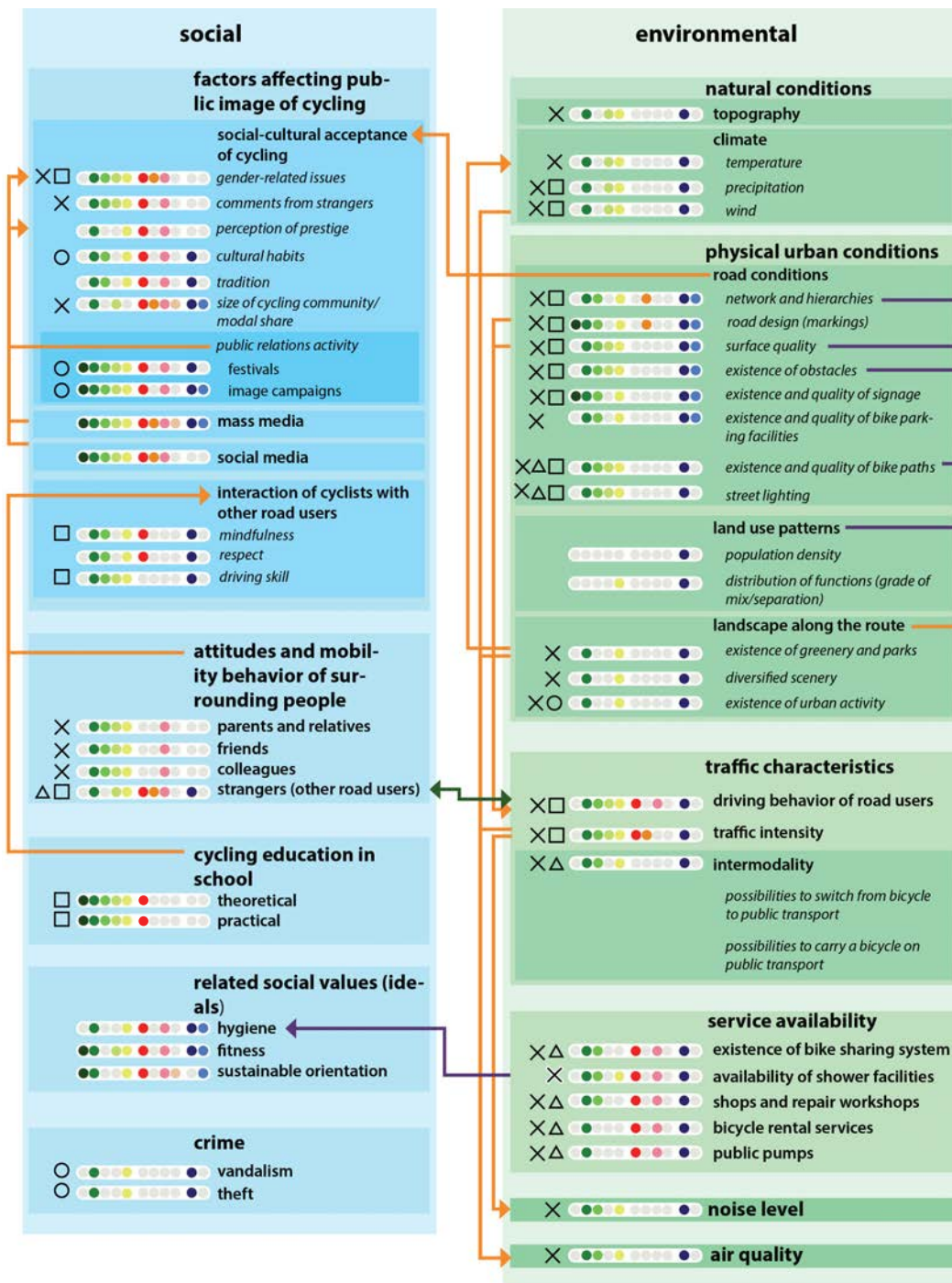
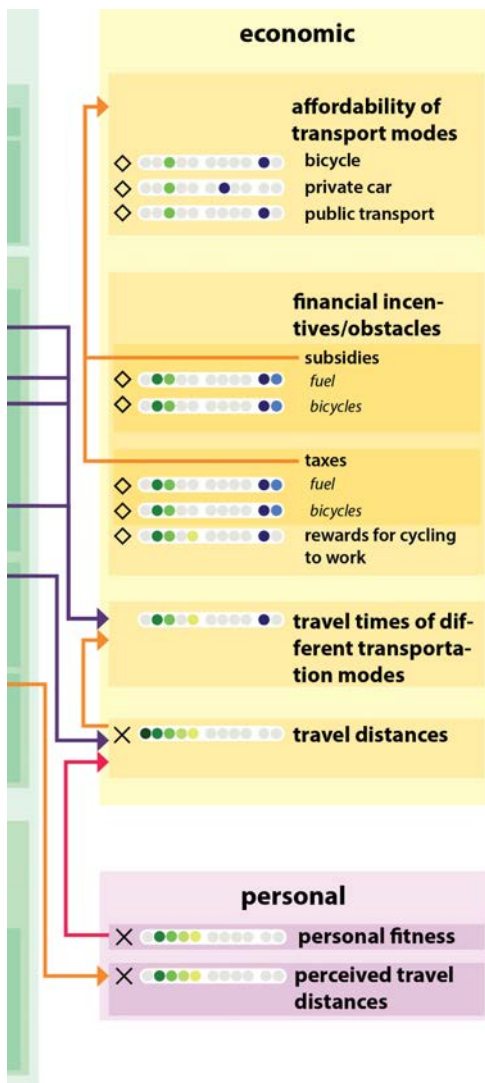


fig. 105:

The decision whether to use a bicycle for transportation or not is determined by a network of the factors showed in the diagram. Their characteristics have consequences for the attractiveness of cycling and affect behavior in different ways.

Source: Author



influences (general)

correlate

determines

limits

factors influencing behavior

personal

● knowledge/awareness

● attitude

● habits/routine

● self efficacy

● emotions

social

● descriptive norms

● injunctive norms

● social proof

● diffusion of responsibility

environmental

● local (exo)

● wider (macro)

qualities associated with
attractivity of cycling

□ safety

○ security

△ easiness

× comfort

◇ affordability

CONCEPT

5. Concept

5.1 Introduction

The site analyses proved, that the mobility demand, as well as problems and potentials for the use of bicycles are very specific according to the respective case study site. However, the analysis also showed that there might be approaches applicable for Cairo as a whole or the Egyptian society in general. This point is reinforced by the results of discussions with experts, cyclists from other districts than the case study sites and theoretical models like TOD. Therefore, the first part of this chapter will examine general concepts considering the encouragement of cycling as a means of transportation beyond the borders of the observed districts. It will also discuss possible solutions for the traffic in general, which are not directly related to cycling, but will affect it indirectly.

After creating this overarching frame, the integrated concept for each case study site will be elaborated and presented. The problems discovered are multicausal and complex, hence a concept is favorable, which considers many aspects and provides possible treatment for different causes.

5.2 General Strategy to Encourage Cycling as a Means of Transportation

5.2.1 Introduction

This chapter is going to present a general strategy to encourage cycling in Cairo, but some projects will be applicable in other Egyptian cities as well. The projects should address needs of the target groups, which are the two big types

of cyclists identified before, and individuals, who do not cycle yet. However, ‘oldschoolers’ have different demands than ‘lifestylers’, due to their personal circumstances, such as financial capabilities, attitudes etc. as well as the external conditions depending on the areas in which they concentrate. Personal and external conditions are interrelated, for instance by the influence of the social environment. Schöller-Schwedes and Rammner (2008) claim, that the recognition of negative long-term consequences of rampant motor traffic growth and the sensitivity for environmental protection are literally not affordable for many Cairenes. The millions of poor citizens hardly earn enough money to feed their families and are focused on short-term goals in a circular routine, thus rather seeking affordable mobility. However, certain needs are shared by all cyclists, especially the need for safety. Therefore, a powerful, united entity must be formed to represent this need and urge the creation of a more bicycle-friendly physical environment.

One of the specific aims is to give motivation to young people to spend time in the street and the open air, in order to reconnect them to the public space and create a sense of belonging and responsibility. If this happens, they will care more about the space and esteem and shape it. This will happen by giving them the freedom and power to modify public space according to their needs and dreams. The method to do this is the participation in adequate formal organizations and the acceptance and support of informal initiatives.

5.2.2 Challenges

Due to its density and compactness, Cairo has only few unused open spaces, which could be turned into cycling paths. But turning road space into dedicated cycling surfaces is at the moment not realistic, because a big share of Cairenes would not understand and accept this. Instead, their opinion about cycling could become even worse, since they would see it as a threat for their customary transportation with a motorized vehicle. The challenge is to reach a critical mass of cyclists, which would justify the installation of cycle paths along major routes. Until then, cycling between districts will in many cases require the use of dangerous main streets, which is not advisable and only a few courageous cyclists will dare to do this.

