

## **Cycling around Delta Cities in Egypt: Applicable Cycling Program within Kafr Elshiekh City**

Usama Elfiky

*Kafr Elshikh University, Egypt*

### **Abstract**

The bicycle is one of the most environmentally-efficient modes of transportation. By using a renewable energy source, the human body, the bicycle, in contrast to the automobile, is non-polluting. The bicycle also uses much less space than the automobile, and is considerably quieter than other modes of transportation.

It is the goal of the City of kafr Elshiekh to create and maintain an integrated system of bikeways. The City recognizes the need to encourage bicycle travel for both transportation & recreation and works to promote bicycle use as a viable, attractive, non-polluting form of transportation and assure safe and convenient access to all areas of the city.

This paper tests hypothesis that say changing some aspects of cultural values is possible through the new generation in addition it evaluates a proposed cycling program designed for Kafr Elshiekh city in the middle of delta region in Egypt by questionnaire students with deferent age. The conclusion of the paper is a set of criteria for cycling program within kafr Elshiekh city.

**Keywords:** *Green architecture, transportation, cultural values, environmental impact, Sustainable city*

## 1 Introduction

The bicycle is one of the most environmentally-efficient modes of transportation. By using a renewable energy source, the human body, the bicycle, in contrast to the automobile, is non-polluting. The bicycle also uses much less space than the automobile, and is considerably quieter than other modes of transportation. The bicycle also has tremendous health benefits

Physical activity is an important lifestyle component of improving long-term health. Increasing physical activity in the population has been described as the "best buy" for improving public health [Pate RR, 1995], but we have tended to promote physical activity as leisure and through individual behavior change [U.S. Department of Health and Human Services, 1996]. Could we also achieve this through changes in the transport environment? [Ogilvie, 2004]

Shifting people's approach to transport is now a common objective of transport policies, the overall aims of which may include managing congestion and improving air quality, road safety, and access to services.

David Lawyer wrote the ultimate paper comparing bicycle vs. automobile energy use, and found that bikes are 2/3 more efficient than cars even after factoring in the energy to produce the extra food the cyclist requires. [Lawyer, 2007]

### 1.1 Problems, obstacles and hypotheses

No doubts, using bike for commuting around city is very useful for human and natural environment. The problem is how to apply that within any community. There are some green design strategies which are refused because of social reasons in Egypt. Using bike in daily life is one of those strategies. [Elfiky, 2006]

To apply such green strategies, the cultural attitude needs to be changed. Changing 'the way it has always been' is very difficult and can take years if not decades to break. It has taken years to make smoking socially unacceptable and it may take the same length of time for people to use their cars less and walk and cycle more. Public involvement is an important component of nonmotorized planning. It broadens the scope of concerns, solutions, and perspectives to be considered in the plan, and can help identify potential problems early in the process. It can also help gain support for the plan's implementation. [Litman, 2010]

Through new generation it is possible to change some aspects of cultural values. This is the paper hypothesis.

## 1.2 Goals and methodology

In order to be able to apply (KCP) within kafr-elshiekh, the paper is going to check if the research hypothesis is true or falls. The paper is testing a designed program proposed by the researcher for cycling within kafr-elshiekh city (KCP) for improvement purpose.

The paper is relying on school and university students and their parents by questioning them in order to get their impression about applying kafr-elshiekh cycling program.

