



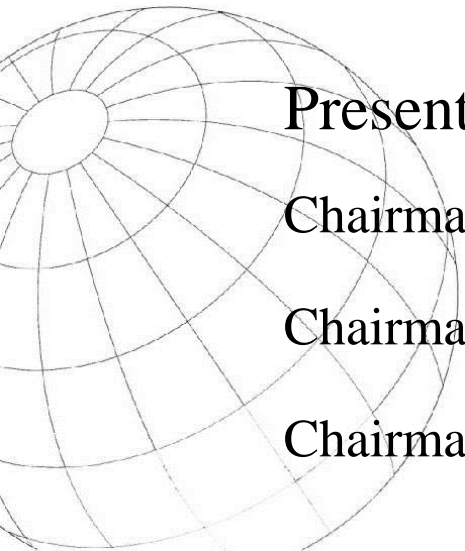
# Cycling<sup>+</sup> & Health<sup>+</sup>

Presenter : Robert Wu

Chairman of Cycling & Health Tech. Industry R&D Center

Chairman of A-Team

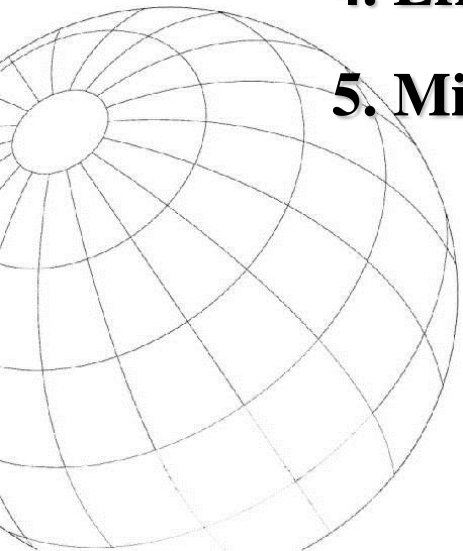
Chairman of KMC Chain Industrial Co., Ltd.





# Outline

- 1. Our Intentions**
- 2. Health benefits from cycling**
- 3. What Barriers?**
- 4. Efforts & Solution**
- 5. Mission & Vision**





# Our Intentions

- **Modern Society lifestyle makes people life longer but unhealthy.**
- **Lack of exercise results in unhealthy people. (who have high risk of mortality rate, cardiovascular disease, Diabetes mellitus, kinds of Cancer, hypertension, Osteoporosis, depression, obesity )**
- **Is Cycling a good way to solve the problem of health and make people happier without less side effects or injuries?**
- **If yes, are there any barriers needed to be overcome in order to put more people to ride for health?**
- **We believe that is one of important issues for bicycle industry to make some contribution to riders and itself.**
- **Here , We would like to share the intentions and responsibilities of our CHC team, the NPO, Cycling and Health Technology R&D Centre, to make some contribution to this issue.**



# Our Intentions- Taiwan bicycle industry

## Stakeholders:

1. Nation & Society
2. Riders
3. Bicycle industry

## Benefits by Health and wellness :

- >> Low carbon lifestyle
- >> Body 、 Spirit and Mind
- >> Sustainable development  
Providing green products  
Contributing to our Earth





# Our Intentions- For Users knowledge



Modern society lifestyle

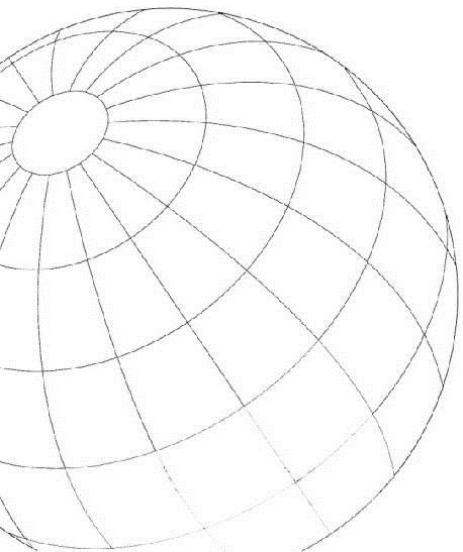
People need to exercise

By Cycling

Happiness & Health



# Health Benefits from Cycling







# Health Benefits from Cycling

Benefits from cycling supported by 5 researches

## 1) To help you keep fit

According to the research from *Archives of Internal Medicine*, cycling is an effective way of long-term weight maintenance. Studies show that cycling 4 hours a week can effectively help you keep fit.