What makes social factors so important in Cairo is the habit of usually doing things together instead of alone and the high status of traditional values and social bonds, especially to the family. In consequence, acting against social norms and risking the exclusion from a social group is very unusual. This is proble-

matic, because cycling is currently stigmatized as a transportation mode for the poor by the rich. This issue needs to be strongly addressed in image campaigns. For example, the importance of community can turn out as an advantage for cycling, if it can be promoted as a social activity, which brings people together. Most people I talked to were skeptic about the engagement of the government in the development of cycling culture in Egypt, especially considering recent infrastructure projects, which totally disregard non-motorized transportation means and the questionable development of the new desert cities. Apart from the fuel price rises and president Sisi's public presence on a bicycle, which both happened shortly before the submission of this thesis, the state is currently inactive or even counteractive regarding bicycle culture, while the cycling movement from below is growing. This situation should change and the state and the municipalities should support these movements. In general, informal developments have big potentials, because they can be dynamic, community-based, inclusive, direct, and respond to actual needs. These potentials in combination with a supportive governmental engagement can enable the innovative, but at the same time feasible solutions, which are necessary. Many of the projects work without the involvement of governmental authorities, but for some others, it is inevitable. The potential of saving national budget by promoting cycling, as well as the importance of preventing environmental disasters in the long run, will be convincing arguments for the state to get engaged. Unlike in Bogotá, the political will and the social acceptance still have to be raised. But a rising number of cyclists will increase the pressure to facilitate their needs, which will in turn attract more people to cycling.

5.2.3 Limitations

Encouraging cycling alone cannot be the ultimate solution for Cairo's traffic crisis. There are already more than 2 million motor vehicles in Cairo and a growth rate of circa 10 per cent per year is stunning (Egypt's licensed vehicles rise to 7 million in 2013, June 2nd 2014). The strategy to encourage cycling can only help to relieve a part of the pressure on this city's streets, which is likely to increase even more in the future, if radical measures will not be taken. This includes restrictions for private cars, concepts for more sustainable freight transport, and a thorough improvement of public transport with an extended metro, buses and potentially also a renovated tram. Also, Cairo is a huge city and inhabitants have to handle big distances, for which other modes of transportation might be more efficient than cycling. Equally importantly, urban and regional planning

processes must take into account measures to control traffic flows. E.g., land use planning measures can lower the mobility demand by benefitting the creation of jobs close to residences.

5.2.4 Prospects

It is likely, that the suggested solutions will not result in a convergence, amalgamation or dissolution of ‘lifestylers’ and ‘oldschoolers’ into one, more uniform cyclists community. This is also not necessarily desirable, since the existing diversity is not a problem. Instead of, or next to the approximation of ‘oldschoolers’ and ‘lifestylers’, there will also be a diversification of cyclist types. The lifestylers will be going to change their group characteristics and potentially, new groups will arise, as a second generation of the currently existing ‘conscious cyclists’, which could be called ‘pragmatic cyclists’. These will be close to the most cyclists in European countries, using reasonable bicycles for commuting, but not motivated by a certain lifestyle-oriented attitude. Rather, they will be used to cycling from their childhood, without the currently characteristic interruption during adolescence. Their parents will be the conscious cyclists of today, the pioneers, who will guide them into an everyday life, of which cycling is a normal element. Thus, their attitude will be similar to the one of the current natives, but they will have better equipment and no economic necessity to cycle.

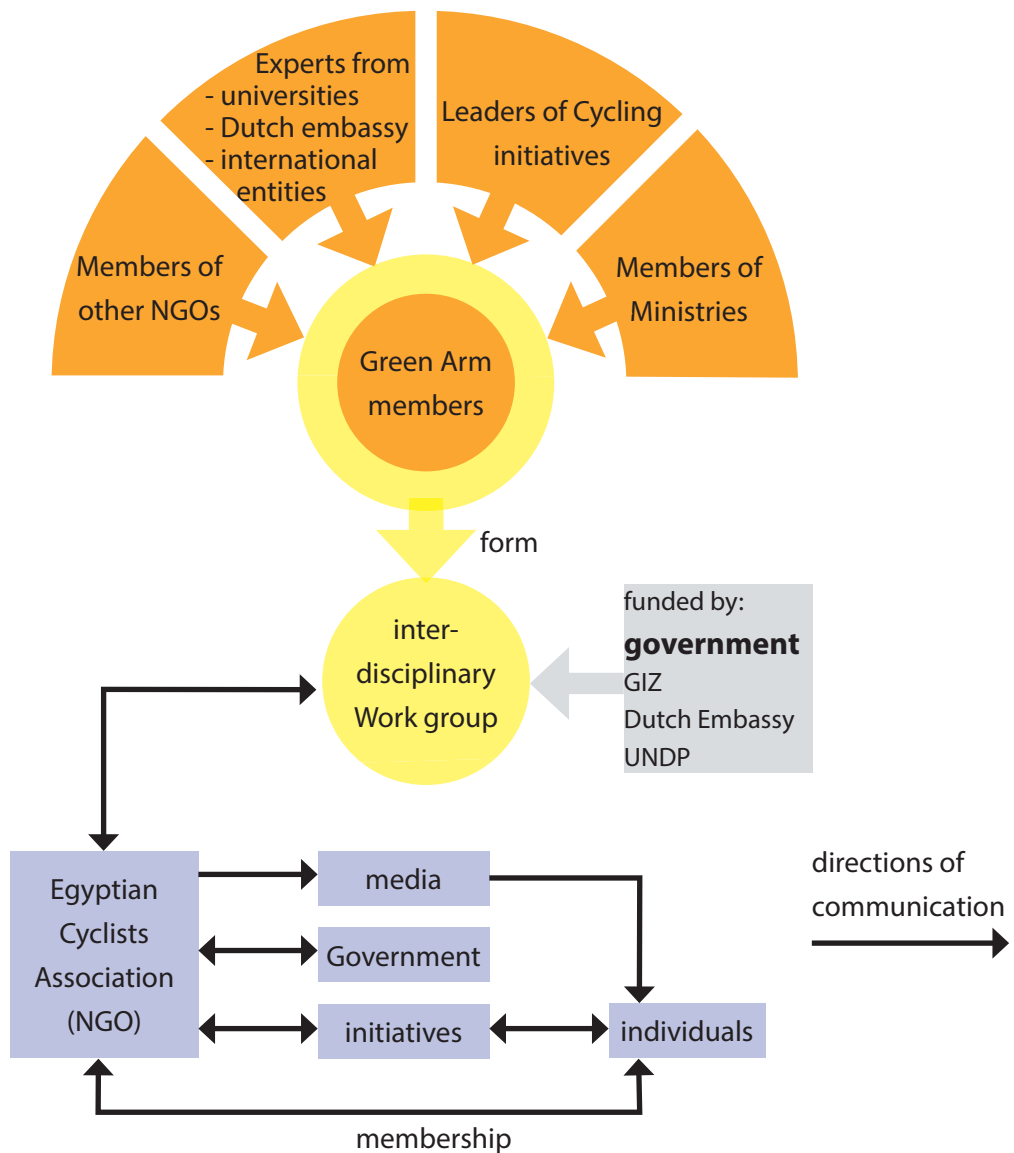
On the other side, drastic increase of fuel prices could lead to a renaissance of the ‘natives’ and ‘deliverers’, who are currently declining in favor of scooters and motorbikes. If these vehicles become more expensive and the poverty is not being reduced in parallel, bicycles will not only be an attractive alternative, but will again become the only affordable vehicle for many. Thus, the cycling circumstances must be made as comfortable and safe as possible for these people, too.

5.2.5 The Four Phases

The general strategy consists of four phases. Certain projects will be active over more than one phase, but might have a ‘core activity period’, when they are particularly important or the circumstances are more advantageous. Fig. 107 lists the suggested projects with their categorizations and characterizations and illustrates the activity periods.

Phase 1 – Preparation/networking

Before the implementation of most projects begins, a strong network must be



above

fig. 106:

This scheme illustrates the formation of the interdisciplinary work group and the ways of communication between the stakeholders.

Source: Author

next spread

fig. 107:

The table lists recommended projects with their characteristics and the periods of their activity.