## 2 Literature review

Researchers in transportation, urban design, and planning have long understood that neighborhood design and the way land is developed and used may affect transport choice (auto, transit, walking/cycling). [Frank LD, 2000]

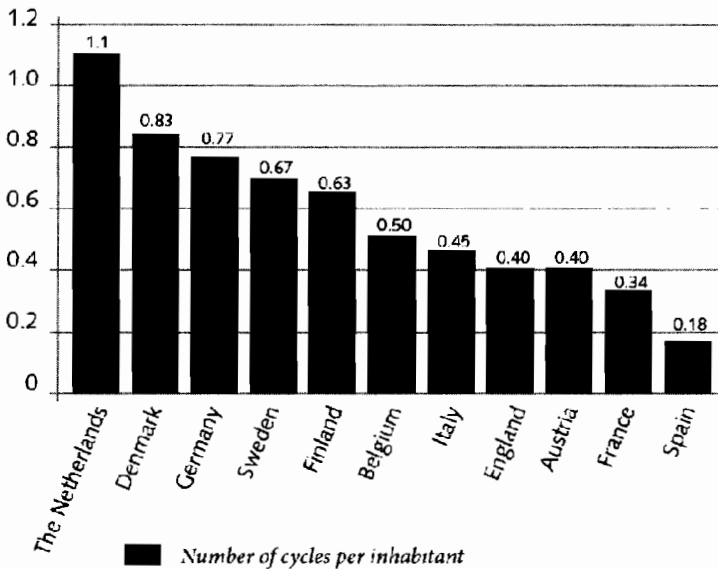


Figure 1: Bicycle ownership in a number of European countries [Ministry of Transport, the Netherlands, 2009]

## 2.1 Examples around the world

### 2.1.1 Portland, Oregon, USA

Portland increased the mode share of bicycling trips in the city from less than 1% in 1990 to 6% in 2008. They did this while spending just under 1% of the city's transportation infrastructure budget on bicycle facilities. They built a complete, connected network of bicycle ways (bicycle lanes, bicycle routes,

bicycle boulevards, and bicycle trails). [City of Portland, bureau of transportation, 2010]

### **2.1.2 Chicago, USA** [Chicago transit authority, 2009]

Chicago city has a Chicago's Bicycle Program which committed to implement the strategies in the Bike 2015 Plan, to make cycling an integral part of daily life in Chicago. The program has the following terms:

- a- There are two types of bicycle racks on buses
- b- Bicycles are permitted on trains every weekday
- c- Bicycle parking racks are installed outside most rail stations
- d- The Municipal Codes of Chicago and the Illinois are applicable to bicycling in Chicago and developed to inform Chicagoans of their rights and responsibilities as cyclists in the city.
- e- Bike lanes had been successfully installed in Chicago on streets as narrow as 46 feet
- f- Chicago uses a bike lane symbol which is very simple and clearly recognizable to both motorists and cyclists.
- g- On-street parking is available throughout Chicago
- h- The federal Manual of Uniform Traffic Control Devices provides standard signs and markings for bicycle lanes and related bicycle facilities.
- i- Bike Messenger Service companies licensed to have bike couriers working in the City of Chicago.

### **2.1.3 Orkney UK**

Orkney Islands Council has a staff travel plan incorporating various measures to encourage more sustainable travel to/from work. Recently the Council has launched a cycle to work scheme. This scheme allows staff to purchase a tax free bike which they then pay off during a 12 month period of time.

### **2.1.4 Germany and the Netherlands**

Traffic regulations in Germany and The Netherlands strongly favor pedestrians and bicyclists. Both countries have implemented a range of policies to make walking and bicycling safer. The factors listed below have contributed significantly to the dramatic decline in pedestrian and bicyclist traffic fatalities. [J. Pucher and L. Dijkstra, 2000]

- 1- Improved Facilities for Walking and Bicycling
- 2- Traffic Calming of Residential Neighborhoods
- 3- Urban Design Oriented to People and Not Cars
- 4- Restrictions on Motor Vehicle Use
- 5- Traffic Education

## 6- Traffic Regulations and Enforcement

### 2.1.5 Denmark

In Denmark, volunteer suburban car commuters were given a free bike and bus pass for a year in the Bike busters program. [Nelson, 2009] The city of Copenhagen (population of metropolitan region 1.5million) has been developing a bicycle network since the late 1980s. Back in the 1950s, Copenhagen already had 200 km of cycle track. Today Copenhagen has more than 320 km of cycle track. [Nelson, 2009]

### 2.2 Bicycle facilities

A key aspect of promoting bicycling is to ensure that adequate facilities exist to encourage use of these modes. This includes bicycle lanes, bicycle boulevard, bicycle rack, on-street parking, bike signs, Bicycle symbol, Bike Messenger Service companies, and Bike stations.