## 2) Reduce risks of cardiac disease

Cycling can significantly promote the cardiac functions. It not only improves the blood flow, but also strengthen the blood vessels and heart. Based on the research of *British Medical Association*, cycling 20 miles (about 32 kilometers) a week can effectively reduce the risk of cardiac disease up to 50%.

## 3) To make you happy

Appropriate exercises help the body secrete a kind of hormone which makes you happy. A research of Portland State University shows that, cycling to work makes people much more happier rather than walking to work.

## 4) To reduce the risk of breast cancer

According to a research of European Journal of Epidemiology, comparing driving and taking bus, spending 30 minutes a day for walking or cycling to work helps reduce the risk of breast cancer effectively.

## 5) To provide disease prevention and enhance the immunity

A research of journal Preventive Medicine indicates that, 20 minutes cycling a day can reduce the risk of chronic disease and enhance the immunity.





# Health Benefits from Cycling-

## Compared to other exercises

### ■ Compared to other exercises, cycling brings benefits such as:

- Burn more calories than walking, increase cardiovascular endurance.
- More suitable for degenerative arthritis patients compared to jogging.
- Other benefits :
  - ✓ Reduce the risks of cardiovascular disease, diabetes and obesity.
  - ✓ Reduce the risks of breast cancer, colon cancer, depression, and Anxiety Disorder.





# Health Benefits from Cycling

overweight    cardiac disease    cancer  
civil diseases

Shielding



Modern society lifestyle

People need to exercise

By Cycling

Happiness & Health



# Barriers-what **X** will let rider hesitate ?



Modern civil diseases



**Unsafe**  
**Unhealthy**  
**Unpleased**



Modern society lifestyle	People need to exercise	By Cycling	Happiness & Health
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# Barriers=



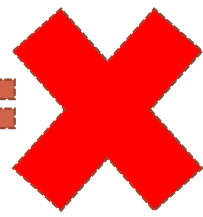
1. Unsafe bicycle
2. Non-fit
3. Usage in unsafe manner



OR



OR



Modern society  
lifestyle

People need to exercise

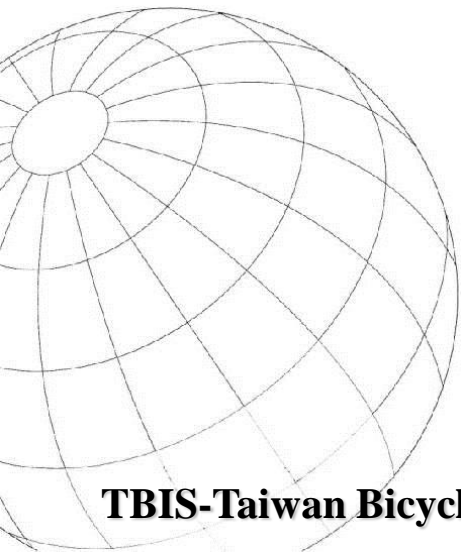
By Cycling

Happiness & Health



# Efforts & Solution

- 1. Safe bicycle : TBIS – Approval products**
- 2. Ergonomics engineering**
- 3. Promotion of safe riding**
- 4. Platform of cycling science & health research**







# Safe bicycle - TBIS (Taiwan Bicycle Industry Standard )

- **To develop and produce the high quality and safe bicycle is the responsibility, our DNA of Taiwan bicycle industry to ensure the safeness and joyfulness of riders.**
- **Standard is the world's common language.**
- **The Taiwan bicycle industry had set up its own standard voluntarily and approved by TBA (Taiwan Bicycle Association)last year 2015, Its framework follows the ISO 4210( International Standards Organization) but more higher safety standard. We are also willing to share this standard to bicycle industries worldwide.**
- **This means Taiwan bicycle industry wants to be a positive responsible role in cycling world.(Even Taiwan is not the member of ISO-TC.)**



# Rider-bike fitness

- Every individual is unique, the body feature of people in different regions are also different, the industry realizes the bicycles that need to be treated as a bio-machine not put people to fit them, in order to gain the benefit from the cycling meanwhile avoid the injuries and uncomfortable during cycling,
- The following is our methodology:





# Methodology

Exercises , cycling : pattern of cycling commuting, leisure, sports X time

Power output, / work consumption

Bio-machine → rider (engine and controller )+ bicycle (machine)

**Rider (engine)**

**Bicycle (machine)**

Geometry fitness (Cockpit geometry need to be tuned)

Human engine system

muscles , bones , joints , energies supply system etc.