Source: Author

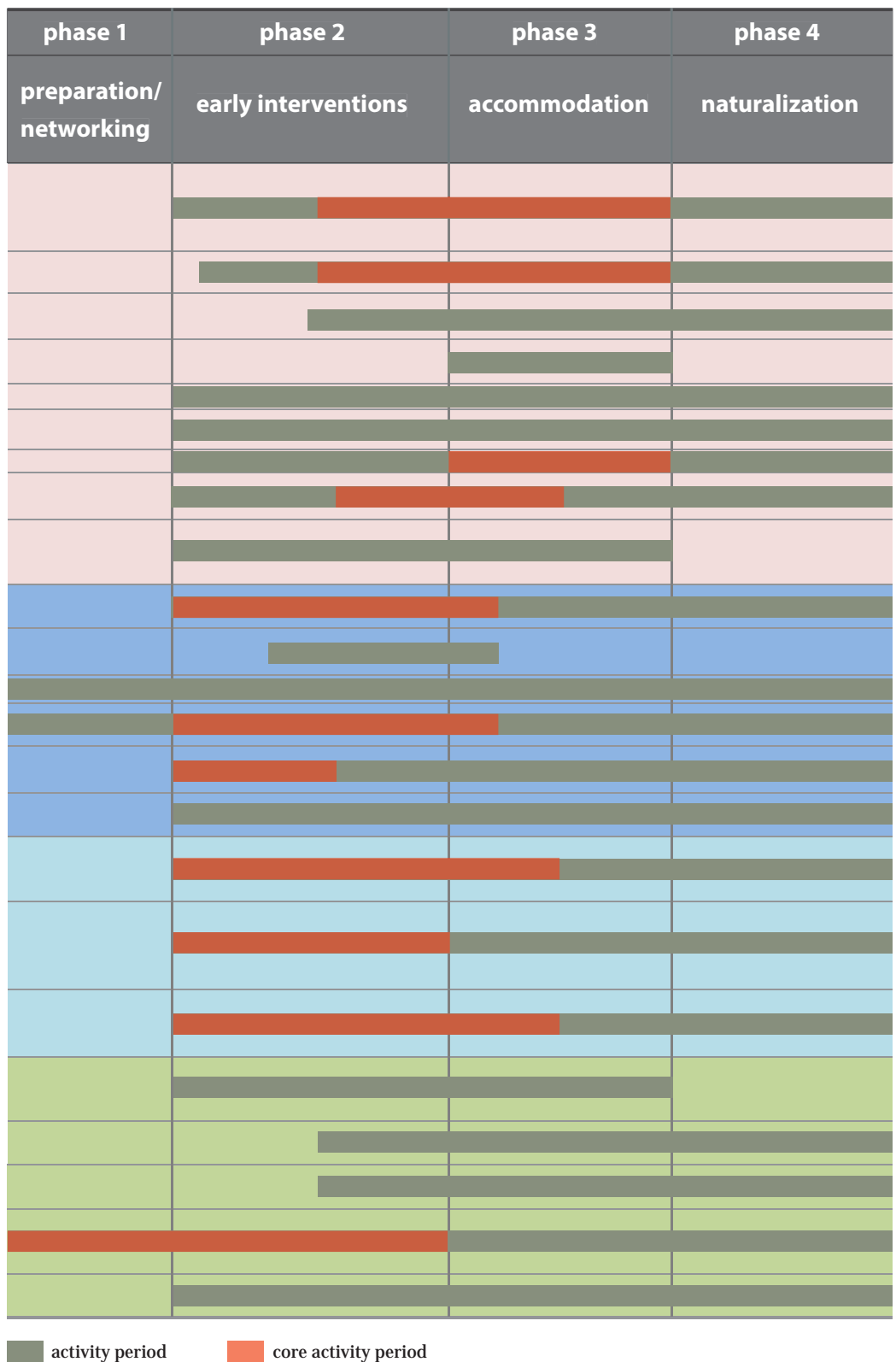
set up to be able to coordinate interventions. The team of the independent organization `green arm`, which is concerned with sustainable transport in Egypt, could be the core of an interdisciplinary work group, which would be formed out of members of other NGOs, leaders of the existing cycling initiatives like Cairo Cyclers Club, GBI or Bike Zone, representatives from bike shops, experts from universities and international entities like the Dutch embassy, and mem-

Policy	Plans	Programs	Projects	Representation		Nature			Budget & Stakeholders				Status	
				Spatial	Non-spatial	CI	CB	PROC	Public	Private	Comm.Ini	PPP	Urgent	relevance
encouraging cycling	make the urban environment more bicycle friendly	increase comfort	install bike parking facilities at public transport hubs, universities and other strategic points	x		x			x		x	x		xx
			provide showers at destinations	x		x			x	x	x	x		x
			allow bicycle transport on metro and Nile bus		x			x	x					x
			turn ex-tramways into bike paths	x		x			x					x
		increase safety	training for cyclists				x		x				x	xx
			training for motor vehicle drivers				x		x				x	xx
			create zebra crossings	x		x			x		x		x	x
			install forum for suggestions of bike paths	x	x	x		x	x		x		x	xx
			open gaps in barriers in the middle of big streets for safe crossing	x		x			x		x			x
	improve image of cycling	raise awareness	reports and presence in the TV		x			x	x	x				xxx
			(photo) exhibition about Cairo's cycling culture		x			x	x	x	x	x		x
			cycling events		x			x	x	x	x	x		xxx
			promote cycling with social media		x			x		x	x			xx
		...	introduce cycling delivery in popular shops/restaurants		x			x		x		x		x
			rewards for people who cycle to work		x			x		x		x		x
	provide advice and knowledge for cyclists	favorable routes	create road markings and signage at favorable routes	x		x			x		x			x
			create a possibility to recommend favorable routes to the community (could be an app)		x			x	x	x	x			x
		network cyclists	create possibility to find cycling partners for regular trips (could be an app)		x			x	x	x	x			xx
	stimulate new ways of bicycle usage and businesses etc		establish informal bike sharing systems at universities	x	x			x			x			x
			found an Egyptian bicycle brand and open a factory		x	x			x	x		x		xx
			introduce police on bicycles		x			x	x					x
			subsidize bicycles and charge extra for fuel and car parking		x			x	x				x	xxx
			establish (a) cyclist's café(s)	x		x				x	x			xxx

urgent: directly affecting the safety of cyclists and other road users, other projects
relevance: grade of expected improvement

CI: Capital Investment
PROC: Procedure
PPP: Public Private Partnership

CB: Capacity building
Comm Ini: Community Initiative



bers of adequate ministries (fig 106). In many cases, individuals are already engaged in more than one of those groups, e.g. staff of bike shops are also team members of cycling initiatives. Thus, they are already well connected, but without an official frame and the power to work out integrated concepts. This work group will need funding, ideally coming from the government, otherwise from the UNDP, GIZ or the Dutch embassy.

In addition to this work group, a national cyclists association will be founded, following the scheme of existing foreign associations like the German ADFC. This will be an independent NGO, which will work closely together with the work group and all other stakeholders and lobby cycling in the government. Urgent interventions are the taxation or at least the cutting of fuel subsidies and the introduction of high parking fees for central districts, while subsidizing the purchase of bicycles. Although a beginning step has been taken by raising the fuel prices in July 2014, the alternative of purchasing a bicycle must be supported by financial incentives immediately. The strategy is to make car driving unattractive by means of tolls, high fuel prices, reduced parking space etc. and simultaneously make cycling and public transport more attractive by means of cheap fares, a good network, safe and clean vehicles etc. These two approaches reinforce each other and the first can be used to help financing the second one.

Phase 2 – early interventions

This phase aims at fixing urgent safety problems and building up a critical mass of cyclists. One method to reach the second aim is to raise the social acceptance of cycling, to reach a wider range of potential cyclists. Therefore, the promotion effort will be the highest in this phase and many projects begin then. The promotion will mainly focus on the usage of currently safe cycling environments, which means quiet neighborhood streets within a district, and thus, rather short distances. Such routes are mostly shaded thanks to trees or high buildings, which increases the comfort. Promotion will point to the equality of women, cycling as a social activity and a way to save money as well as health benefits of cycling and the mediation of responsible road behavior. Improving the image of cycling is a process, which can be initiated by many actors of different scales. Alone the presence of cyclists and the individual driving behavior have an effect on the way cycling is perceived by the public.

Social media already have a tremendous significance for the 'lifestylers' community. Cycling initiatives, bicycle shops and individuals already use it to a great extent and this trend is very likely to increase. Social media are also a

great platform for the engagement of the newly founded association. On a bigger scale, cycling events, like group rides, festivals etc. must not only include the existing community, but also outsiders. Non-cyclists must be invited to attend such events by offering other programs like concerts, to make the encounter with the bicycle happen easily and by the way. The attraction of non-cyclists is also in the interest of the commercial stakeholders, who have the chance to gain new customers. They must cooperate with activists from the community.

But also mass media have a heavy influence on the public's perspective. If TV and newspapers promote cycling, the effect will be big, especially in combination with cycling events. Celebrities on bicycles broadcasted in TV can boost the public awareness about cycling in an instant, as president Sisi proved on June 13th 2014 by participating in a cycling marathon (Kingsley, P., June 13th 2014).

As another step into people's minds, a photo exhibition about Cairo's bike scene, perhaps with individual portraits and stories, will inspire people and raise the desire to try cycling themselves. Also, exhibiting such stories of 'lifestyle' will raise the social acceptance by presenting cyclists as decent members of the society. Many young wealthy Egyptians, which are usually those who can afford a private car, feel attracted to a western lifestyle. However, in contemporary western lifestyles, cycling is an important element, and marketing and image campaigns should aim at making the mentioned target group realizing and adopting this fact.

As mentioned, people will get used to seeing more cyclists, especially females, in the streets and this alone will gradually raise the social acceptance. However, the driving behavior of cyclists influences their image as seriously as their sheer presence, making training extremely important. Only if cyclists drive in a predictable and considerate way, other road users will accept them. Therefore, cycling training in schools will be introduced. In addition, information materials will be provided via events and media. On the other hand, also other road users must be informed and trained about how to deal with cyclists, leaving aside the fact that better driving training would generally be very advisable in Egypt.

Apart from the mentioned projects to raise awareness, the image of bicycle deliverers needs particular support. The promotion of bicycle delivery among stylish shops, such as the restaurant 'Zooba' in Zamalek, as an environmentally friendly feature will improve their image, especially if the bicycles prove to be faster in dense traffic. The customers of such shops have more environmental awareness than the average Cairene, hence they will support the idea. In case of success, also big international corporations like 'McDonald's' will certainly

imitate this strategy to profit from it, which I clearly oppose, since such corporations destroy local structures as well as cultural identity and diversity. Eventually, the resulting image upgrade for bicycle deliverers, also those of the ordinary shops, and the recognition of their benefits justify the compromise.