Figure 2: Bicycle symbol and cycle lane

### 2.3 Community Design and Physical Activity

Certain changes in community design will increase the opportunities for physical activity. The two clearest recommendations are to design streets for slow speeds and low levels of traffic and to put potential destinations, including parks and commercial areas, within walking or cycling distance. [Handy, 2004]

### 2.4 Bicycle sharing system

#### 2.4.1 Unregulated

In this type of program the bicycles are simply released into a city or given area. In some cases, such as a university campus, the bicycles are only designated for use within certain boundaries. Users are expected to leave the bike unlocked in a public area once they reach their destination.

### **2.4.2 Deposit**

A small cash deposit releases the bike from a locked terminal and can only be retrieved by returning it to another.

### **2.4.3 Membership**

In this version of the program, bicycles are kept either at volunteer-run hubs or at self-service terminals throughout the city. Individuals registered with the program identify themselves with their membership card (or a smart card, via cell phone, etc) at any of the hubs to check out a bicycle for a short period of time, usually less than two hours. In many schemes the first half hour is free. The individual is responsible for the bike until it is returned to another hub.

### **2.4.4 Public-private partnership**

Many of the membership programs are being operated through public-private partnerships. Several European cities have signed contracts with private advertising agencies that supply the city with thousands of bicycles free of charge (or for a minor fee). In return, the agencies are allowed to advertise both on the bikes themselves and in other select locations in the city.

These programs also prevent theft by requiring users to purchase subscriptions with a credit card or debit card (this option requiring a large, temporary deposit) and by equipping the bike with complex anti-theft and bike maintenance sensors. If the bike is not returned within the subscription period, or returned with significant damage, the bike sharing operator withdraws money from the user's credit card account. Some other programs are not linked to an advertising deal but can be financed by public support.

### **2.4.5 Long-term checkout**

Sometimes known as Bike Library models, these bicycles may be given free of charge, for a refundable deposit, or sold at a reduced price. They are assigned to one person who will typically keep the bike for months or years and lock it between uses.

### **2.4.6 Partnership with railway sector**

In a national-level program which combines a typical rental system with several of the above system types, a passenger railway operator or infrastructure manager partners with a national cycling organization and others to create a system closely connected with public transport. These programs allow usually for a longer rental time of up to 24 or 48 hours and as well for tourist and round trips.

"Call a Bike". The Call a Bike principle is very simple; the bikes are locked electronically and again left in the open at widely distributed locations. After initial online registration, a potential user can phone a number printed on the

bike. He then receives a number code that opens the lock. If desired, billing can be done directly to the users mobile phone account.

#### **2.4.7 Partnership with car park operators**

Some car park operators lend bikes to their customers who park a car.

### **3 Kafr Elshiekh cycling program (KCP)**

#### **3.1 Planning Process**

Any planning should be based on an overall problem statement, vision, and general goals. The vision and goals help determine specific objectives. This also determines the evaluation criteria that will be used for prioritizing actions, programs, projects, and tasks. [Litman, 2010]

#### **3.2 Using bike and private car in Egypt**

A CAPMAS (Central Agency for Public Mobilization and Statistics) study in the early 80s showed that in Egypt's population of 44 million, there were 22 vehicles for every 1,000 people. That number has now tripled, with 62 vehicles per 1,000 people by the end of 2008. The danger is coming, congestion, air pollution, and noisy. [CAPMAS, 2008]

In general using bike for commuting is unfamiliar in Egypt. Some cities south of Cairo slightly are using bikes for commuting such as Assuit 400 km south Cairo. No statistics about using bike in Egypt; it is just used for recreation or within sporting clubs. No services for bike. Using bike is mixed with other vehicle modes.



