



Accident-Free Riders Social Return on Investment (SROI) Evaluation Report

February 2020



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Ben Carpenter
Chief Executive Officer
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Summary

PROJECT TARGET

This study is mainly used for internal management and analysis, and determines parts of the Project that can be adjusted and optimized in the measurement process, in order to increase the Project's overall benefits and impact. The core objective of the Accident-free Rider Project is to protect the safety of students riding motor scooters. This study ascertains the project's effect on changes in students and other stakeholders via stakeholder engagement and survey, so that the project can be optimized to gain greater impact and generate greater social value and benefits.

RESEARCH METHODOLOGY

This report uses the social return on investment (SROI) methodology for evaluation research and assessment. In this report, we have followed “A Guide to Social Return on Investment” (2012 edition; hereinafter referred to as the “SROI Guide”) published by the British government, as the basis of our analytical framework. Based on the actual data from interviews with the stakeholders during the assessment period, the changes and impacts that occurred for the stakeholders in that time served as the basis for evaluation of the project's social impact.

We carried out each step of the research analysis in accordance with the description and framework design of the SROI Guide:

SROI Analysis Procedures	Description
1. Establishing scope and identifying stakeholders	Establish a scope for the report and list the stakeholders.
2. Mapping outcomes	Through stakeholder engagement, list the impacts and changes that the project has brought about for them.
3. Evidencing outcomes and giving them a value	Design indicators to identify whether the impacts and changes have indeed occurred; after engaging with stakeholders again, select the appropriate financial proxy to measure impact and changes.
4. Establishing impact	Adjust the value of impact and changes through four adjusting factors.
5. Calculating SROI	Calculate the net present value of impact using the discount rate, and then calculate the SROI ratio.
6. Reporting and management	Confirm the results of the assessment and the SROI ratio with the stakeholders again, and then disclose the final results in the report.

LIMITATIONS OF THE STUDY

Under the SROI framework, abstract, narrative or non-quantitative indicators are priced. Using the assumed variables as adjusting factors (such as deadweight and drop-off), the generated values are derived from the



perceptions of the stakeholders and not the traditional models of predictive financial analysis. As a result, the SROI rates of this project are inapplicable for comparison with figures from a different project. In view of the reasons stated above, apart from the SROI outcomes, we should publicly disclose the SROI report in a responsible manner and openly explain the outcomes as well as the processes of calculation and derivation. It is also necessary to list the various assumptions and sensitivity analysis used in the process. It is hoped that the users of the report will be able to understand this project and its social value with the complete information provided, from which the basis for activity management and maximizing social value and other decisions can be derived.

In addition, the research progressed in accordance with the seven principles of SROI. The limitations of the study will explained in the following section.

SROI Principles	Limitations of the Study	Possible Effects on SROI Outcomes	Response Method
1. Involve stakeholders	Large number of stakeholders	N/A	Use three-stage, diverse methods (face-to-face interviews, telephone interviews, questionnaire surveys, etc.) to engage different stakeholders.
2. Understand what changes	A small number of stakeholders cannot clearly express the impact or changes they have experienced.	N/A	Use literature as an aid, discuss with experts, and ask family, friends, and teachers of the stakeholders regarding what they have observed.
3. Value the things that matter	Most stakeholders are unable to value the things that matter at first.	N/A	Engage in multiple discussions with stakeholders to assign a value to outcomes that best matches their perceptions.
4. Only include what is material	The different levels of impact on stakeholders prevents the degree of importance from being accurately determined.	Underestimation	Use scores to express the degree of importance and ask stakeholders to respond, then express as a weighted average.
5. Do not over-claim	The impact on a small number of stakeholders is relatively indirect	Underestimation/Overestimation	After discussion with the government traffic supervision agency, if stakeholders are unable to describe the causal relationship of impacts and unable to provide clear evidence of outcomes, such as the standards set by the scale have not been met, this study will not include the stakeholder based on the principle of Do Not Over-claim.(Professional and expert judgment)



SROI Principles	Limitations of the Study	Possible Effects on SROI Outcomes	Response Method
6. Be transparent	The information within the complete impact map of the report may not be clear due to layout restrictions.	N/A	Openly explain the outcomes as well as the calculation and derivation processes in the report.
7. Verify the result	Due to time constraints, not all of the stakeholders in the study are invited to participate in the verification of results.	N/A	Results are verified by sampling each type of stakeholder, and literature and discussions with experts and scholars are used for verification.

SCOPE OF RESEARCH

Cathay Century Insurance and related units and schools co-organized three Accident-free Rider activities (including one conventional activity and two VR activities) from October 22, 2018 to April 30, 2019.

RESEARCH RESULTS

A comprehensive survey and analysis of this study shows that Cathay Century Insurance's Accident-free Rider Project has created the equivalent of NT\$3.30 in social value for every NT\$1 input. The sensitivity analysis placed the result between NT\$2.31 and NT\$3.63.

After stakeholder engagement, the Project's main impacts were determined to be business development promotion, positive corporate image increased hazard perception and defensive driving skills, and prevention of riding accidents and casualties among students; increased passion for teaching, and reduced effort handling student traffic accidents among schools' military instructors; and reduced work time and further reduced workload, and improved traffic safety curriculum design abilities among collaborative partners. Stakeholder feedback shows that the Project was able to achieve its goals.

We also discussed the result and the stakeholder feedback received during the process of the study with Cathay Century Insurance, the agency that subsidized the project, in order to look for ways to improve and optimize the project. This was intended to allow adjustments and corrections whenever needed during the future implementation process, and to expand and maximize the project's impact, social value, and benefits.



Chapter 1 Accident-free Riders

SECTION 1 PROJECT INFORMATION

Cathay Century Insurance Co., Ltd. (“Cathay Century Insurance”) has protected the Taiwanese public and enterprises through insurance coverage for many years. Vehicle insurance accounts for more than 50% of Cathay Century Insurance's property insurance business. After years of handling traffic accidents, Cathay Century Insurance has witnessed how traffic accidents have fractured countless families. This made Cathay Century Insurance realize that instead of providing damage compensation after a traffic accident occurs, it is better to promote loss prevention concepts, and learn skills to prevent traffic accidents from occurring. Cathay Century Insurance thus established the Vehicle Insurance Loss Prevention unit in 2013 to promote the traffic safety risk management models and establish a driver assessment system.

Taiwan has the highest density of scooters in the world, but it is relatively easier to obtain a driver's license for scooters in Taiwan than anywhere else in the world. Taiwan does not require citizens to take professional courses that will provide them with the correct knowledge and skills, and then pass a road test to obtain a driver's license. Citizens only need to pass a written exam and a simple riding test¹. In this system, even though many people have a driver's license, they do not have the right driving concepts and skills, causing a great threat to road safety². For example, Taiwan's regulations and guidelines only remind drivers to see if there are vehicles coming from the sides and to observe the speed limit when passing through an intersection, but these guidelines are not suitable for actual road conditions and is one of the reasons for Taiwan's frequent traffic accidents. Studies show that most traffic accidents involve drivers between the ages of 18 and 20, accounting for 79.22% of all accidents, which is within two years after they receive their driver's license at the age of 18.

In the light of this, Cathay Century utilized its core competency in loss prevention and offered the Accident-free Riders Course to Protect Student Riding Safety at major universities around Taiwan in 2015. In 2017, Cathay Century further launched the Accident-free Riders 2.0 – VR Hazard Perception Test to introduce the concept of defensive driving, compensating for the inadequacies of Taiwan's driver's license test system. The project targeted college students between the ages of 18 and 20 in hopes of effectively lowering Taiwan's traffic accident rate involving scooters.