**At Output a given power**

**Response** : Muscles fatigue , uncomfortable or injuries

**QCHs** : Co- congestion, Muscles activities, joint reaction

**Dvs** : geometries of human body, cockpit geometry

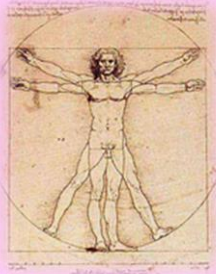

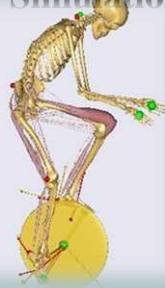
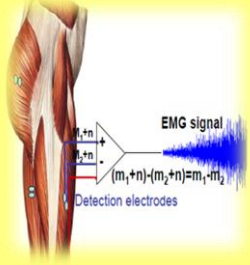
**Experiments** : computer simulation by ANYBODY to derive the muscles activities and joint reaction and conduct of Physical Experiment to measure Emgs, VO<sub>2</sub>, and power out

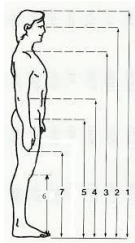
**Targets** : finding the optimal DVs of cockpit geometries to Minimum the QCHs



# Ergonomics engineering

## Methodology offered for ergonomics engineering

<p><b>Ergonomics</b></p> 	<p><b>Human anatomy</b></p> 	<p><b>Biomechanical Simulation</b></p> 	<p><b>Muscle activity Measurement</b></p> 
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Human Dimension



Modeling & Simulation



Experiment

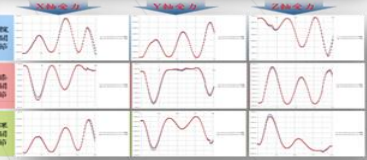
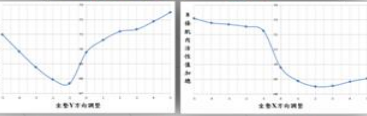
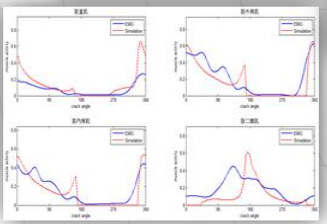
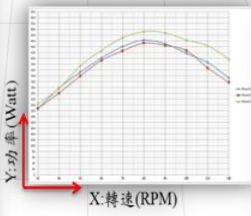
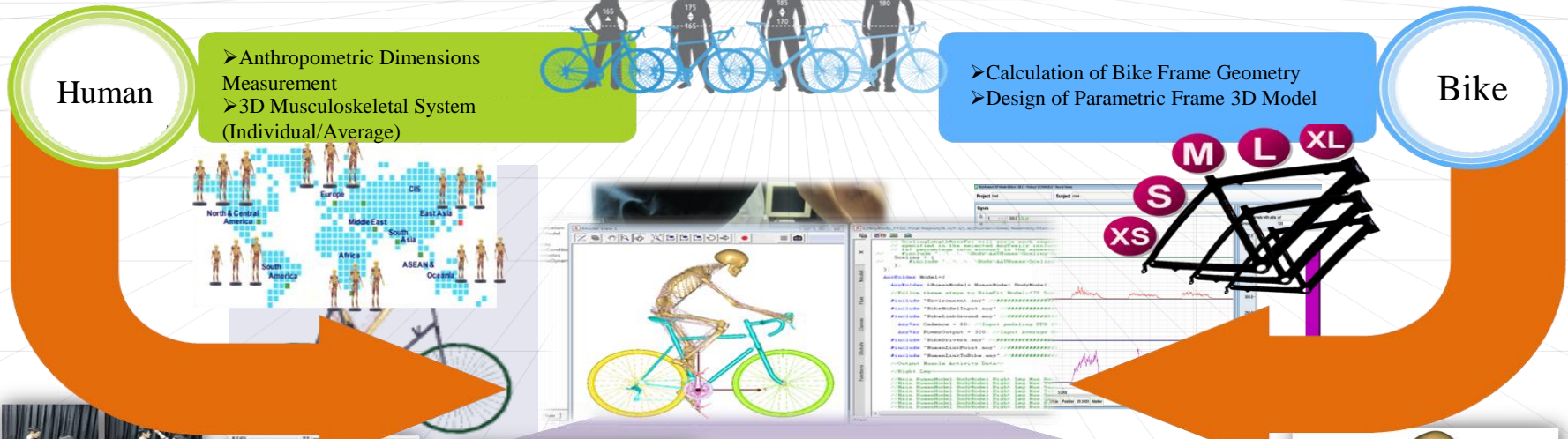