Figure 3: delivering bread to homes and restaurants

There are some advocacy/enthusiast groups in Egypt try to apply using bike around cities in Egypt such as Cairo Circler's Club, the Cairo Cyclists, MTB Egypt and Cycling in Alexandria's Streets group.

### 3.3 Constraints and opportunities for using bike within Kafr elshiekh

Kafr-Elshiekh city is 150000 inhabitants in 2009 Census live in area about 4.5 km<sup>2</sup>. The population density is 140 persons per acre. Kafr-Elshiekh is high density city. The maximum time to cross the city by bike is 10 minutes. Kafr-Elshiekh has flat topography and mild climate. So, it is cycle able city.

Sidewalks are in very bad condition. Normally, they are in deferent levels and used as extension for shops which exist every where. The common modes of transportation are taxi, toc-toc, microbus, minibus, and private car.

### 3.4 Description of the kafr-Elshiekh cycling program (KCP)

Kafr-Elshiekh cycling program provides a many benefits, including economic development and a better environment. The objective of kafr-Elshiekh cycling program (KCP) is to separate different modes of moving around the city with painted cycling route in order to encourage younger people to use bike around the city.

The program is divided into three phases:-

The first is to connect homes with schools within the city and the university camps as well with painted cycling route.



The second is to connect the villages with 5 km distance from the city with bicycle route.

The third is to connect homes with different work places within the city for mature people.

Many figures of community have to participate with some assignments in the program to be launched. They are shown in Table 4.

Table 1: community figures and assignments

Community Figures	Assignments
Traffic police	1-Using traffic lights 2-Separating pedestrian, bikes and cars traffic within city then connect the villages with the city bike lanes 3-Painting with red color or white lane to separate other vehicles types
Municipality	1-Bike's parking near schools, businesses and shopping centers 2-Small parking for each tall apartment building 3-Connecting the close villages with kafr elshiekh city
Schools and public places	1-Bikes parking near schools, businesses and shopping centers 2-Curses of how to use bike within schools
Private sector	1-Bike shops and maintenance places within the city 2-Bikes rental projects
Charities	1-incentives for cyclists 2-Competitions within the city periodically and big prizes
Researchers	1-periodically evaluation for the cycling program (increase of user). Data could be collected from bike parking, shops, maintenance places)

## 4 The field survey

All Kafr-elshiekh citizens are included in the survey of (KCP) Kafr-elshiekh Cycling Program. In order to get a good representative sampling of kafr-Elshiekh city, area sampling then random stratified sampling is used as a procedure of selecting informants. [Bernard, 1995]

A division made by the researcher is used for the questionnaire. In this division, kafr-Elshiekh city is divided into two main regions separated by railway road. They are slightly different in some cultural aspects and public services.

To assure a good representation, two separate groups are targeted and the representatives have been chosen randomly to represent the whole city. The first are school students and there parents from the main two regions of kafr-elshiekh city. The second are the university students from different collage.

### 4.1 Designing the questionnaire

Gender, different education level, age, residence location, employment status, and income have been stated in the beginning of the questionnaire. By

distributing the questionnaires, the researcher strove to meet comparable averages in all variables of the questionnaire.

Some questions within the questionnaire devoted to the students and other for their parents. The respondents were asked about the total benefits that bicycling creates, including the benefits to cyclists themselves, such as improved health and recreational opportunities. The respondents have been asked to choose from a list of some main reasons which prevent them to use bike.

In case of using bike, Origin and destination of trips, Time, day of the week, day of the year and Purpose of trip are identified.

The questionnaire divided into two parts the first estimated how many people are using bicycle in their daily life for commuting and leisure. The average use of different modes of transportation has been checked as well as the problems and facilities associated with each, Such as how much they pay for car parking.