Given the strong sense of social community and mutual support, which characterizes the Egyptian society, community-based or crowd-sourced initiatives have a big potential. The website and mobile application `Bey2ollak´ is based on community knowledge and gives advice to car drivers about how congested the roads on their way are. Drivers feed the forum with reports themselves, hence the application needs a critical amount of dedicated active users. A similar approach for an independent application for cyclists and by cyclists recommending each other safe and pleasant route alternatives based on the community-oriented attitude of the local society could be an interesting idea. The result would be a rating of crowd-sourced favorable routes, and a collection of particularly hazardous and boring or safe and enjoyable spots. User-friendliness by simplicity and easy access, as well as a sufficient number of active users and contributors are essential for the success of such concepts. A similar model will also work well for an application to find partners with same destinations to commute together. Cycling together will give users additional motivation, more safety, especially in terms of protection from harassment, and more fun. This concept is likely to attract users among the `lifestylers´, who are concentrated in a few districts, more than the `oldschoolers´, who have less access to internet.

As a link from the virtual networks to the physical world, the most recommended routes will get road markings and signage, implemented by activists in cooperation with the association. As another part of this cooperation, a forum for the suggestion of official, permanent dedicated cycle paths will be established as a feature of the association. It will collect and rate potential routes, develop a strategy and submit it to the work group.

In districts with high concentrations of `lifestylers´, like Maadi, Zamalek or Heliopolis, bike kitchens or bike cafés will be opened. The concept combines a place for cyclists to meet and chat with a repair workshop for bicycles and a venue for regular events related to cycling. The bike café could become a true hub for the entirety of bicycle culture in Cairo, providing space for the work on its development in all directions. It would address many of the found obstacles and potentials, such as awareness, the importance of community in the Egyptian society, gender inequality, lack of information, misconceptions etc. The fea-

tures, potentials and the resulting relevance of the bike café are described more detailed in chapter 5.2.6.

In connection with the bike café, a cycling magazine for Cairo will be initiated, which will also give safety advices about good routes, driving behavior, females' cycling experience in Cairo, reports from other cities, inspiring documentaries about long distance trips, an events calendar, contacts, bike shops, tips & tricks, new bicycle models, etc. Therefore, the magazine would cooperate with actors like the cycling initiatives, the mentioned crowd-sourcing networks or bike shops.

As another important factor, the physical environment must be made more bicycle-friendly. This can be done by increasing the safety on the one hand and increasing the comfort on the other side. For more comfort, it is very important to integrate cycling with public transport, especially since this phase focuses on cycling for short trips within district boundaries. Therefore, bicycle parking facilities are needed at public transport hubs and at universities as well as other strategic spots. Integrating cycling into the public transport network diminishes the typical 'last mile'-problem, the way between stations and the start or the destination. This will make public transport more attractive, too. In a later stage of phase 2, the transportation of bicycles on the Nile Bus will be enabled. This will be especially attractive for students, who take the boat to reach Cairo University. For integrating cycling effectively, a parallel, general and profound improvement of the public transport system, especially the connection of new desert cities and informal settlements, is necessary.

The creation of gaps in elevated road islands for easier crossing of big streets and adequate zebra crossings are desirable for pedestrians and wheelchair users, too. For such physical interventions, community-based actions under guidance and control of the newly founded association will prevail first, while the involvement of the state increases steadily.

As another factor of comfort, body hygiene is very important for Cairenes of the middle class and upper class. For these many potential cyclists, showers and washing facilities at destinations (e.g. workplaces) would be a truly effective argument. To encourage commuting to work, the principle of rewarding cyclists with a bonus will eventually also benefit the employer, who has healthier and more punctual, thus more productive staff. Another way to encourage cycling for commuting is creating a competition. Humans like to compare themselves with each other and see their positions in rankings. Such competitions could be arranged between individual employees, different teams within a compa-

ny or even between entire companies city-wide. Over a certain period of time, each commute by bike will increase the score of a team, until winning teams get awarded. Attractive prizes will raise the motivation to participate and colleagues would encourage each other. The force of team spirit will raise individuals' will to cycle in order to contribute to their team's performance. Bikes could be provided by the association, if participants do not own one yet. The prizes could be sponsored by Cairo's bike shops with the chance to gain new customers. The Belgian initiative 'Bike To Work' (Bike to Work, 2013) has already successfully done these competitions for four consecutive years. Companies will organize such initiatives under the supervision of the association. Such initiatives should only promote cycling on routes with reasonable safety conditions, too.

In many districts, the introduction of bike taxis as an alternative to owning a bicycle or using a motor vehicle will be successful, particularly after the rise of fuel prices. The vehicles could be afforded with the help of a microfinance model or crowd-funding. In different districts, their fares, comfort and equipment will be adequate to the dominant social stratum. The idea of bicycle sharing will work in a small scale inside university campuses, like the Cairo University, a rectangle measuring 1,6 km by circa 1km. A bike-sharing system there could be informally established by students, launched as a commercial enterprise or operated by the university itself, perhaps in cooperation with the national cyclists association.

The establishment of an Egyptian bicycle brand and the installation of a factory will gain sympathy of many Egyptians, who are usually patriotic people. The domestic production will create jobs and provide deliverers with affordable bicycles of high quality. The profit from selling a certain premium model for rich customers could help subsidizing the cheaper, less luxurious models for the poor. The company could also develop and produce a shading device for bicycles to increase the thermal comfort of the cyclist and lower the risk of health problems for people, who are sensitive to long, direct sun exposure.

In a more advanced stage of the second phase, police on bicycles will be introduced, firstly to make their operations more flexible and secondly, to provide a symbolic step of the state towards a cycling society. As the acceptance of cycling gradually rises, but the community is still too small to justify the implementation of extensive bike paths, I propose to implement a symbolic pilot bike path at a relevant spot, where high response can be expected. This could be Al-Ahram Street, from the Heliopolis Sports Club to the Basilique Catholic Church, and perhaps further along Othmane Ibn Afan Street. This would be a motivating signal for already active cyclists and those attracted to cycling.

Phase 3 - accommodation

As soon as the critical mass has been reached and citizens have the feeling, that cycling is becoming a normal and common way of transportation within small scale areas, measures to reach full safety and comfort will be introduced. The justification for the implementation of a wider, dedicated cycling infrastructure does now exist. Therefore, the results of the forum, which was introduced in phase 2, will be taken into account. Possibly, former tramlines will be converted into cycle paths, shaded by trees. Taking away space from existing roads is also an option, if the acceptance of this measure is on a certain level, as it was proved in Copenhagen. The construction of such bike paths along major roads or apart from them enable safe cycling trips between districts and provide acceptable conditions for longer distance deliveries and bike taxi services as well. Furthermore, the full integration of public transport is part of this phase. This means, all metro stations will be equipped with bicycle parking and the transport of bicycles, at least foldable ones, will be possible on the metro. At popular final destinations, like universities, showers will be installed for refreshment. A semi-public bicycle-sharing network between the established bike cafés all over the city will have grown, but the introduction of a public bicycle sharing system could be an option. In addition, most of the projects launched in phase two or earlier will continue, perhaps with lower or higher intensity than before.

Phase 4 – naturalization

Now, a new generation of cyclists will perceive using bicycles as natural, since they grow up with it. They will have a pleasant, safe environment to cycle in and a society, which regards this as a normal situation. New and innovative approaches to develop the cycling culture will continuously be introduced in order to adapt to continuous changes of lifestyles and mobility needs, or more desirably, shape these.

5.2.6 The Bike Café

This particular project is described in more detail, because it has an enormous potential. It affects many causes and aspects related to cycling culture, it is easily imitable, expandable (almost modular) and adaptable to specific local conditions or changes over time. The bike café is a place, where cyclists can gather in the casual atmosphere of a café, to connect, talk to each other about experiences and plan activities. At the same time, this place has a do-it-yourself repair work-

shop with professional support, and perhaps rental bikes. Maybe it even sells bicycles, or cycling equipment. The bike café follows the bike-kitchen concept, with the addition of regular events. Other initiatives or businesses in areas with demand can copy it and begin to form a network in case of success.

The place will be a hub for creative activities and promotion events, also for non-cyclists. It will inform about the benefits of cycling, cycling culture in European cities etc. Users will have the chance to introduce their own ideas and work on self-initiated projects related to cycling. A direct exposition to the street will make the issue of cycling more present in the public and more inviting for curious not-yet-cyclists. The place must be convenient for females. Direct connection between repair shop and café is desirable. It will have a shower, so cyclists can refresh after an exhausting ride.

The concept makes use of the important role of socializing in the Egyptian society, both in cafés and for cycling. Since the bike café opens opportunities for manifold discussions, activities and initiatives, it has the potential to affect a big number of the identified determinants, like social acceptance, gender issues, events, bicycle parking, driving behavior, social values, to name a few. Cyclists will have a place to network and meet like-minded persons to encourage each other to cycle more and perhaps find people to commute with, thus they will be more motivated to cycle regularly. Also, a network of bike-sharing will be established between bike cafés to enable fast, fun and sustainable transportation between those places.

Past events can be documented and released in a regular cycling magazine. Future events can be announced, bike routes and shops suggested, new bike models and related products presented, articles about cycling in Cairo and elsewhere etc. Other information material will also be available.

The repair workshop provides tools and used bicycle parts donated by users, so others can assemble their own bicycles. Usage of the workshop can be based on volunteer work to replace money payment to enable participation of less wealthy users. Spare parts and used bicycles can also be bought. Accessories, like bike bags, pants protection clamps, bicycle jewelry and stuff made from old bike parts like inner tubes, made by local independent designers, can be bought there, too. The café for gathering, events, etc. will ideally be completed by a kitchen for self-organized cooking for the community. Bike parking will be possible at the place.