Therefore, during the courses of the Project, we introduce the theory of defense driving based on Taiwan's road environment, using videos, presentations, and even VR to simulate actual road conditions in Taiwan, so that students can remember hotspots of risk on the road through personal experience. In the future, when students are riding a scooter on the road, their memories of the course will improve their knowledge and skills to lower the traffic accident rate.

Activities of the Project are designed based on videos, presentations, and

¹ Contents of Taiwan's driver's license tests

<https://tpcmv.thb.gov.tw/english/ServicesEng/LicenseEng/LicenseTest/t02.htm>

² <http://focustaiwan.tw/news/aftr/201801090005.aspx>



VR for analyzing road risks and actual cases. This way students gain defense driving concepts that become their intuition when they see a situation where they should be on alert. Studies pointed out³ that memories based on alert or fear will stimulate the amygdala. The amygdala combines feelings with memory, and once this perception of hazard becomes memory recorded in the amygdala, it will take priority over other neural activities and cause the individual to take action before thinking, so that he/she can avoid the dangerous situation in memory. Courses of the Project help students understand how to predict hazard and avoid hazard, and take defensive action, improving road traffic safety.

Hazard Perception⁴ : Refers to the ability of the driver to take some action as soon as possible on the relevant road and traffic conditions, and through planning in advance, to produce a result with good expectations.

Defensive driving⁵ : Means a skill to drive a vehicle safely .Driving to save lives, time, and money, in spite of the conditions around you and the actions of others

³ References 13-15

⁴ References : https://hpt.thb.gov.tw/risk_perception

⁵ References :

<https://zh.wikipedia.org/wiki/%E9%98%B2%E8%A1%9B%E9%A7%95%E9%A7%9B>



SECTION 2 SCOPE AND GOALS

- Name of assessment activity: Accident-free Riders
- Scope of the Evaluation: Three Accident-Free Rider activities (one conventional activity and 2 VR activities)
- Assessment period: From October 22, 2018 to April 30, 2019
- Activity goals and vision:

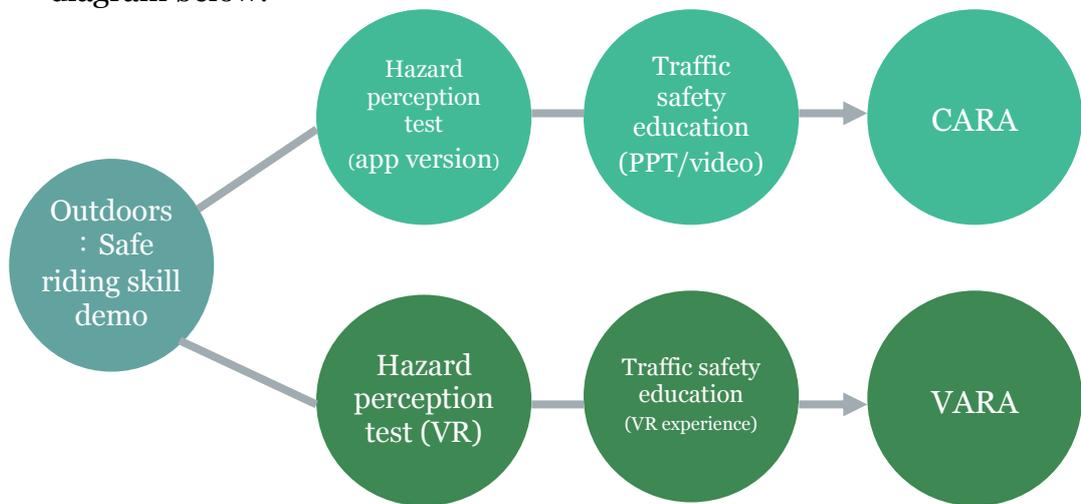
To combine the insurance industry's core competencies in Risk Management and in Loss Prevention through a dedicated loss prevention team and complete accident claims database, in hopes of accurately determining the risks of different groups through specialized analysis and review, and further providing appropriate improvement recommendations and educational content. Creative and interesting ways are used to flip the campus traffic safety education, improve students' knowledge and skills for riding scooters safely, raise students' awareness of traffic safety, and create an environment for zero traffic accidents in Taiwan.
- Event description:

There are two types of Accident-free Rider activities in the scope of this assessment, namely “conventional” and “VR.” Professional instructors from the Hsinchu Safety Educational Center collaborative partner use motorcycles for the first half of conventional and VR activities, and demonstrate the correct way to ride motorcycles and motor scooters in an outdoor space on campus. The second half of activities is divided into the following two modes:

 - Conventional: Professional instructors from the Hsinchu Safety Educational Center collaborative partner provide a relatively static presentation and show a video to teach traffic safety concepts. Combined with Cathay Century's online hazard perception test, it strengthens participants ability to foresee hazards and gives them defensive driving concepts.
 - VR: Cathay Century's VR equipment is used by Cathay Century employees to teach traffic safety concepts in an interactive way. VR equipment is used to simulate road conditions and strengthen participants' ability to foresee hazards and gives them defensive driving concepts.



The contents of conventional and VR Accident-free Rider activities (abbreviated “CARA” and “VARA”, respectively) are shown in the diagram below:



Cathay Century Insurance hopes to start with small actions and influence society one step at a time to achieve the goal of “social mutual prosperity,” while also upholding the philosophy that “happiness is giving others happiness.”



Chapter 2 SROI Analysis and Implementation

The SROI analysis can be summarized in six stages, as shown in the figure below. Analysis details are described in subsequent sections.