Second part estimated how many people will use bicycle after applying KCP in order to estimate the future situation. The respondents were asked for the reason behind their acceptance or refusal. The respondents were asked for suggestions to improve KCP to be more accepted.

## 4.2 Finding of the survey

### 4.2.1 Reasons which prevent using bike

90% of respondents refused using bike in there daily life because it is unsafe and 70% because it is sign for poorness and 60% because it is dangerous for girl's virginity and not suitable for Islamic women uniform. Figure 4

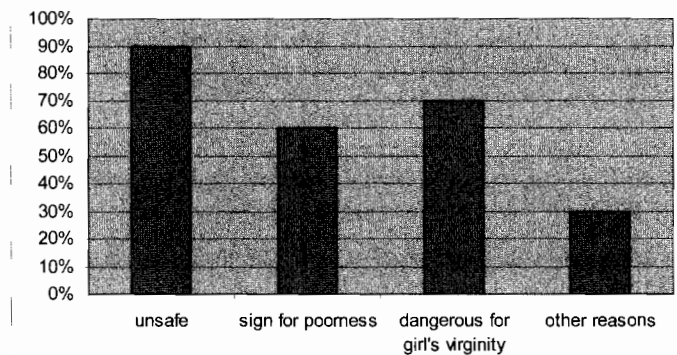


Figure 4: Deferent reasons which prevent using bike

### 4.2.2 Using bike rats

The younger the more using bike where, 2% of respondents of age between 6:11 years, 1.5% of age between 12:14years, 1% of age between 15:17 and 0.5% of age between 18:22 are using bike before applying KCP. Figure 5

And 25% of respondents of age between 6:11 years, 27% of age between 12:14years, 21% of age between 15:17, 14% of age between 18:22 and 6% of age between 23:29 are willing to use bike after applying KCP, Figure 5

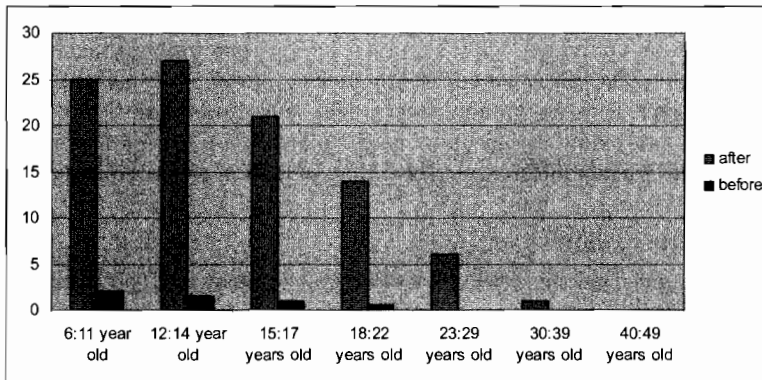


Figure 5: using bike rats before and after showing KCP

In reverse, old people prefer walking where, 17% of respondents of age between 6:11 years, 29% of age between 12:14years, 35% of age between 15:17, 38% of age between 18:22, 42% of age between 23:29, 46% of age between 30:39, 45% of age between 40:59, are walking. Figure 6 and 7