The place will be inaugurated with a big opening event including music, a group ride, little cycling giveaways etc. Regular events will include presentations,

discussions or speeches about issues like females' cycling experiences in Cairo, bicycle travels, workshops on topics like infrastructure development, activism, females' conditions and practical repair courses or competitions for the construction of bicycle parking facilities, exhibitions, a regular plenary assembly, and competitions like alleycats. The place will also be used as the starting and ending point of regular group rides by established initiatives, so they can stay there and develop the community.

The bike café can be established in different contexts and configurations, for example as the extension of an existing café with an added bike (work)shop function or vice versa, as an existing bike shop with an added café function, as a part of a co-working space, where it would support users who want to come by bike and attract more, as part of a social cultural center (like El-Raseef in Maadi, which already offers a wide range of workshops and could just include bike repair sessions into their program, or the Sawy Culture Wheel in Zamalek) or as a completely new project. The team could be an independent company or part of an association, NGO or cycling initiative. It could have a commercial orientation with the goal to create profit and the character of a service provider or a community-led, non-commercial collaborative team, where users and staff blend. Required positions are one barkeeper, one mechanic and an event organizer. According to the business model, they could be either volunteers, permanent employees or loose community members.

A high grade of participation is desired to create a vital place, which begins with the selection of the site. The community will be asked for the desired location and advice to find an appropriate facility. Users will also contribute to the interior design by building furniture out of old bicycle parts in a workshop. They will also decide about the program and events. This concept of integration aims on creating an atmosphere of a family rather than a business. It will make users feel belonging to and responsible for the place. Cooperation with cycling initiatives, NGOs and other stakeholders in terms of mutual support and inspiration will be essential. Financial support for the initial phase can be expected from the UNDP or the Dutch embassy.

5.2.7 Conclusion

Numerous interventions can encourage cycling for transportation in Cairo as a whole. Most of them aim at the improvement of safety, increasing the comfort and raising awareness and the social acceptance of cycling. The involvement of the state will be essential - or at least very beneficial - for some projects. In

many projects, more than one actor is involved and their realization and success will strongly depend on the cooperation of the involved entities. An outstanding role plays the concept of the bike café, because it has the potential to address many determining factors for cycling.

5.3 Concept for Shubra

Shubra's calm neighborhood streets are comfortable to cycle and already used by kids, deliverers and other cyclists. However, the crossing of big streets, which separate neighborhoods, can be complicated and dangerous. Making crossing safer can be done by easy interventions and would benefit not only the many still active cyclists, but also pedestrians. Especially curbs, which separate the directions on main streets, are a serious obstacle. Regular gaps would ease the passing for cyclists and wheelchair users.

A bike rickshaw service could be successful. Those, who prefer a motorbike for their personal transport, because they find cycling exhausting, might embrace this service as an alternative to a more expensive scooter or motorbike. Goods are already being transported by bike and a high number of cargo bikes is available. With the help of some external funding, they could be equipped with simple seats or a bench to become a bike taxi. Microfinance schemes or the support of an NGO using crowd-funding could be applied here, as well.

The presence of the metro stations in Shubra is a very big advantage. It can be developed by the installation of bike parking facilities to make the access for people with longer ways to the station more convenient.

Imbaba Bridge has a second level, which is used by pedestrians and even has ramps going up and down. Hence, it is potentially an optimal Nile crossing, free of motor vehicles. It should be opened for cyclists and could become the beginning of a longer bike path, for example into central Shubra or along the railway track to Ramsis square.

The high number of bike shops and rentals are an important quality of the district, but their existence is threatened. They could be more successful and popular, if they would cooperate and form a network with the possibility to rent a bicycle at shop `A` and return it at shop `B`. Without the pressure to return the bicycle at the same shop, one-way rides or trips with a long layover inbetween will become more attractive.

To ease the job for deliverers, their old delivery bicycles must be renovated. Therefore, the newly founded Egyptian cyclists association or another NGO will provide bicycle parts, potentially from European donations. The local rental

shops will install the parts. Thus, the shops will profit from this scheme, too.

5.4 Concept for Al-Rehab

The gated community Al-Rehab has mostly rich inhabitants, who have cars, but also a certain environmental awareness and a demand for fitness activities. The roads are bigger and quieter, which enables safe cycling.

Many children cycle, and according to interviews, they imagine and wish to continue cycling, when they get older. If cycling becomes more fashionable and kids are encouraged and have commuting trips with reasonable distances, this is an enormous potential to grow a whole generation of new cyclists. Children are the most open minded and influenceable members of the society, thus cycling must become part of children's education. Therefore, cycling to school should be encouraged and schools should conduct cycling training classes and cycling class excursions to destinations in the surrounding. Equally important is the task to wise up parents about the real risks and dangers, which they usually overestimate in Al-Rehab.

The idea of a bike café, which is detailed in chapter 5.2.6, is very well applicable in Al-Rehab. Dedicated cyclists exist there, but giving them a dedicated meeting place would contribute to the formation of a community, make the issue of cycling more apparent for the public and thus attract individuals, who do not yet cycle, but are interested in trying it. The café(s) should have a bathroom with a shower.

Many inhabitants of Al-Rehab commute with their private cars to their work in distant parts of Cairo. By driving to central Cairo with their cars, Al-Rehab residents cause congestion there, while they have a clean and quiet district themselves. Bus services, as an alternative, currently have low capacities and only two destinations: Heliopolis and Nasr City. Trips to the bus station at gate 13 already include another ride on a small district bus, plus walking to the bus stop and waiting time, making it inconvenient. Cycling to the center takes much time and the roads and the scenery are not very pleasant. Therefore, a bike-sharing system within the boundaries of Al-Rehab, in combination with a drastically improved public bus service to central destinations, will make such intermodal trips more attractive. The commuters, who use cars now, would switch to public transport, if the connections would be comfortable, fast and reliable. The benefits would be saving time and being able to use the time on the road for reading, working etc., saving money and avoiding struggle to find a parking space. This requires higher capacities and improved travel characteristics, achieved,

for instance, by the installation of dedicated bus lanes, which will make buses immune to congestion, thus more attractive than cars. Cycling would become attractive as a transfer mode from homes to the bus terminal at the gate. With a combined ticket, e.g. a monthly subscription, both bus and bicycle would benefit from the system. Stations would be installed at existing focus points, like the malls, the sports club and the market. The flow of people is very beneficial for the redistribution, which is usually a classic problem of bike-sharing systems: in the morning, inhabitants come to the bus terminal to leave Al-Rehab, while outsiders come to work there, and vice versa in the evening. Hence, incoming workers will distribute the bicycles from the terminal to the stations all over the district, from where Al-Rehab residents will take them back to the terminal on their way to work in the morning. In the evening, the idea works the other way around.

The concept requires political will, which is problematic because of the high grade of legal independence of Al-Rehab. It has its own town hall and Al-Rehab is a commercial project, thus interested in serving the inhabitants' (i.e. customers) wishes and not to prescribe them their modes of transportation. If the inhabitants want to drive cars, Al-Rehab's administration will do efforts to facilitate this wish. Hence, two strategies should be applied to make the concept realistic:

Firstly, Al-Rehab's administrators must be convinced of the economic benefits and the image improvement resulting from the installation of such a system. The second part is about raising the demand for such a system among the inhabitants, to make the administration react on this. Generally, citizens of Al-Rehab are orientated towards western lifestyles and some of them are Europeans themselves. Among other points, this means, they wish to drive cars. However, cycling is a characteristic element of modern European lifestyles, and it is even becoming more common and popular. Hence, why should cycling not become a new fashion in Al-Rehab, as the next adopted lifestyle element? It is a question of marketing, a question of events and image campaigns. TV, social media and bicycle shops will play a major role here. The first two have an enormous influence on people's attitudes and the shops are interested in selling more bicycles.

5.5 Concept for Ard El-Liwa

The bicycle as a means of transportation for people with low income is the most important aspect in Ard El-Liwa, since these are the majority there. The aspect of relieving streets from congestion is not relevant here, since car traffic is

low and will stay low, due to the narrow streets and high price of private cars. Numerous people still use bicycles and recognize their advantages, first of all flexibility and low cost. The aims are to consolidate and extend this pragmatic user group on the one hand, and to introduce new ways of bicycle usage on the other hand.

It is important to improve the surface quality. This will make cycling more comfortable and safe and it will increase the lifetime of bicycles. A first easy step would be to remove the bumpy layer of compressed dirt on the few already paved roads. Obviously, also motorists could drive faster then.

Simplifying the crossing of the 26th of July Corridor is very important to safeguard the cohesion and consistency of the district. Apart from El-Zomor Canal Street, only three footbridges exist, not suitable for bicycles, disabled, and elderly persons.

Used cargo bikes can be renovated and equipped with seats to transport passengers in their boxes. Those can be financed with the help of a micro-credit scheme, as it is practiced with the tuk-tuks, according to interviews. The bike taxi would even save the cost of fuel, which could increase in the future, if the government decides to reduce or remove the high subsidies for fuel. It would also be quieter and cleaner, improving walkability, too. The same vehicles can be used for goods transportation, which is, to my knowledge, not yet practiced in Ard El-Liwa in this manner. The bike taxi business will create new jobs and a new affordable transportation mode. The long history of bike rickshaws in other hot countries in south and south-east Asia demonstrates the practicability of this concept. In this case, the system could be run as an independent formal or informal enterprise, or as an extension of the existing bike rental shops' businesses. They could purchase adequate bikes and renovate/equip them and hire drivers. In another model, drivers could be owners of the bikes and self-employed members of an association.