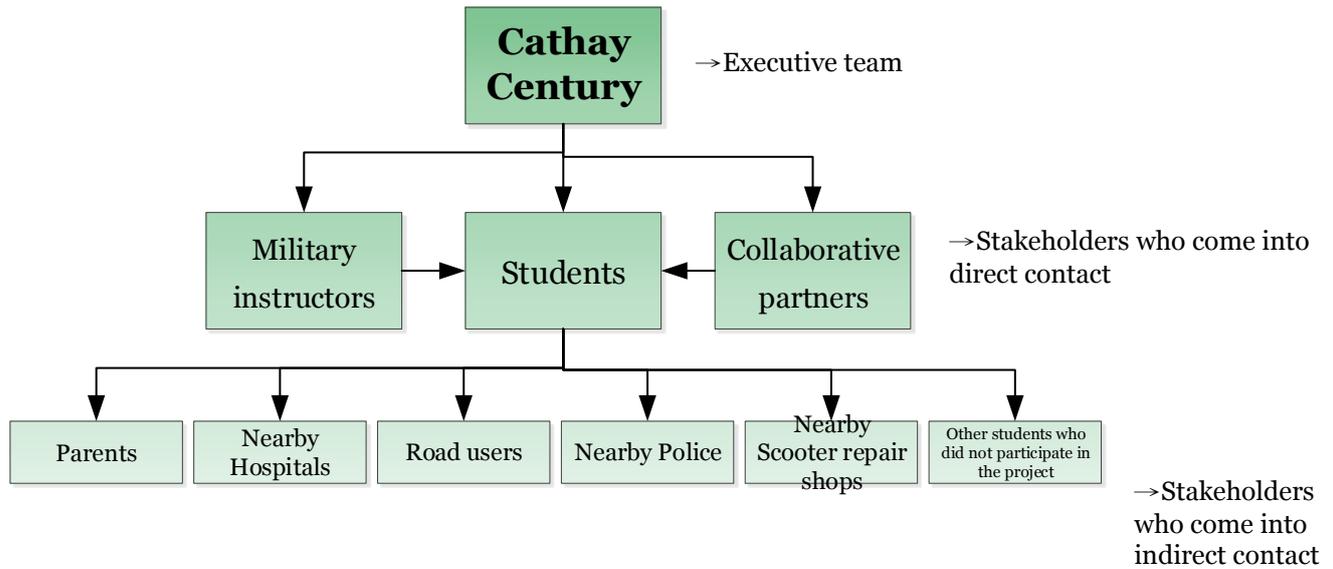
SECTION 1 STAKEHOLDER

I. Stakeholder Identification and Scope

Based on the objectives of this project, we will consider all the people who come into contact with the project in the rolling process for identification, inventory and classification. We will first discuss the impact of this project on the executive team, and then engage with the relevant stakeholders mentioned in the engagement process to understand the various types of stakeholders. The stakeholders of Cathay Century Insurance's Accident-free Rider Project were divided into two levels: stakeholders who came into direct contact; and stakeholders who came into indirect contact.

- Stakeholders who come into direct contact: Stakeholders who the project came into direct contact with include students, military instructors, and partners collaborating in the activities. The interested parties who are the main targets of the project are also relatively important stakeholders.
- Stakeholders who come into indirect contact: Stakeholders who may go experience changes as a result of direct contact include students' parents, nearby hospitals, nearby police, nearby scooter repair shops, road users⁶, and other students who did not participate in project activities.

⁶ Refers to pedestrians or vehicle drivers on the road



First stage of stakeholder engagement, for internal management purposes of the Project evaluation, we referenced the guidelines in the AA1000 Stakeholder Engagement Standard (2015) and discussed with the Project execution team, the Project manager and military instructors with participating the Project. We adopted five principles of AA1000 to comprehensively consider and discuss the stakeholders that the Project may affect and then preliminary analysis and judgments on stakeholders who were in direct or indirect contact with the Accident-free Rider Project. Initial scope of potential stakeholders was performed:

Stakeholder	Principle ⁷	Description
Cathay Century Insurance	Responsibility and influence	Cathay Century Insurance is the main implementer of the Accident-free Rider activities and is legally responsible for its collaboration partners. It also influences collaboration partners, military instructors, and students.
Students	Tension and influence	Students are often involved in traffic accidents; Cathay Century Insurance therefore designed Accident-free Rider activities to interact with students, communicate traffic safety concepts, and thereby reduce traffic accidents.
Military instructors	Dependency and influence	Using the Cathay Century Insurance teaching materials for Accident-free Rider activities, military instructors at schools are able to effectively communicate traffic safety concepts with

⁷ AA1000 Stakeholders engagement standards (2015) 3.3.2 Stakeholder Identification (p.17)



Stakeholder	Principle⁷	Description
		students; this benefits promotion of traffic safety in schools to a certain extent.
Collaborative partners	Dependency, responsibility, and influence	Collaborative partners are dependent on the requirements of Cathay Century Insurance's Accident-free Rider activities, and have responsibilities and influence in the collaboration process.
Parents	Influence and diverse perspectives	The influence of the Accident-free Rider Project on students may expand to their parents.
Nearby Hospitals	Influence	The influence of the Accident-free Rider Project on students may lower the traffic accident rate, reduce the chances of them needing medical attention, and further influencing nearby hospitals
Nearby Police	Influence	The influence of the Accident-free Rider Project on students may lower the traffic accident rate, reduce the chances of police going on patrol, and further influencing nearby police stations
Nearby Scooter repair shops	Influence	Through the Accident-free Rider Project, students may reduce accidents, and may reduce chances of repairing scooters, and affect the situation to scooter repair shops.
Road users	Influence	The influence of the Accident-free Rider Project on students may lower the traffic accident rate, further influence other drivers, and lower the chances of other drivers being in a traffic accident
Other students who did not participate in the project	Influence	Students who participated in the project may share contents of the course with other students who did not participate in the project



➤ Description of stakeholders who have been excluded

Based on the purpose for preparing this report, stakeholders are defined as "people or organizations that experience change as a result of your activity, or those who affect the activity under analysis. " Under this definition, this study first discusses with direct stakeholders, and further asks if they made contact with other stakeholders. Project managers were also asked whether or not they may contact with other stakeholders. We discussed the following matters with indirect stakeholders, and discussed with direct stakeholders the relevance and significance of indirect stakeholders, using this as the basis for determining whether or not to include them in calculations.

	Parents	Nearby hospitals	Road users	Nearby police stations	Nearby Scooter repair shops	Other students who did not participate in project activities
Has an understanding of or experience from this Project	Most were unclear and did not have any experience	Don't know and does not have any experience	Don't know and does not have any experience	Don't know and does not have any experience	Don't know and does not have any experience	Most were unclear and did not have any experience
Stakeholder perception	<ul style="list-style-type: none"> • Parents rarely teach their children traffic safety concepts • Feels that abiding by traffic regulations is the key, it is an attitude issues, and unclear of the influence of school courses. • Most parents feed backed that they were not aware of their children's participation in this Project. 	<ul style="list-style-type: none"> • Nearby hospitals are unaware of project activities, so direct feedback from nearby hospitals could not be obtained. • Unable to say the impact of project activities and the causal relationship of the impact due to being unaware of project activities, and cannot provide evidence of being impacted. 	<ul style="list-style-type: none"> • Stakeholders are non-specific, so feedback could not be obtained from road users, and road users are unaware of project activities. • Unable to say if he/she was impacted and the causal relationship of the impact, and cannot provide evidence of being impacted 	<ul style="list-style-type: none"> • Nearby police stations are unaware of project activities, so direct feedback from nearby police stations could not be obtained. • Unable to say if he/she was impacted and the causal relationship of the impact, and cannot provide evidence of being impacted 	<ul style="list-style-type: none"> • Nearby motorcycle repair shops are unaware of project activities, so direct feedback from nearby motorcycle repair shops could not be obtained. • Unable to say if he/she was impacted and the causal relationship of the impact, and cannot provide evidence of being impacted 	<ul style="list-style-type: none"> • Other students who did not participate in project activities are unaware of project activities, so direct feedback from students who did not participate in project activities could not be obtained. • Unable to say if he/she was impacted and the causal relationship of the impact, and cannot provide evidence of being impacted. • We engaged with students who are not participating in this project in a



	Parents	Nearby hospitals	Road users	Nearby police stations	Nearby Scooter repair shops	Other students who did not participate in project activities
						hypothetical way. If participating in this project, learning the right cycling knowledge and technology, and the concept of defensive driving will affect them? Or is it affected by the Project without participating in the Project. They feedback that it would be very helpful if they really participated in the Project, but because they did not actually participate in the Project, they think that it has not affected them.
Feedback from other stakeholders	Students said that they did not specially tell their parents about this course offered in school(this Project), and their parents would not know this Project. So it's very likely this Project will not have a significant impact on parents.	Military instructors said that nearby hospitals only come in contact with injured students when that are in traffic accidents on campus and sent to nearby hospitals for treatment, but students participating in the course were not involved in any accidents during the period assessed by this study.	Students and military instructors both said that road users are non-specific, they are unclear whether or not it impacted road users, and cannot provide supporting documents.	Military instructors said that they would only notify nearby police stations when a student reported a traffic accident and the location was near the school. Hence, nearby police stations are not particularly concerned about what courses students take in school.	Students said that they would only go to the Scooter repair shop if a severe accident occurred and it damaged their scooters, but no traffic accidents occurred during the period assessed by this study, so there was no contact with scooter repair shops.	Students that participated in the Project said that they will not specially tell other students who did not participate in the Project about the course, so the Project will not have a significant impact on other students who did not participate in the Project.