Parameter decision



# Ergonomics engineering

## Example I: Bike Design & Development Process



Anthropometric Dimension Measurement

Calculation of Frame Size

Parametric Frame 3D Model

Performance Power Measurement

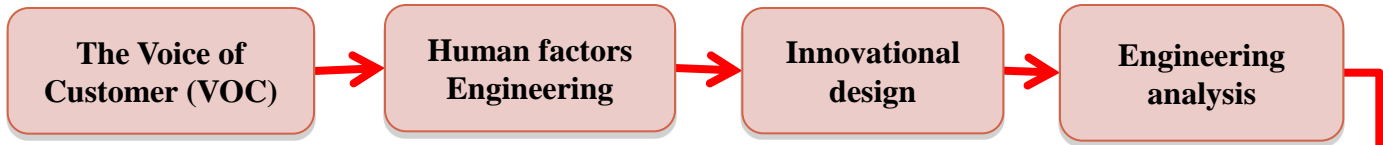
EMG Measurement/ Verification

Simulation of Bike Biomechanics

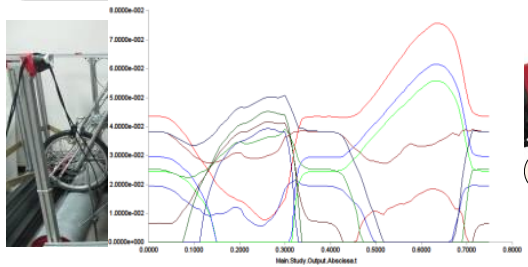
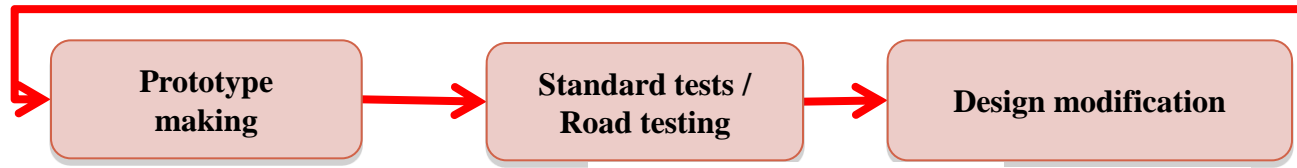
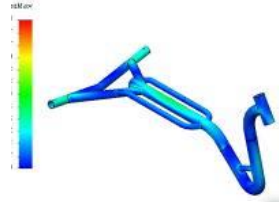