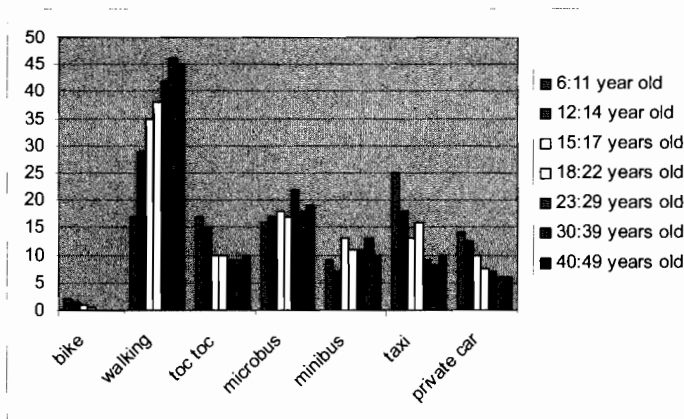


Figure 6: using different modes of transportation before showing KCP

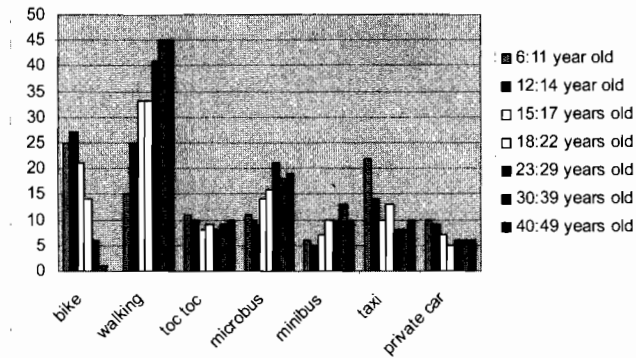


Figure 7: using different modes of transportation after showing KCP

**4.2.3 Cycle per inhabitant**

Number of cycle per inhabitant is 0.007 before applying KCP and 0.135 after applying KCP. Figure 8

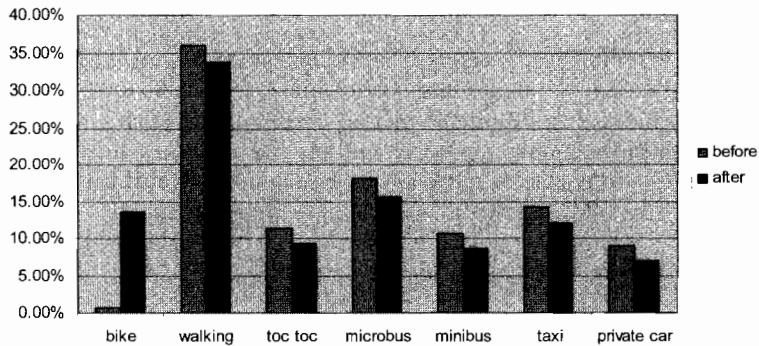


Figure 8: Percentage of using different modes of transportation after and before KCP

**4.2.4 Facilities and constraints**

When respondents were asked about facilities and constraints for deferent mode of transportation the answers were on favour of the vehicles (private car, Taxi, Toc Toc and bus).where, 10% of facilities and 90% of constraints for bike. In reverse, 90% of facilities and 10% of constraints for vehicle. Figure 9:

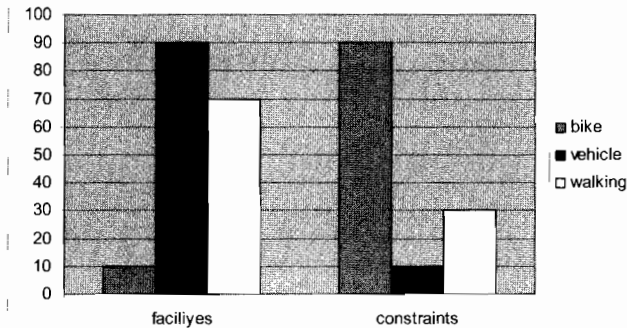


Figure 9: Facilities and constraints for bike, pedestrians and vehicle

**4.2.5 Bike use and income**

According to the income of the respondents, the richness the more using bike among younger, where 70% of age 6-11 who using bike are rich and 30% are poor, and 60% of age 12-14 who using bike are rich and 40% are poor. In reverse, 10% of age 23-29 who using bike are rich and 90% are poor. Figure 10