	Parents	Nearby hospitals	Road users	Nearby police stations	Nearby Scooter repair shops	Other students who did not participate in project activities
Adjusting Factor Causation	May be very high					
Do not over claim	Inclusion may result in over-claiming					
Number of stakeholders who felt they were impacted by the Project/had outcomes caused by the Project	1	0	0	0	0	0
Extent of connection with the Project	Low	Low	Low	Low	Low	Low
Determination of Relevance and Significance	Low	Low	Low	Low	Low	Low
Counted or not?	No	No	No	No	No	No



In summary, this study includes the following stakeholders:

Stakeholder			Role in project and reason for inclusion
Name		Total population/unit	
Cathay Century Insurance	N/A	1	Project implementers were included due to the significant changes and feedback they experienced, discovered after interviews with Cathay Century Insurance during the first phase.
Students	CARA students	51	Students participating in conventional Accident-free Rider activities were included due to the significant changes and feedback they experienced, discovered through the phase 1 interviews and phase 2 questionnaire survey on students, parents, and military instructors.
	VARA students	93	Students participating in VR Accident-free Rider activities were included due to the significant changes and feedback they experienced, discovered through the phase 1 interviews and phase 2 questionnaire survey on students, parents, and military instructors.



Stakeholder			Role in project and reason for inclusion
Name		Total population/unit	
Military instructors	N/A	2	Assist in the implementation of conventional/VR Accident-free Rider activities in schools. Military instructors were included because the changes and feedback they experienced were discovered to be significant after the phase 1 interview with military instructors and Cathay Century Insurance.
Collaborative partners	Tainan Traffic Police Corps	1	Assists in the implementation of conventional/VR Accident-free Rider activities in schools. The changes and feedback that the Corps experienced were discovered to be significant after the phase 1 interview with the Tainan Traffic Police Corps and Cathay Century Insurance; the Corps was therefore included.
	Kaohsiung Motor Vehicles Office	1	Assists in the implementation of conventional/VR Accident-free Rider activities in schools. The changes and feedback that the Office experienced were discovered to be significant after the phase 1 interview with the Kaohsiung Motor Vehicles Office and Cathay Century Insurance; the Office was therefore included.
	Hsinchu Safety Educational Center	1	The Hsinchu Safety Educational Center collaborates with Cathay Century Insurance by providing safe riding skill demonstrations. Changes experienced by the Hsinchu Safety Educational Center were discovered to be insignificant after the phase 1 interview. Hence, only their inputs are included, but not outcomes, based on the SROI principles of materiality and Do



Stakeholder		Role in project and reason for inclusion
Name	Total population/unit	
		Not Over-claim.

II. Stakeholder Engagement

In the first stage engagement, we referenced the guidelines in the AA1000 Stakeholder Engagement Standard and locked the scope of the potential stakeholders of the Project, and then designed different engagement processes for students and other stakeholders. This is mainly because the way and number of students and other stakeholders the Project expects to impact is different. In order to increase the reliability of this study, after using our professional judgment of research methodology and considering management requirements of report users and other SROI reports and academic literature, we designed different engagement processes for students and other stakeholders. For a relatively large number of students, we use multiple sampling plan to reduce sampling errors and improve confidence level. The total coverage ratio of the three stages is as high as 66% and 100%. The population of other stakeholders is relatively small, so we engaged all stakeholders through two stages. The total coverage ratio of the two stages is 100%. The detailed implementation method is as follows:

✓ **Students:**

The Project aims to improve students' driving skills and lower traffic accident rates through memories of dangerous situations. Therefore, to better test the hypotheses of this study, we designed three different stages of engagement to understand the impacts and changes in students after participating in the Project, which will provide evidence of their memory of dangerous situations. The first phase of engagement mainly aims to determine students' acceptance and performance in hazard perception. We used this opportunity to verify and revise the causal relationship based on literature and the description of project managers. The second phase of engagement aims to determine how well students remember hazards, because studies pointed out that whether or not they remember will affect our determination of the outcome. Therefore, we distributed questionnaires to students after six months to verify how well they remembered hazards. We also used the opportunity of the phase two questionnaire, and added the chain of events, indicators, duration, value, and adjusting factors collected and revised in the first phase for verification with students. In the third phase of engagement, we used focus group discussions to verify if there are any deviations in key factors of this study, such as the chain of events, indicator design, significance of outcomes, valuation, and adjusting factors. After three phases of engagement and discussions, and with student questionnaire coverage of 66% and 100%, we were able to significantly lower the margin of error, so that the main users of this report (project management team and Cathay Century) can make decisions and carry out management based on the contents of this report with a sufficient level of confidence.



✓ **Other stakeholders:**

We engaged stakeholders with a relatively small population, such as military instructors and collaborative partners, in two phases. With regard to collaborative partners, we engaged organization managers⁸ with an in-depth understanding and direct contact with the Project, in order to determine how they were impacted and their changes after coming in contact with the Project. In the first phase of engagement, we conducted a 60-90 minute face-to-face interview with stakeholders to gain a complete and in-depth understanding of the Project's impacts, the best definition of outcomes, causal relationship of outcomes, the chain of events, indicators that an outcome occurred, adjusting factor ratio, and the value of outcomes perceived by stakeholders and conversion method. In the second phase of engagement, we used face-to-face or telephone interviews for discussion with stakeholders, and to verify if there are any deviations in key factors of this study, such as the chain of events, indicator design, significance of outcomes, valuation, and adjusting factors. After two phases of engagement and discussions, and with 100% engagement with military instructors and collaborative partners, we gained a complete understanding and verified the thoughts and experience of stakeholders from the Project, so that the main users of this report (project management team and Cathay Century) can make decisions and carry out management based on the contents of this report with a sufficient level of confidence.

III. Identification and clarification of stakeholders

We learned about the stakeholders' types and extent of outcomes through the phase 1 and phase 2 engagement process, and considered whether or not to divide stakeholders into subgroups. Our considerations and identifications are as follows:

(I) Subgroup Identification

⁸ Since they are the management of the organization and have a deep understanding of the project, they can represent the opinions of the organization.