# Ergonomics engineering

## Example II: hand bike Design & Development Process for handicapped people



		Index of Muscle Activity				Design of Structure			
		Weighted muscle activity	Weighted muscle activity	Weighted muscle activity	Weighted muscle activity	Weighted muscle activity	Weighted muscle activity	Weighted muscle activity	Weighted muscle activity
Shoulder	Shoulder	0.15	9	9	3	3	3	3	3
	Elbow	0.05	9	9	3	3	3	3	3
	Wrist	0.05	3	3	3	3	3	3	3
	Hand	0.15	3	3	3	3	3	3	3
Elbow	Shoulder	0.05	3	3	3	3	3	3	3
	Elbow	0.05	3	3	3	3	3	3	3
	Wrist	0.05	3	3	3	3	3	3	3
	Hand	0.05	3	3	3	3	3	3	3
Wrist	Shoulder	0.05	3	3	3	3	3	3	3
	Elbow	0.05	3	3	3	3	3	3	3
	Wrist	0.05	3	3	3	3	3	3	3
	Hand	0.05	3	3	3	3	3	3	3
Hand	Shoulder	0.05	3	3	3	3	3	3	3
	Elbow	0.05	3	3	3	3	3	3	3
	Wrist	0.05	3	3	3	3	3	3	3
	Hand	0.05	3	3	3	3	3	3	3



Muscle activity & Joint force





# Promotion of Safe Riding

## Wear helmet



**Wrong**



**Wrong**



**Right**

## Gesture or signal

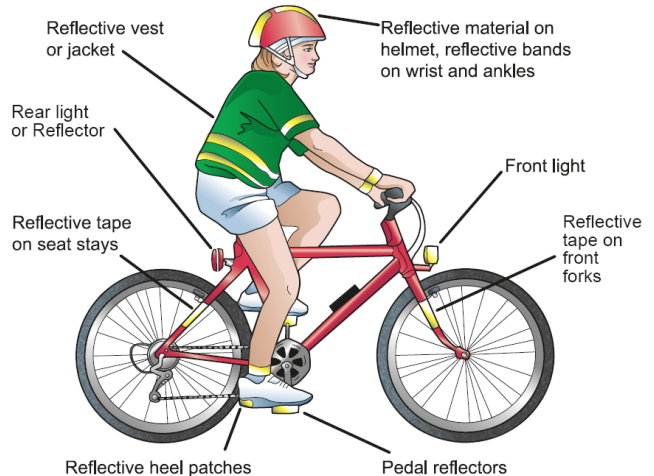


Left Turn—Left arm out



Right Turn—Left arm out, up

## Reflective or Lighting Equipment



Slow Down—Left arm obliquely below 45 degrees straight up and down swing



# Promotion of Safe Riding

## -Developing the service and propaganda

programme of action

Propaganda strategy



**Manual for safe cycling**

- Including how to recognize traffic signs, how to do pre-examinations, and what should be paid attention to.
- Targeting primary school students
- Electronic Manual is posted on the official website of the Centre and available for free download**

**Lectures for safe cycling**

- Lectures for safe cycling
- Education for Kid rider hosted at the Giant、Merida、KMC、VP Cycling Sports Village、NPO and so on.
- The content of the lectures including safety cycling, brand identification and riding experiences



**Micro films about safe cycling**

Two micro films about **traffic and safety regulations of cycling** have been shot, and have the Bicycle Alliance's endorsement.