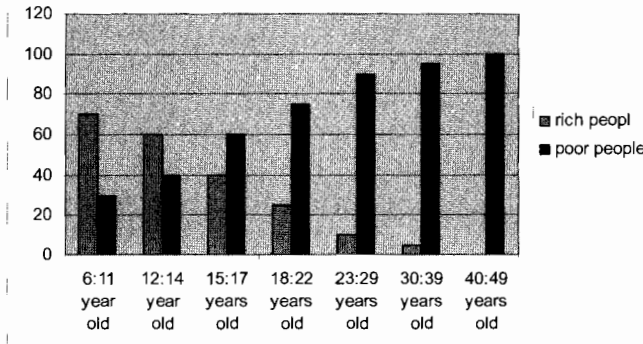


Figure 10: Comparison between poor and rich people for using bike

**4.2.6 Bike and gender**

According to the gender of the respondents, boys use bike more than girls where, 80% of age 6-11 who using bike are boys and 20% are girls, and 100% of age 18-49 who using bike are boys Figure 11

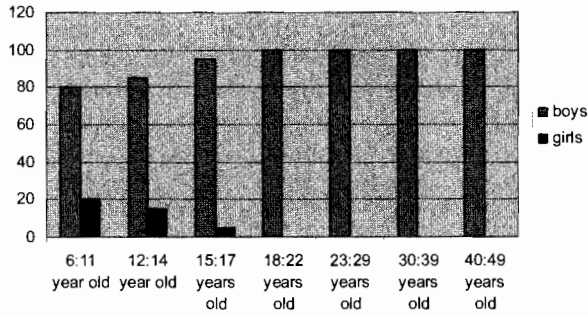


Figure 11: Comparison between boys and girls for using bike

#### 4.2.7 Reasons of using bike

When respondents were asked about reasons of using bike, the answers were on favour of recreation where 75% of whom using bike choose recreation as main reason and small percentage for work, school, shopping and travelling. Figure 12

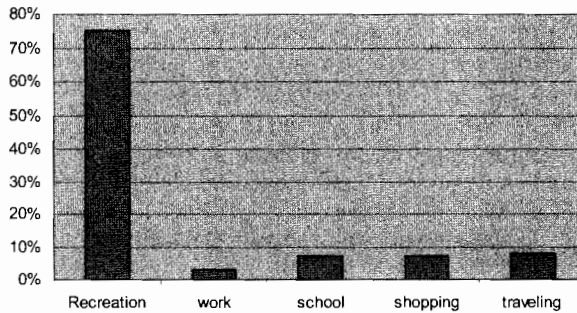


Figure 12: Deferent reasons of using bike

#### 4.3 Finding analysis and results

-The finding of the younger the more using bike proved the paper hypothesis is true.

- using bike is familiar among boys not girls. More awareness is needed to encourage girls to use women bike to be suitable for Islamic women uniform.

- comparing Bike use and income, the field survey indicates that rich children use bike as recreation and poor younger people use bike for work. This could be used as approach to encourage poor people to use bike much more for economic reason.

- Number of cycle per inhabitant is dramatically increased after applying KCP from 0.007 to 0.135. It is optimism finding encourage us to apply the KCP very soon.

- Among the reasons behind the answer of 'not using bike' were dangerous for girl's virginity. The using of women bike is very safe. It needs more awareness to persuade girls and their parents.

- More complains about public transportation. They are absence, unscheduled and crowded. Taxi is expensive for poor people. This situation will support the idea of shifting to using bike.

- kafr elshiekh citizens are familiar with walking. So improving the condition of sidewalk satisfy people desire of walking and encourage people to shifting from walking to cycling easily.

-Recreation is the common reason for using bike. So it could be useful to be used as approach to make using bike familiar within kafr elshiekh community.

-Regarding facilities and constraints with bike and vehicle, the vehicle get more facilities because the planning policy is for vehicle not cyclist. If we changing the planning policy to be in favour cyclist will help to encourage using bike.