Stakeholder	Possible impact factors for subgroup division	Description of subgroup identification	Subgroup categorization results	
Students	Actual activity content and form	We learned from student and military instructor feedback during the phase 1 interview that the same outcomes occurred regardless of differences in activities and teaching materials; however, the degrees to which outcomes occur varied, and had different adjusting factor ratios. Hence, we divided participating students into conventional Accident-free Rider activity students	CARA students	Students who don't have scooter driver's license



Stakeholder	Possible impact factors for subgroup division	Description of subgroup identification	Subgroup categorization results	
		<p>(CARA students) and VR Accident-free Rider activity students (VARA students). In addition to the form of actual activity content, this study considers other factors that may affect the difference, such as gender, age, and whether there is a scooter driver's license.</p> <ol style="list-style-type: none">1. Under the consideration of gender, it is found that the number of males and		Students who have scooter driver's license



Stakeholder	Possible impact factors for subgroup division	Description of subgroup identification	Subgroup categorization results	
		<p>females in the cooperative schools and departments within the scope of this study is very different. Therefore, if they are analyzed by gender, they are not representative, so they are not segmented by gender.</p> <p>2. Under the age considerations, the students in the scope of the study were all the same students, so the average age is about 18 years old, so the age difference is not large, so it is not segmented by age.</p> <p>3. We found that memory does indeed affect</p>	VARA students	Students who don't have scooter driver's license



Stakeholder	Possible impact factors for subgroup division	Description of subgroup identification	Subgroup categorization results	
		student's defensive driving behavior, but students without a driver's license do not ride a scooter, so their outcome is only gaining hazard perception and defensive driving skills. Among students with a driver's license, memory further prevents riding accidents and		Students who have scooter driver's license



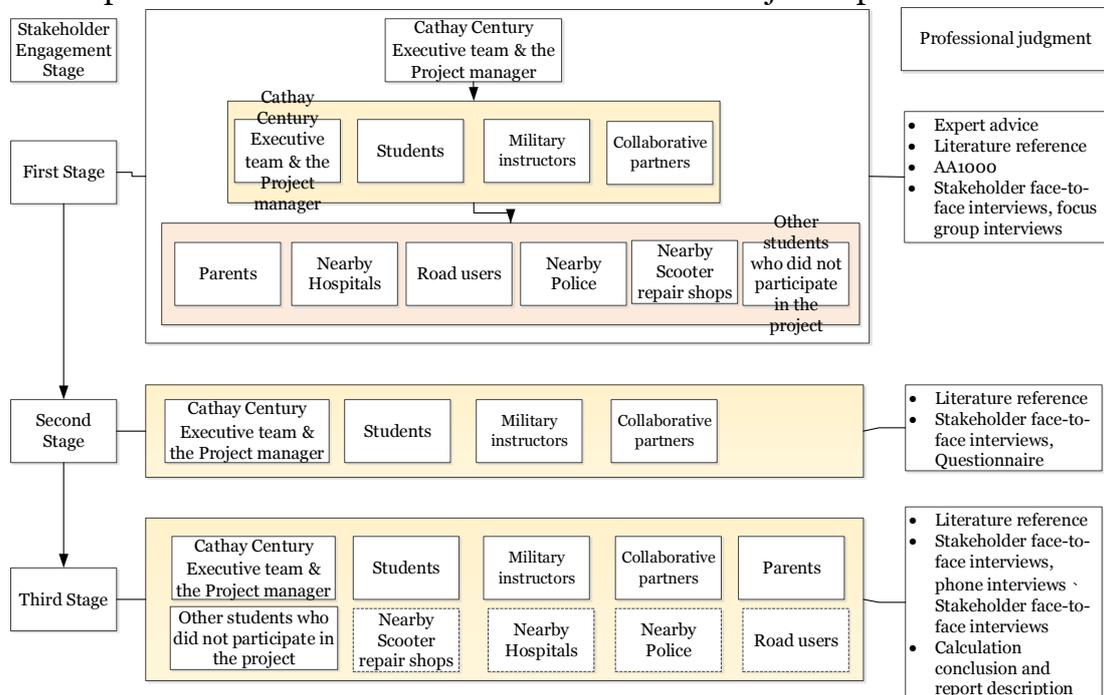
Stakeholder	Possible impact factors for subgroup division	Description of subgroup identification	Subgroup categorization results	
		<p>casualties. We can clearly see different outcomes among students with and without a driver's license, so it is meaningful to use whether or not they have a driver's license as the standard for dividing subgroups.</p>		
Collaborative partners	Collaboration method	<p>Based on the feedback from phase 1 interviews with collaborative partners and Cathay Century Insurance, we learned that collaborative partners had different outcomes from different collaboration methods. Hence, we divided</p>	Hsinchu Safety Educational Center	
			Tainan Traffic Police Corps	



Stakeholder	Possible impact factors for subgroup division	Description of subgroup identification	Subgroup categorization results
		collaborative partners into the Hsinchu Safety Educational Center, Tainan Traffic Police Corps, and Kaohsiung Motor Vehicles Office.	Kaohsiung Motor Vehicles Office

Supplementary Information

In order to clearly explain the process of stakeholder formation and participation, the process of identifying, engagement, and clarifying the above-mentioned stakeholders is supplemented. In the first stage, we openly discuss the possible stakeholders of the Project, and then clarify and focus on each one. The second stage is a deeper understanding about the stakeholders' feeling. The third stage is verification of all stakeholders' outcomes. Through the process of openly discussion, clarification, focus, and verification, a complete inventory of the scope and outcomes of the stakeholders of the Project is provided.





SECTION 2 INPUTS AND OUTPUTS

I. Project Inputs

Resources input by stakeholders to make project activities happen.

Stakeholder type	Inputs	Amount invested within the scope of assessment for this project	Calculation method/Description
Cathay Century	Funds	48,510	Instructor expenses and capital expenditures for three activities (=16,170*3)
	VR equipment (set)	12,052	Stakeholders replied that a set of VR equipment (=NTD 502,154) is expected by the company's internal management to be used 125 times. Three events were organized during the period assessed by the study, so equipment expenses are evenly distributed. (=502,154/125)*3=12,052
	Promotional materials, small gifts	31,710	Promotional materials distributed during the three events, small gifts from Q&A
	Website used by the course ⁹	12,200	Stakeholders replied that it is expected by the company's internal management to be used 150 times, so the cost is distributed by the three events organized during the period assessed by the study (=610,000/150)*3=12,200
	Human resources input into course activities	36,000	Cathay Century provides two people for every event, and each person inputs 3 hours. A total of 3 events were held during the period assessed by this study, and average cost of time per hour is NT\$2,000 =2*3*3*2,000=36,000)
	Development of course contents	1,500	Stakeholders replied that the course is expected by the company's internal management

⁹ Hazard perception test of the Zero-Accident Academy https://carrisk.cathay-ins.com.tw/aware_test.asp



			to be used 300 times, the total cost of course development = NT\$150,000, and the cost for the 3 events during the period assessed by this study $= (150,000/300) * 3 = 1,500$
	VR test content development and design	28,000	Stakeholders replied that the VR course is expected by the company's internal management to be used 75 times (needs to be adjusted and updated after 75 sessions), so the total cost of VR test content development and design = NT\$700,000, and the cost for the 3 events during the period assessed by this study $= (700,000/75) * 3 = 28,000$
Military instructors	Class time	5,284	Military instructors assist in administrative communication and order management on campus. For the 3 events during the period assessed in this study, the monthly salary of military instructors are calculated into average hourly wage, and then the cost of time they spend on the project is calculated One event = Half day = 0.5, three events, average number of work days a month = 22 days, average monthly salary of a military instructor is NT\$75,000-NT\$80,000 $= ((75000+80000)/2) / 22 * 0.5 * 3 = 5,284$
Collaborative partners	Time	0	Already calculated in the amount of funds invested by Cathay Century
Students	Time	0	The execution period of the Project is the university military instructors' course time, which is a time when a college student is required to attend class by the Ministry of Education. Therefore, students will only have the option of "joining the class" during this period, and will not have extra value like work or volunteering. Based on this assumption, we get



			the same feedback when interviewing military instructors and students. Therefore, based on such reasons and feedback, the time value of the students' investment is zero.
Total		175,256	