**Advocacy of safe cycling**

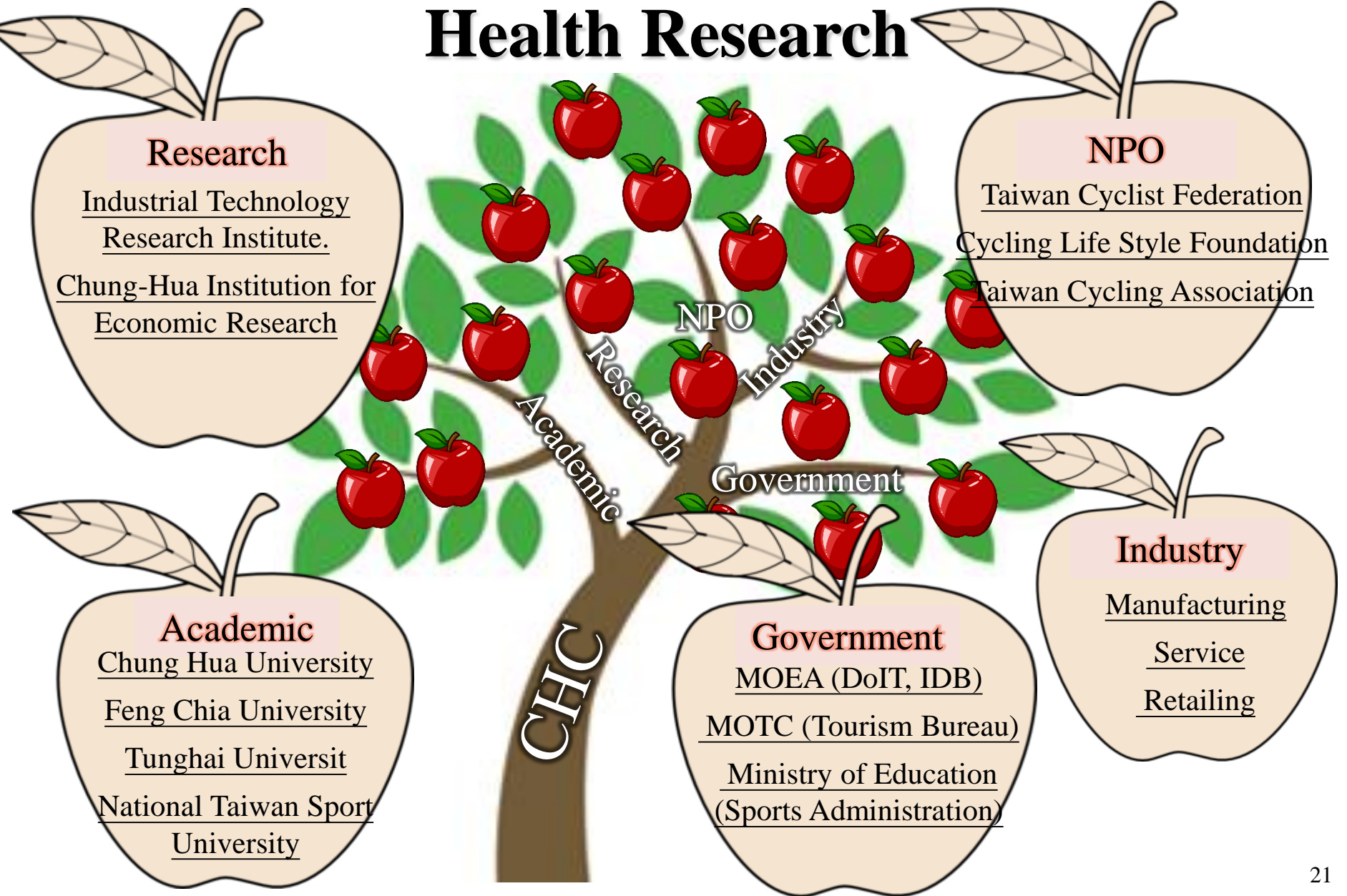
Conduct placement marketing and social marketing with the **safe cycling micro films**.