## **5 Suggestions to Improve KCP**

1- Simple engineering measures and good active travel-focused design can make a big difference to encouraging people to cycle more. For example, avoidance / removal of barriers and steps, and junctions for example are designed to ease pedestrian and cycle access and egress.

2- Offering bank loans for students to buy bikes

3- Traffic regulation and enforcement of cyclist and pedestrian right and duty.

4- Tax free bike project will be an incentive from the governorate to encourage people to use bike.

5- Improving the condition of sidewalk for pedestrians.

## **6 Conclusion and Recommendation**

1- The paper hypothesis is true, where it is possible to change some aspects of cultural values through new generation.

2- Applying a good and safe cycling network will lead to more acceptance of using the bike for commuting.

3- Allocates banking loans will help low income students to use bike

- 4- More awareness is needed to encourage girls to use safe women bike which is safe for their virginity
- 5- The above mentioned improvements have to be made to KCP.
- 6- Preventative measures to use cars less can also increase cycling levels. For example, increased parking charges, and harder to get driving license.

## References

- Nelson, A., Valle Scholar. (2009). *Livable Copenhagen: the design of a bicycle city*, center for public space research, Copenhagen, university of Washington, Seattle.
- Bernard, H. R. (1995). *Research Methodology in Anthropology Qualitative and Quantitative Approaches*, AltaMria Press, Walnut Creek.
- Chicago transit authority. (2009). *bike & ride guide to Chicago January*. Accessible at: <http://www.chicagobikes.org/public/listofdocuments.php>
- City of Portland, bureau of transportation. (2010). *Portland bicycle plan for 2030: a healthy community, vibrant neighbourhoods and bicycle everywhere*. Accessible at: <http://www.portlandonline.com>
- David Ogilvie, Matt Egan, Val Hamilton, Mark Petticrew. (2004). *Promoting walking and cycling as an alternative to using cars: systematic review*, MRC Social and Public Health Sciences Unit, University of Glasgow, Glasgow G12 8RZ. <http://pubsindex.trb.org/>
- David S. Lawyer. (2007), *Bicycle Energy*. Accessible at: <http://www.lafn.org/~dave/trans/energy/bicycle-energy.html>
- Egyptian village development & constructing authority and local development ministry and UNDP. (2003). *Human development report of kafr Elshiekh governorate Egypt*.
- El Fiky U. (2006). *Toward Applicable Green Architecture; an Approach to Colonize the Desert in Egypt*, Technical University Eindhoven Printservice.
- Frank LD. (2000). Land use and transportation interaction: Implications on public health and quality of life. *Journal of Planning Education and Research*. 20:6–22.
- Handy, S. (2004). *Community Design and Physical Activity: What Do We Know? – And what DON'T we know?* The National Institute of Environmental Health Sciences conference, Washington, DC
- Ministry of Transport, Public Works and Water Management Directorate-General for Passenger Transport. (2009). *Cycling in the Netherlands*. [www.minvenw.nl](http://www.minvenw.nl)
- Pate RR, Pratt M, Blair SN, et al. (1995). *Physical activity and public health: A recommendation from the Centers for Disease Control and Prevention*



and the American College of Sports Medicine. *Journal of the American Medical Association*. 273:402-407.

- U.S. Department of Health and Human Services. (1996). *Physical Activity and Health: A Report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion.
- CAPMAS, Central agency for public mobilization and statistics, 2008, Egypt, *CAPMAS Statistical Year book 2008*, Cairo
- Litman, T., Blair, R., Demopoulos, B., Eddy, N., Fritzel, A., Laidlaw, D., Maddox, H., Forster, K., (2010), *Pedestrian and Bicycle Planning: A Guide to Best Practices*, Victoria Transport Policy Institute CANADA, [www.vtppi.org](http://www.vtppi.org)
- J. Pucher and L. Dijkstra (2000). Making Walking and Cycling Safer: Lessons from Europe, *Transportation Quarterly*, Vol. 54, No. 3.