II. Project Outputs

Quantified outcomes of project activities (e.g., number of people; number of activities)

1. One conventional Accident-free Rider activity; total of 51 students participating

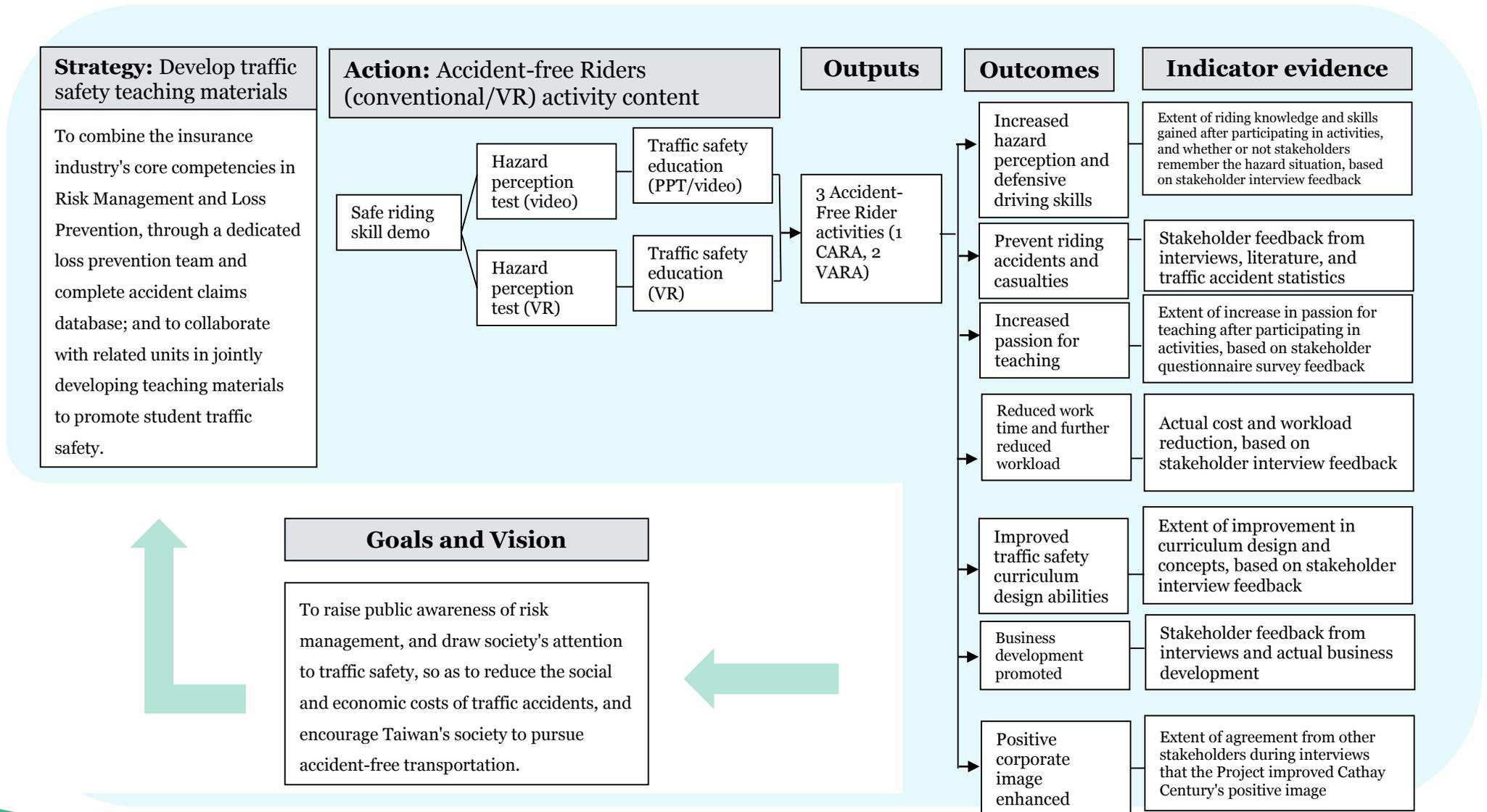


2. Two VR Accident-free Rider activities; total of 93 students participating



SECTION 3 ASSESSING THE OUTCOMES

I. Accident-free Rider activity Chain of Events





II. Stakeholder feedback and outcome chain of events

[Materiality of outcomes]

Based on the SROI principle 4 “ Only include what is material”, we only include outcomes that are important to stakeholders. For the judgment of the materiality of outcomes, we use qualitative and quantitative analysis methods. In qualitative research, we discuss the causality of the outcomes with stakeholders from interviews with stakeholders and feedback from focus groups, and from the most mentioned outcomes that are mostly agreed with stakeholders as significant Included qualitative references.

In order not to be affected by the overly subjective opinions of the stakeholders, we refer to the score survey of the importance of the theoretical design of Likert scales¹⁰. We take the average of 3 points as the baseline of 5 points. An outcome with an importance score of more than 3 is considered to be important.

Likert scale was created by psychologist Rensis Likert and is often used in questionnaires. It is the most widely used scale in current research and can help respondents respond specifically to their thoughts or feelings.

[Explanation of Outcome Indicators]

For indicators of whether or not an outcome occurred, we referenced the SROI principles to use subjective or objective feedback from stakeholders as indicators that an outcome occurred. Hence, in the phase one qualitative and phase two quantitative questionnaires, we asked stakeholders provide feedback on the extent of their changes before and after using changes in scores, or objectively describe actual behavior changes. This way subjective and objective stakeholder feedback can serve as indicators to assist this study in determining if an outcome occurred, the extent it occurred, and its importance to stakeholders.

[Indicator design of subjective feedback]

An indicator of subjective willingness, we usually cannot collect objective data or corroborating evidence Therefore, in order to allow stakeholders to conveniently feedback their specific ideas and feelings about the Project, we refer to the research methods and literature on psychology. We estimate that statistics based on a scale will be more appropriate to design subjective indicators and are representative.(Professional judgement in social psychology) According to the management purpose of the Project, we use the Likert scale to design different types of indicators.

¹⁰ References :

<https://zh.wikipedia.org/wiki/%E6%9D%8E%E5%85%8B%E7%89%B9%E9%87%8F%E8%A1%A8>



In addition, we also refer to the Kirkpatrick model¹¹, which is the most widely used research method for measuring the degree of learning in a course. The Kirkpatrick model divides the degree of the learning process into four stages: reaction, learning, behavior, and result. According to the theoretical basis of the Project, it is established by the impression of fear, stored in the amygdala of the brain, and the result of defensive driving is achieved by the instinctual response before thinking. Therefore, in the design of the Likert scale indicators, we divided them into three stages: reaction, learning, behavior, and result according to the Kirkpatrick assessment model. And before and after the test, the gap between the two stages is used as the basis for evaluating the degree of change in the model :

The scores of the four stages and indicators are as follows:

1. The difference of 1-3 points before and after the change is judged to have a response, representing the impression that fear has been established.
2. The difference of 4-6 points before and after the change is judged that you have learned from fear impressions.
3. The difference of 7-9 points before and after the change is judged to be that the fear impression has not only been memorized and learned, but also developed into behavior.
4. The difference of 10 points before and after changes is judged that behavior to produce subsequent economic benefits.

According to the implementation goals and internal management objectives of the Project, the outcomes of the Project are defined as the build fear in students. Therefore, we set the indicator of the outcome to be 2 points before and after the average change.