One of the big potentials, the proposed, elongated community park between Ard El-Liwa and Mohandeseen, can help to further connect these two districts and create a beginning of cycling infrastructure apart from motorized traffic, which could be extended in the future. Bicycle trips between Ard El-Liwa and Mohandeseen or other neighboring areas have already been observed and connectivity is a key factor to make cycling more attractive in this rather small district.

5.6 Conclusion

This chapter presented a general strategy to encourage cycling as a transporta-

tion mode in whole Cairo. Some of the projects can be applied in other Egyptian cities as well; some concern the society as a whole. The strategy consists of four phases, beginning with an organizational preparation and formation of institutions in order to operate the implementation of the strategy, followed by a phase of urgent interventions to increase safety with simple measures and to improve the image of cycling. A salient role plays the project `bike café`. In the third phase, cycling is becoming widely accepted and practiced, supported by the government and a growing cycling infrastructure, while in the last phase, the characteristics of cyclist types have changed already and new types emerge. Also, innovative, unpredictable concepts will shape the development of the cycling culture in Cairo from this phase on. However, corresponding to the specific situations in different districts of Cairo, dedicated concepts have been developed and presented in this chapter. They treat the areas Shubra, Al-Rehab and Ard El-Liwa. It was found, that very specific measures will be applicable in certain areas only, according to the respective circumstances.

CONCLUSION

6. Conclusion

This thesis treated the question of how to encourage cycling as a means of transportation in Cairo. Cairo is not a bicycle friendly city, and few people use bicycles. If more people would use bicycles for transportation instead of cars, the severe problem of congestion and the resulting destructive effects on humans, nature and the built environment, could be reduced. Also, cycling could be an excellent mode of transportation for less wealthy citizens, since it is affordable. Without a doubt, big potentials exist for the development of Cairo's cycling culture, but numerous serious obstacles need to be addressed. To understand the mechanisms, which drive the cycling culture of Cairo, various aspects of it were analyzed. Two different main types of cyclists were identified, which exist as two almost fully separated cultures with different equipment, motivations to cycle, social, cultural and financial circumstances. Furthermore, the factors, which determine the behavior of cycling, were analyzed and connected with models of behavioral psychology. The social acceptance and the image of cycling play an eminent role in the entire set of problems. Therefore, concepts from the field of social psychology were regarded. Apart from these influences, the integration with public transport and its quality and effectivity have a big impact on the attractiveness of cycling.

Numerous interviews were conducted with cyclists of all categories, ages, genders and areas. Experts were consulted and literature about contemporary approaches to sustainable urban transportation planning models and the role of the bicycle within them was reviewed. Three districts of Cairo were selected to represent different urban environments and to study the actual, small scale

manifestations of Cairo's cycling culture and the reasons for its current condition. It was found out, that there are significant differences between the status quo and the potentials or obstacles for development in the three selected districts. Thus, apart from the general strategy for encouraging cycling as a mode of transportation in Cairo, specialized concepts were developed for the three case study sites. The general strategy comprises approaches involving different stakeholders, from self-organized community initiatives to governmental authorities, physical as well as intangible interventions, short-, mid- and long-term projects. Many of them have interrelations and focus on the strength of community, which is an important traditional value characteristic for the Egyptian society. Regarding the diversity of suggested projects, this thesis can serve as a tool for independent entrepreneurs as well as an advice for ministries and municipalities or as an inspiration for community-based initiatives.

As an example, I started the initiative to establish a bike café in Cairo with interested local community members parallel to the work on this thesis. A team was formed, rough plans for the operation and organization were made and a suitable location was identified. However, if the dedication of the team is strong enough to develop and implement the project, remains to be seen.

The work done in this thesis deals with a topic, which gains its relevance from its potential to solve problems in a way not yet conceived by many. However, a recent rise of fuel prices and the increasing congestion, as well as the impact of the growing cycling initiatives are likely to affect the status of cycling in the near future. Thus, the pressure for governmental authorities to facilitate this issue will rise, if they do not decide to be proactive. The situation in Cairo is currently extremely dynamic and many things happen simultaneously: Presently, during the boom of motorbikes and scooters and dramatically rising numbers of motor vehicles, a new government aims to reduce fuel subsidies, increasing the pressure on poor people to find alternative access to mobility. Paradigm shifts are under progress. While a poor majority dreams of motorized individual mobility, certain young members of upper income groups switch the image of cycling to a fashionable, fancy activity. Numerous independent initiatives and shops make great efforts to promote cycling among young Cairenes, turning the conventional image of cycling upside down. Meanwhile, the Egyptian president acts a rolemodel, cycling on the head of a huge group in public. The benefits of informal developments like those mentioned, should be combined with the power of formal supportive interventions done by the government to create synergies. In Fayoum and Shebin El-Kom, official projects for the promotion of cycling in

Egyptian medium-sized cities are under progress, including the implementation of dedicated cycle paths, awareness campaigns, support for the cycling industry and the development of a transportation policy framework. However, the projects are delayed and not finished yet, and for results we have to wait.

Further research is necessary about the impact and the significance of social media for the development of the cyclist community. The 'Green Arm' members Moussa and El-Dorghamy are currently working on a research about this topic. Furthermore, the lack of documentation of numbers of sold bicycles, accidents and other relevant data makes estimations inevitable at many positions, which could be improved. A thorough analysis of sources of accidents with bicycle involvement would tremendously help to find effective approaches to improve road safety.

Even though it is clear that the road safety is a general problem affecting all cyclists, facilitating the oldschoolers was not as easy to handle, since all my findings are based on observations and a few interviews conducted by an assistant in a foreign language. Clearly, financial considerations are among the strongest driving forces for them, but the detailed factors and their relationships are more complex. In order to be able to facilitate their needs and solve their problems most appropriately, further discussions with the persons affected are strongly advisable.

Access to the lifestylers' community was much easier and this involvement gave deep insight into the mentality of young cyclists. In addition, my own extensive experience of cycling in different areas of Cairo, at different day-times and in different seasons, alone and in company, was very helpful to get an understanding of the actual situation and the real needs of cyclists.

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Appendices

A. Report from Participation in a Group Ride with 'Bescletta'

'Bescletta' is a bicycle shop with different branches in Cairo, offering regular free and open group rides, which start and end at each branch. I joined the ride on February 20th 2014. Participating is free, participants without an own bicycle can borrow one from the organizers for 10 Egyptian pounds. About 50 people took part, most were between twenty and thirty years old and almost half of them were females. I spoke to 10 persons and all of them said, they joined the ride for the first time. Only 6 participants brought their own bicycle. Most came together with their friends as groups of four to ten people. Getting in contact with the participants was easy, since they were curious about me for being foreigner and I had the opportunity of more detailed conversation with some of them. The males said that they learned cycling when they were children, but quit cycling when they were teenagers. One said that he planned to cycle more for commuting in the future. Another one stated that the reason for Egyptians not to cycle is a cultural one, since the people would be too comfort-seeking. The ride was very well organized. The meeting time was 4pm and most of the registered participants, who had ordered a bicycle before, had arrived at twenty past four, so that the collection of IDs and the distribution of safety vests and bicycles began. A destination was quickly discussed between the guides and participants and the ride started around twenty minutes to five pm. This meeting time is a compromise between giving most people the chance to participate after their work, study or school, and trying to avoid the darkness. However, it was already dark before the ride was finished. In consequence, the ride took place during the busiest traffic hours, which made it difficult to cycle in a relaxed way and keep the group together. Another effect was, that a great number of car dri-

vers saw the cycling group, which gave the ride the character of a demonstration of cyclists' presence on the road. The ride ended half past six in front of the bike shop, where the bicycles, vests and IDs were returned and everyone left.

The rides are sponsored by a potato chips company. During the ride, there were two breaks with time to chat, when free potato chips were given away to the participants and other road users passing by. Flyers were also given to passersby.

The name of the potato chips brand and Bescletta itself was also printed on the safety vests to advertise in the public.

Car drivers were generally careful and respectful to the cyclists and no accident happened. However, within the group, two light crashes happened, without someone getting injured. This illustrates the lacking cycling experience of the participants.

B. Report from Participation in a Group Ride with the 'Bike Zone' Initiative

On Friday, February 28th 2014, I participated in the regular cycling event by 'Bike Zone Egypt'. The organization team chooses another destination each week. Friday mornings are popular for cycling events, due to the low car traffic. The ride started at 8 o'clock in the morning at Maryland Park in Heliopolis, where it also ended. The destination of the ride was the Giza Pyramids. At certain places, like Abbasiya Bridge, more cyclists joined. 85 cyclists reached the pyramids, some left earlier. The participants were aged between approximately 7 and 30 years, most of them brought their own bicycles. Several females participated, but male participants were the clear majority. All except me were Egyptians and the atmosphere was friendly. During the breaks, it was easy to get in contact with other participants.

Participants without an own bicycle could borrow one from the organizers for 10 Egyptian pounds. A car with spare bicycles for breakdowns followed the group. At least two accidents causing injuries and several falls happened during the ride, however without involvement of cars. The poor driving skills due to lack of experience, especially among females, and the tendency to silly maneuvers are the main causes of crashes in such events.