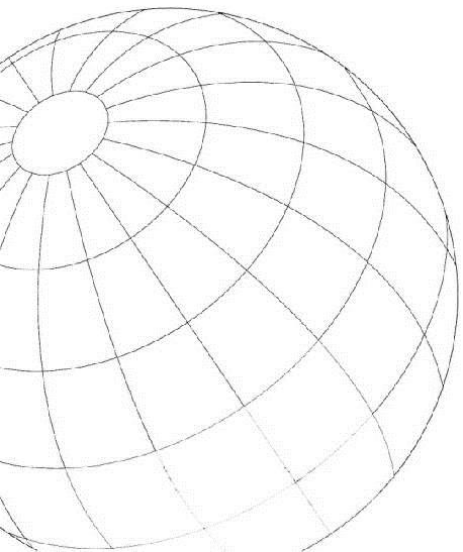


# Platform of Cycling Science & Health Research



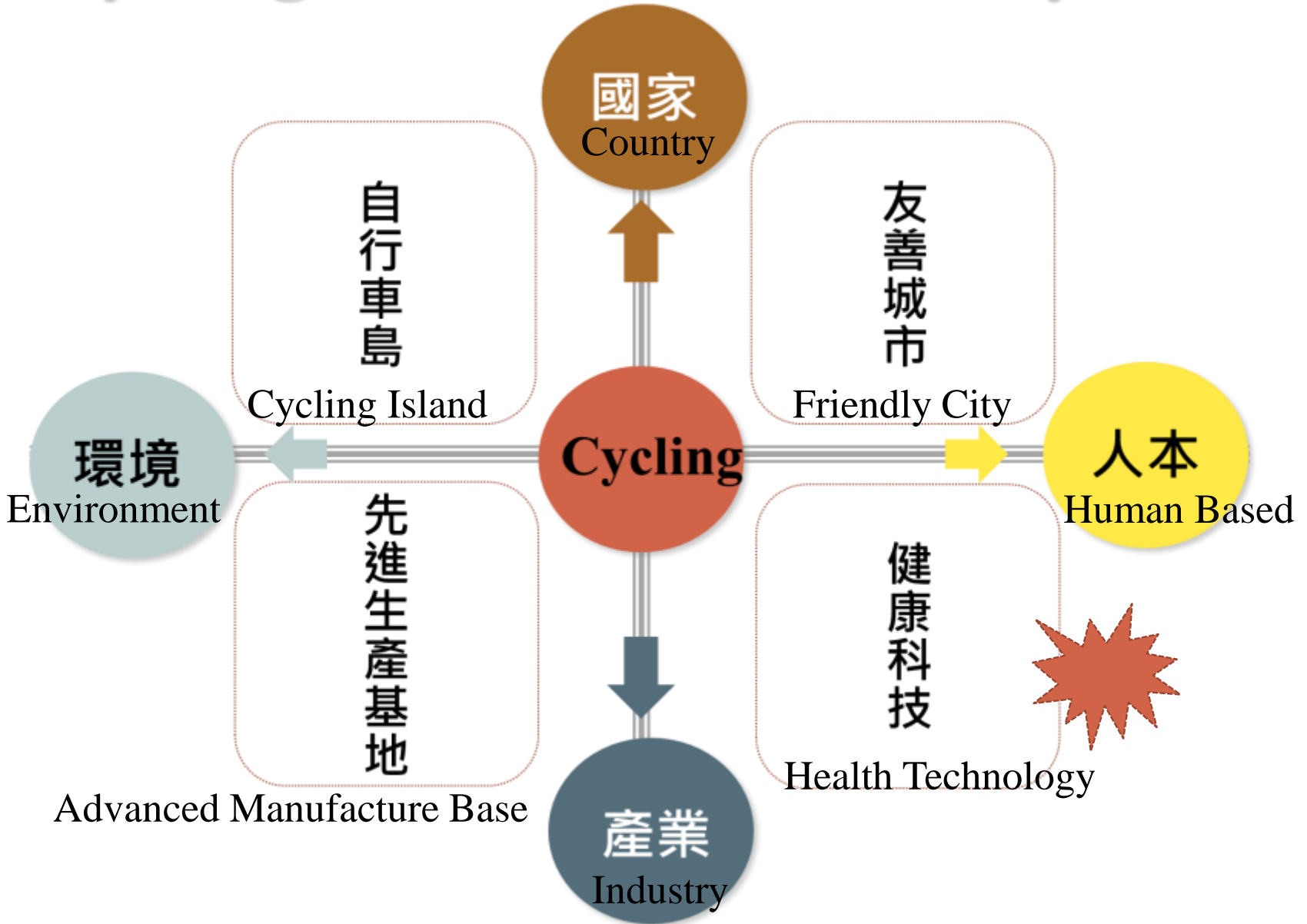


# Mission & Vision





# Cycling as a hub of an Eco-System





# PPeP > PPcP > PPhP

<b>Result</b>	<b>Providing green products Contributing to our Earth</b>	<b>Sharing bike system -UBike etc</b>	<b>Platform of cycling science &amp; health research</b>
<b>Vision</b>	<b>Sustainable development Think bicycle, think Taiwan</b>	<b>Smart transportation For cycling and commuting</b>	<b>Big Data of National health statistics &amp; analytics</b>
<b>Department</b>	<b>Economics Department</b>	<b>Local Government Taipei City etc</b>	<b>Health Department</b>

**PPP Model : private –public –partnership**

**Taiwan bicycle industry**



# Cycling is simple solution

- Zero Carbon Vehicle
- Creation of Low Carbon HomeGreen Power
- Exercise & Fitness
- Energy Saving & Carbon Reduction



- Green energy
- environmental protection
- health,
- economic mobilization







# Enjoy your cycling experiences in Taiwan.