For the indicators of outcomes of other stakeholders, in order to make the standards of this report consistent, the same standard "average difference between before and after changes of up to 2 points" is also used as the judgment basis for feeling establishment.

Outcomes	Indicator	Indicator description
Increased hazard perception and defensive driving skills	Extent of riding knowledge and skills gained after participating in activities, based on stakeholder questionnaire feedback Stakeholders provided feedback on whether or	According to literature, the use of the scale helps researchers to analyze research problems in a systematic and scientific way, and provides an effective evaluation tool for empirical research in

¹¹ References : <https://wiki.mbalib.com/zh-tw/%E6%9F%AF%E6%B0%8F%E5%9B%9B%E7%BA%A7%E5%9F%B9%E8%AE%AD%E8%AF%84%E4%BC%B0%E6%A8%A1%E5%BC%8F>



	not they remembered hazardous situations	social sciences. Therefore, in this study, we use the scale to measure the outcomes, so that stakeholders can use both objective and subjective way to give their feedback. Furthermore, the study ¹² also showed that whether or not students remembered hazards or not affected their intuitive response in a hazardous situation, so they would be able to face actual road conditions when riding their scooter in the future. Hence, we used students' memory as an indicator of this outcome.
Prevent riding accidents and casualties	Stakeholder feedback from interviews, literature, and traffic accident statistics	In addition to the subjective feedback of the stakeholders has reduced riding accidents, we also compares statistics with student accident rates that are not actually enrolled in the course. Furthermore, students with a driver's license will directly ride their scooters on the road. Hence, increasing their knowledge and skills will directly affect the prevention of riding accidents and casualties. The best way to prove that the Project prevents riding accidents and casualties is to compare the traffic

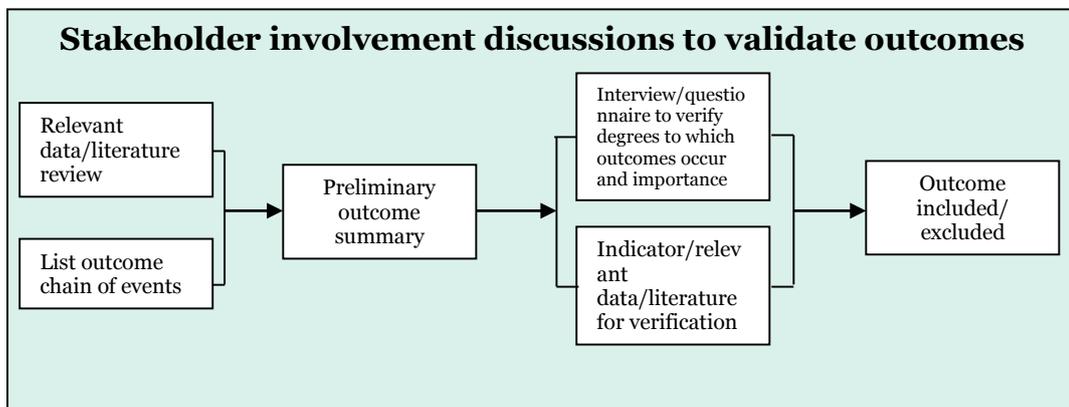
References 13-15¹³ Yang, Ming-Chieh (2010), Exploring the Defensive Driving Ability of Motorcyclists and Its Affecting Factors



		accident rate of students who participated in the course and students who did not.
Increased passion for teaching	Extent of increase in passion for teaching after participating in activities, based on stakeholder questionnaire survey feedback	According to literature, the use of the scale helps researchers to analyze research problems in a systematic and scientific way, and provides an effective evaluation tool for empirical research in social sciences. Therefore, in this study, we use the scale to measure the outcomes, so that stakeholders can use both objective and subjective way to give their feedback.
Reduced work time and further reduced workload	Actual work time and workload reduction, based on stakeholder interview feedback	The objective difference in amount of work time and workload reduced after the Project's intervention is used as the indicator for this outcome.
Improved traffic safety curriculum design abilities	Extent of improvement in curriculum design and concepts, based on stakeholder interview feedback Teaching material design for the actual learning and application project	According to literature, the use of the scale helps researchers to analyze research problems in a systematic and scientific way, and provides an effective evaluation tool for empirical research in social sciences. Therefore, in this study, we use the scale to measure the outcomes, so that stakeholders can use both objective and subjective way to give their feedback.



		Training materials for motor vehicles offices designed based on the Project and budget allocation are used as the indicator of this outcome.
Business development promoted	Stakeholder feedback from interviews and actual business development	Business development promoted by the Project and business volume increased or number of collaborative schools increased is used as the indicator for this outcome.
Positive corporate image enhanced	Extent of agreement from other stakeholders during interviews that the Project improved Cathay Century's positive image	According to literature, the use of the scale helps researchers to analyze research problems in a systematic and scientific way, and provides an effective evaluation tool for empirical research in social sciences. Therefore, in this study, we use the scale to measure the outcomes, so that stakeholders can use both objective and subjective way to give their feedback.



We will feedback the stakeholders we have learned after interviews and questionnaires, discuss with stakeholders and describe the way of the Chain of



Events, explain the causal relationship between results, and discuss with stakeholders Well-defined outcomes. Please refer to Appendix 3 for detailed stakeholder event chain.

(I) Students who participated the Project

For the technical concepts of hazard perception and defensive driving, the Project is constructed with two courses. They are the teaching and practical operation of safe riding technology in outdoor classes, the establishment of correct defensive driving skills and the training of hazard perception in indoor classes, and the establishment of hazard perception. The course content is explained as follows:

1. Demonstration of safe riding technology in outdoor classes : Demonstrate riding locomotive by professional teachers and teach correct riding posture, braking methods, turning skills, etc. to increase students' defensive driving skills.
2. Hazard perception training in indoor classes : Through VR experience or traditional film / presentation teaching methods, simulate the dangerous situations that may occur on the road, and establish the immersive impression of the students on the dangers of cycling on the road in an immersive manner. Situation to strengthen students' ability to perceive danger. Familiarize students with potentially dangerous road conditions to strengthen their hazard perception.

Therefore, the event chains of the project also started from these two classes. However, in the process of promoting the event chain, we found that people who have a driving license and therefore have actual riding experience and people who do not have a driving license and have no actual riding experience. There are significant results differences :

1. CARA/ VARA : Students without scooter driver' s license :

Because the coach communicates and demonstrates riding and driving skills in outdoor safety riding class, it is passed to students in a more vivid and interesting form, and provides opportunities to students for practical exercises. In the class, the students who do not have a scooter driving license simulated the correct reaction actions that they should have under the dangerous conditions that may be encountered on the road. After actually contacting the scooter and practicing, it also significantly improved the students' positive attitude and psychology towards the scooter. Finally, As a result, the concept and ability of defensive driving have been improved.

And in the indoor hazard perception training building class for these students, because the actual danger situation of the road is simulated through slides or VR, such as a collision at a high speed, a collision at a crossroad, a slip through a section of water, etc. In these real cases with the demonstration of the situation, it is easy for students to establish dangerous impressions of the dangerous situation of road riding motorcycles, and these impressions will establish the hazard perception because of the brain reaction mechanism of fear,



and the establishment of hazard perception is the core concept of defensive driving.

Because without the defensive driving skills established through hazard perception, there will be no immediate response on the road. But only hazard perception without correct response skills¹³ will not effectively reduce the accident rate.

In summary, we have derived the intermediate outcomes of the two activities/classes, and later derived it to "Increased hazard perception and defensive driving skills."