During the ride, the group stretched along the street over hundreds of meters and Bike Zone team members in blue jerseys were circulating to ensure a safe ride. Several halts were taken, to keep the group together. The initiative is sponsored by 'Tubro', a US-American bicycle brand, and by a local gym. Two flags, one with the logo of Bike Zone and one with the name of Tubro, were carried by

team members throughout the ride. Unlike in the Bescletta ride, wearing a safety/advertising vest, or depositing an ID card to the organizers was not required. Many other road users and pedestrians reacted positively to the group, by cheering, giving encouraging comments and gestures. However, some road users, especially minibus drivers, showed angry reaction, since they felt blocked by the group. At a first glance, this seems to illustrate a lack of customization and acceptance towards cyclists on the road. However, such a big group is more likely to attract aggression, due to the big amount of space it uses in comparison to smaller groups or single riders. At 'critical mass' rides in German cities, where people are usually much more accustomed to cyclists, the same aggression can be observed.

The long rest at the pyramids was used for a joint prayer and other activities, such as horse riding, giving the event an even stronger social dimension. The group cycled back to Maryland Park, where the event ended. Participants, who had other destinations along the route, left the group before the final destination.

C. Interviews in Shubra



name: Khalid

age: 41 years

gender: male

occupation: bicycle mechanic

Khalid has been cycling since circa 20 years. He had no accidents apart from flat tires. As a bicycle mechanic in a car repair garage, he has 6-7 customers a day, roughly between 25 and 35 years.

motivation to cycle: He began to cycle as a hobby and found out that it is the most efficient and fun way to get around. Since then, he uses it for transportation

usual trips: Khalid cycles to work each day, which is 25 km from his home. He uses the bicycle for any trip up to three hours length, (he mentioned Giza as an example)

problems: none

origin of the bicycle: not known, but in his job, he assembles bikes with parts he gets from inside and outside of Shubra.



name: Amr
age: 42 years
gender: male
occupation: pet shop deliverer

Amr cycles since he was a child. The bicycle is his own and he comes to work with it in the morning. His colleague from the pet shop also uses bicycles for errands. While cycling, he has no pain or feeling of exhaustion, and so far he had no serious accidents. He uses main streets and side streets, according to the traffic situation. To repair the bicycle, he gives it to one of the local shops.

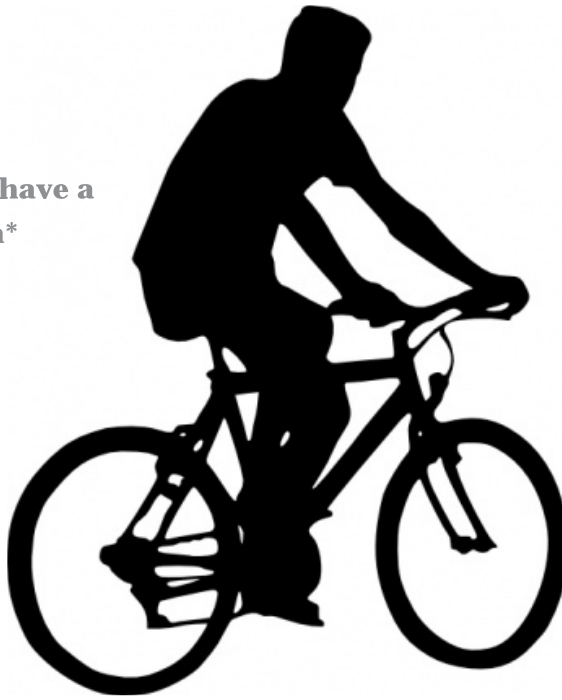
motivation to cycle: He thinks that the bicycle is the safest and easiest means of transport (e.g. safer than motorbike), and especially within congestion, the bicycle is the most efficient one. Also, it is an affordable way to do deliveries.

usual trips: 4-5 deliveries per day, which take at least 10 minutes. Besides the deliveries, Amr cycles for all purposes and to all destinations, mostly within Shubra.

problems: He feels, that cars and other vehicles suddenly stop in unexpected moments.

origin of the bicycle: Bought at a market in Imbaba

***refused to have a
photo taken***



name: Hamdi

age: 26 years

gender: male

occupation: egg deliverer

Hamdi delivers since 8 years, with his own bike.

He had no accident yet, and he prefers smaller side streets, where less cars are.

motivation to cycle: to earn money

usual trips: 8-9 deliveries each day

problems: The job is physically demanding and he would prefer a motorbike, if he could afford it.

origin of the bicycle: He bought the bicycle from a local shop, where he also gets it mended.



name: Mohamed

age: 57 years

gender: male

occupation: bike rental / repair shop owner

His bicycle shop exists since 60 years and belonged to his father in the past. Customers are between 4 and around 30 years old and renting a bike costs 2 Egyptian pounds for each 30 minutes.

He estimates that 30 to 40 shops like his exist in Shubra. They have no strong interaction, only sometimes, he goes to get spare parts from another shop, if he has no more, or vice versa.

He said, children use bicycles to go to downtown (more than 3 km away).

He is also a regular cyclist.

***refused to have a
photo taken***



name: Aiman

age: 45 years

gender: male

occupation: shisha coal deliverer

Cycles for work since 10 years, with his own bicycle.

motivation to cycle: to earn money

usual trips: about 15 deliveries per day, which take about 15 minutes each

problems: none

origin of the bicycle: not known



name: Ali

age: 50 years

gender: male

occupation: bike rental / repair shop owner

His shop existed for 50 years.

Most customers are between 30-35 year old men, who rent bicycles for errands.

He has never seen a woman on a bicycle in Shubra.

The rent for a bicycle is 2 Egyptian pounds for each 30 minutes.

He has 2-3 repair customers and 5-6 rental customers per day, which used to be about 20 – 30 before the rise of scooters.

He estimates, that about 20 shops like his exist in Shubra and about 7 in the neighborhood alone.

D. Interviews in Al-Rehab



name: Moustafa

age: 40 years

gender: male

occupation: deliverer for fruits and vegetables shop

Moustafa owned a bike shop in his hometown in Upper Egypt, which he closed, before he came to Al-Rehab. He worked as a deliverer for the shop since 2010, for around 12 hours each day.

He finds it easy to get around and likes the cycling job. He even refused to use a motorbike, which was offered to him.

With the experience from his former job, he knows how to repair the bicycle himself, if there is a problem.

motivation to cycle: earn money

usual trips: He does 10 to 15 deliveries all around Al-Rehab each day, each one taking 30-40 minutes for the return.

problems: none

origin of the bicycle: from his own former bicycle shop



name: Maryam (left), Yasmin (middle, Jordanian) and Malak (right)

age: 10, 12, and 8 years

gender: female

occupation: school students

The girls use bicycles since they were 6 or 7 years old and cycle every day. They say that they wish to cycle when they are grown up, too. They cycle in pedestrian zones as well as in the streets alongside the car traffic.

Malak says, she rides the bicycle only in Al-Rehab, because her mother does not want her to do it outside the district for safety reasons.

Maryam lives in the 5th settlement and wants to start cycling to her school in Al-Rehab soon.

motivation to cycle: fun, play with friends

usual trips: random routes around the neighbourhood. Sometimes, they use the bike to buy something in the supermarket for their parents.

problems: Yasmin says, that some cars come very close when she cycles in the street, but she had no accident yet. The other two sense no difficulties.

origin of the bicycle: bought from an unknown shop



***refused to have a
photo taken***

name: Khaled

age: 65 years

gender: male

occupation: gardener

He does his job since 20 years and has the bicycle since 7 years. He carries his tools in the box on the rack.

motivation to cycle: to earn money

usual trips: Works in Rehab and Katameya and cycles from his house, which is close to Gate 9 of Al-Rehab. He finds the cycling exhausting and would prefer a motorbike, but he cannot afford it.

origin of the bicycle: unknown



name: Steve

age: 41 years

gender: male

occupation: Educational administrative at the Modern English School Cairo

Steve cycles in Cairo since 2004, and in Al-Rehab since 2011. He repairs his bicycles himself. He tried out different routes to his workplace and prefers minor streets in the evenings, when main streets get more crowded. He finds cycling easier than in his home country England, because in Cairo, there are no rules and he can cycle which way he wants. The sun is no problem and he finds the weather perfect, though he avoids the noon heat, when he is at work. He perceives the lack of rain as a major benefit. His wife also cycles within Al-Rehab. Steve's family has a car since they have a second child.

motivation to cycle: His main motivation is enjoyment, he is proud of being a cyclist. Fitness and environmental awareness are minor motivation factors.

usual trips: He cycles to work 3 or 4 times a week, 10km to Muqatam. Also, he cycles to do small errands and in the desert for fun and fitness.

problems: He finds it difficult to find high quality spare parts. In his opinion, bicycles in Egypt are either overpriced or substandard quality.

origin of the bicycle: both brought from England



name: Bob
age: 35 years
gender: male
occupation: communication designer

Bob is syrian, married and has two children. He lives in Rehab since one year, before that in the UAE. He has bicycle since one year and no repairs were needed yet.

He cycled regularly since one year and experienced his strength growing. He has no car and goes to work by bus (to Masr Gedida).

motivation to cycle: to improve fitness
usual trips: trips are within Al-Rehab, sometimes with a friend who lives in his house and already had a bicycle before Bob. He also cycles for small errands (bread etc).
problems: none
origin of the bicycle: from Bescletta



name: Bassam

age: 32 years

gender: male

occupation: cook

Bassam is Syrian and cooks in a restaurant in the market of Al-Rehab. He cycles since one year. One of his relatives got inspired when he saw him cycling and also bought a bike for himself. Bassam says, the only accident he was involved in was when his flip flop shoe got stuck in the front wheel and made him fall.

motivation to cycle: He did not want to wait for the unreliable bus any more.

usual trips: He cycles to get to work from his home outside of Al-Rehab, which takes 15 minutes.

problems: When it rains heavily, he does not go by bike, other weather conditions are no problem for him.

He experienced disrespectful treatment by other road users (mostly taxi drivers, who insult him and do not pay attention to him, especially in roundabouts).

He also finds cycling tiring and thinks, cycling is not safe, so he would prefer a motorbike, if he could afford it.

origin of the bicycle: He bought it second hand from one of his friends.



***refused to have a
photo taken***

name: Hassan

age: 19 years

gender: male

occupation: deliverer for a laundry shop

The laundry shop Hassan works for had 15 bicycles belonging to the shop in the past. The bike shop Abou El-Goukh, which is right next to the shop, sold them the bicycles and also repairs them in case of damage. Throughout the years, there were only a few minor accidents. Around 2007, more motorbikes (owned by the deliverers) came into the business.

Hassan works from 10 am to 10 pm. According to the shop owner, the deliverers on bicycles are usually too young to ride a motorbike or cannot afford one.

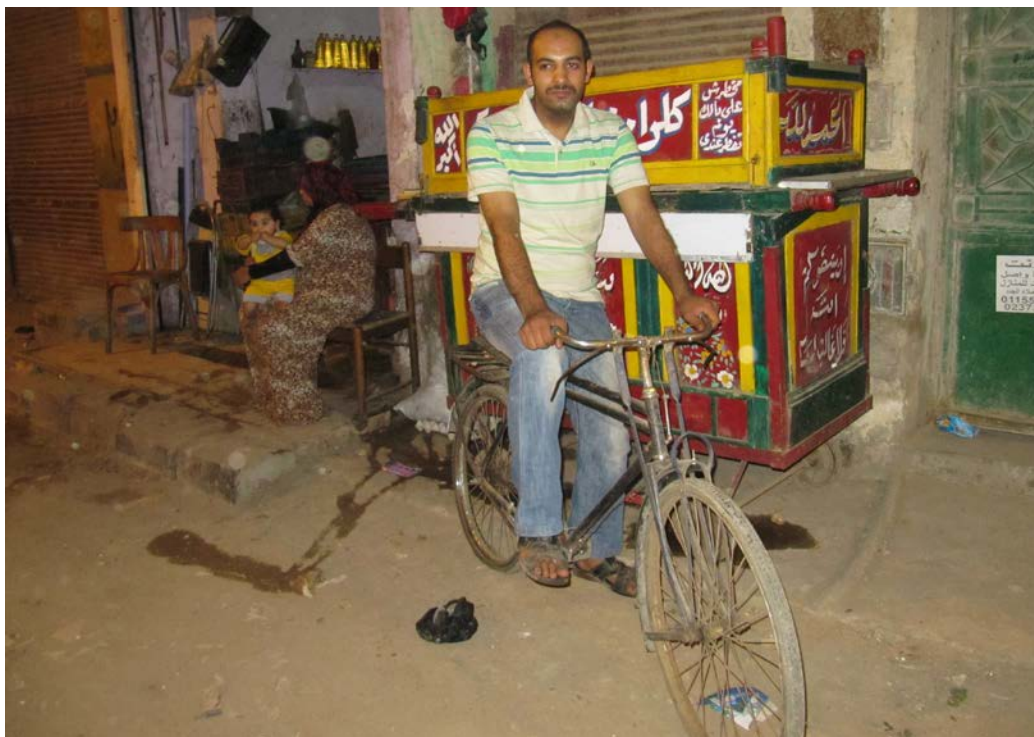
motivation to cycle: earn money

usual trips: He does about 15 deliveries all around Al-Rehab each day, each one taking between 30 and 45 minutes.

problems: He finds riding the bicycle exhausting and painful. He would prefer a motorbike, but is too young to get the license, and cannot afford it.

origin of the bicycle: Abou El-Goukh

E. Interviews in Ard El-Liwa



name: Omar

age: 37 years

gender: male

occupation: falafel maker

motivation to cycle: It is the most flexible means of transportation, which can take him anywhere he wants to go.

usual trips: all around Ard El-liwa, he has between 10 and 20 trips per day, delivering Falafel and bringing ingredients to his kitchen

problems: none

origin of the bicycle: bought at Mohamed's nearby bike shop in 2009



name: Mohamed

age: 59 years

gender: male

occupation: bike shop owner and mechanic

Mohamed opened the shop 45 years ago. He used to have bicycles for rent, but since a couple of years, he only sells and repairs bicycles. The bikes he sells are assembled by him out of old bicycle parts he gets from outside of Ard El-Liwa. For repairs, he has about 20 customers a day in summer time (from about March/April to October), mostly kids, who have school vacancies then. In winter, when the streets are often wet, he has much less customers. He estimates, that there are 6 or 7 bicycle shops like his own in Ard El-liwa.



name: Hisham

age: 38 years

gender: male

occupation: chicken shop owner

Hisham uses his bicycle to deliver chicken, which he prepares in his shop. He has the bicycle since about 10 years and keeps it in the shop over night, since he lives in the same street.

motivation to cycle: to save money by avoiding fuel costs, the possibility to go to any place

usual trips: ca. 10 deliveries per day within Ard El-Liwa and once daily to surrounding areas like Giza, Zamalek or Mohandeseen, bike is used by him also for private trips

problems: none

origin of the bicycle: bought in Ard El-Liwa



name: Gamal

age: 10 years

gender: male

occupation: pupil

Gamal has his own bicycle since two years. He said that his father sometimes puts it into the car to take it to another district to let him cycle there.

motivation to cycle: playing with friends

usual trips: irregular trips within the district; sometimes, his mother sends him to buy some things with the bicycle for the household from local shops

problems: He has a lot of accidents due to his own reckless driving behavior.

origin of the bicycle: not known



name: Nassim

age: 35 years

gender: male

occupation: apartment house doorman (‘bawab’)

Nassim works and lives in a house in Mohandeseen and was in Ard El-Liwa for an after-work shopping tour with his wife and his two children, who he usually carries on the bicycle. His wife sometimes pushes the bicycle while walking, but never rides it.

motivation to cycle: to earn money

usual trips: He goes to shops for the tenants of the house he works in, doing about 10 shopping deliveries a day besides his other tasks related to the building maintenance.

problems: none

origin of the bicycle: not known



name: Waleed

age: 15 years

gender: male

occupation: deliverer

Waleed cycles since 5 years with his own bike to purchase tools and materials for his father's upholstery business. At the moment, He prefers the bicycle instead of a scooter.

motivation to cycle: support the family business

usual trips: to supply shops within the district

problems: none

origin of the bicycle: unknown



name: Yasser

age: 52 years

gender: male

occupation: unknown/house owner

Yasser has a car since four years, when he moved to the Pyramids area and started to work near the airport. Before that, he lived in Ard El-Liwa and used his bicycle frequently. According to him, some locals go cycling in the evenings for fitness in the district.

He perceived cycling as comfortable for short distances, flexible and easy. However, longer trips take too much time and are exhausting, in his opinion.

Summary of the Thesis in Arabic

ركوب الدراجات الهوائية هي واحدة من أكثر وسائل النقل كفاءة. ومع ذلك، مدينة القاهرة تحتوي على عدد قليل من راكبي الدراجات الهوائية وارتفاع عدد السيارات الخاصة والتي تسبب الازدحام المروري والتلوث البيئي. استخدام الدراجات يمكن أن يساعد في حل وتقليل مستوى الازدحام في شوارع القاهرة وتوفير التنقل بأسعار معقولة مستقلة لذوي الدخل المحدود. هذا البحث يدرس و يحلل الوضع الراهن لثقافة ركوب الدراجات و أماكنه استخدامها كوسيلة من أجل التنمية في مدينة القاهرة. كما يناقش هذا البحث النهج المعاصرة للتخطيط في حركة المرور وأماكنه تأثيرها على التنمية ككل في القاهرة. أخيراً، يعرض هذا البحث الاستراتيجيات العامة لتشجيع ركوب الدراجات في القاهرة وافكار واستراتيجيات محدده لثلاث مناطق من المدينة كحالات دراسية

إقرار

هذه الرسالة مقدمة في جامعة عين شمس وجامعة شوتجارت للحصول على درجة العمران المتكامل والتصميم المستدام. إن العمل الذي تحويه هذه الرسالة قد تم إنجازه بمعرفة الباحث سنة ٢٠١٤ هذا ويقر الباحث أن العمل المقدم هو خلاصة بحثه الشخصي وأنه قد اتبع الأسلوب العلمي السليم في الإشارة إلى المواد المؤخذه من المراجع العلمية كل في مكانه في مختلف أجزاء الرسالة..

وهذا إقرار مني بذلك،،،

التوقيع: 

الباحث: اريك فلريد بتروفايت

التاريخ: 07/20/2014

تشجيع ركوب الدراجات كوسيلة من وسائل النقل الحضري المستدام في القاهرة

مقدمة للحصول على درجة الماجستير في العمران المتكامل والتصميم المستدام

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تاريخ المناقشة:

أجيزت الرسالة بتاريخ:

موافقة مجلس الجامعة .../.../...

ختم الإجازة

موافقة مجلس الكلية .../.../...



جامعة شتوتجارت





تشجيع ركوب الدراجات كوسيلة من وسائل النقل الحضري المستدام في القاهرة

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