However, because these students do not have driving licenses, they cannot practice the driving skills and correct traffic safety knowledge learned in actual road conditions. Therefore, this outcome is only in the stage of increasing hazard perception and defensive driving skills, and cannot be deduced to the subsequent actual reduction of the accident rate.

2. CARA/ VARA : Students with scooter driver's license :

Because of the " establishment of hazard perception and defensive driving skills ", among the students who actually ride a scooter with a driver's license, students will actually reduce accidents.

In order to obtain evidence to reduce the accident rate and prove its causal relationship, we analyzed and compared the accident rate of the students who participated and did not participate in the Project. The calculation basis and source of the accident rate are statistics and surveys by the local traffic police during the semester.

After comparing the two data, it can be clearly seen that the accident rate of students who participated in the Project and actually ride a scooter is significantly lower than the students of the same school who didn't participate the Project.

After the engagement with the students in the third stage, the students also gave feedback that they were actually on the road. They thought of the content of the previous class, and also thought that the value of the outcomes of preventing riding accidents and casualties was higher than simply improving skills and knowledge. According to the SVI's SROI supplementary guidance¹⁴, outcomes should stay where the stakeholders feel that the value is generated. Therefore, in the sub-group of students with driver's licenses, we continue to deduce the outcomes to prevent riding accidents and casualties. Such derivation is recognized by students, literature, project teams, and instructors, and is also in line with the significance and purpose of the management of this Project.

Unlike students who can't drive on the road, because students who can't drive on the road, reducing accident rates and preventing riding accidents and casualties are not due to this Project. The value of their outcomes is the promotion of defensive driving concepts, knowledge, and skills, which cannot

¹³ Yang, Ming-Chieh (2010), Exploring the Defensive Driving Ability of Motorcyclists and Its Affecting Factors

¹⁴ Standard on Applying Principle 2: Understand what changes (Part One: Creating well defined outcomes) <http://www.socialvalueuk.org/app/uploads/2018/04/Standard-Principle-2-Understand-what-changes-Part-one.pdf>



be deduced to reduce the accident rate and preventing riding accidents and casualties.

CARA/ VARA : Students without scooter driver’s license

Outcome name	Chain of events	Indicator/evidence of occurrence (Objective/Subjective)	Outcome counted or not?
Increased hazard perception and defensive driving skills	Participate in the outdoor safe riding skill demonstration; listen to the instructor’s explanations and watch the demonstration of safe riding skills; learn/improve new riding skills, knowledge, and relevant traffic safety knowledge; also strengthen traffic safety concepts and psychological preparation.	Interview with stakeholders/questionnaire survey feedback and literature - Extent of improvement in riding knowledge and skills - Actual knowledge and skill content (ex. Turning technique, braking technique, parking technique etc.)	Based on stakeholder feedback from the phase 1 interviews and phase 2 questionnaire survey, this outcome was significant for students who participated in both conventional and VR activities, but the occurrence of the outcomes was different (conventional: 58%; VR: 65%). The average score of feedback from students increased from 6 points to 8 points (0-10 points), and average importance score is over 3 points (0-5 points). In addition, stakeholders also clearly expressed the material of the outcome during the engagement. Based on the SROI principle of materiality, the outcome was determined to be material and the



Outcome name	Chain of events	Indicator/evidence of occurrence (Objective/Subjective)	Outcome counted or not?
			different subgroup outcomes were thus included.
Negative outcomes	N/A	N/A	Based on stakeholder feedback from the phase 1 interviews and phase 2 questionnaire survey, there were no negative outcomes.

CARA/ VARA : Students with scooter driver’s license

Outcome name	Chain of events	Indicator/evidence of occurrence	Outcome counted or not?
Prevent riding accidents and casualties	Listen to the instructor’s instructions on hazard perception and how to operate the VR game in the classroom; learn about possible traffic hazards; increase knowledge of hazard perception, and become more able to avoid danger. Furthermore, positive emotions while riding on the road will increase/become more stable, preventing hazards and traffic accidents.	Interview with stakeholders/questionnaire survey feedback and literature - Extent of agreement that it reduces riding accidents and casualties - Increase in positive emotions - Increase in risk/hazard perception - Comparison of traffic accident rates for students who participated or did not participate in Accident-free Rider activities	Based on stakeholder feedback from the phase 1 interviews and phase 2 questionnaire survey, significant outcomes occurred for students who participated in both conventional and VR activities and had scooter driver’s licenses. Furthermore, stakeholders clearly replied the outcome’s importance to them during the interview, and the average importance score among stakeholders was over 4 points.



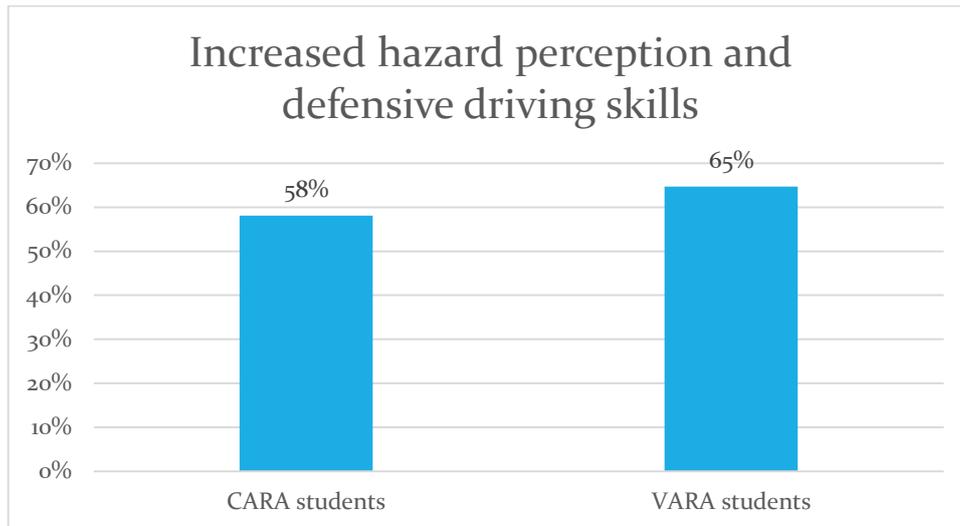
Outcome name	Chain of events	Indicator/evidence of occurrence	Outcome counted or not?
			According to the SROI principle of materiality, the outcome was determined to be material and thus included.
Negative outcomes	N/A	N/A	Based on stakeholder feedback from the phase 1 interviews and phase 2 questionnaire survey, there were no negative outcomes.

Besides, we reviewed the literature to understand the causal relationships between factors affecting traffic safety and potential factors. The study by Tsai Shu-Min (2016)¹⁵ showed that traffic safety knowledge and traffic safety promotion has a significantly positive effect on road safety attitudes and behavior. Results of the study by Lin Yi-Jie (2015)¹⁶ (effects of course instruction on improving motor scooter traffic safety knowledge) showed that multimedia teaching materials improved learning outcomes, as compared with single-medium teaching methods with only text explanations.

Therefore, based on the studies above, we found that there was indeed a difference in the degrees to which outcomes occur for students who participated in the two types of Accident-free Rider activities (conventional and VR), as shown in the figure below. Hence, we divide students into two subgroups: CARA students and VARA students.

¹⁵ Tsai, Shu-Min (2016), *The Effects of Education and Knowledge of Traffic Safety on College Students' Attitude and Behavior of Road Safety*, Master's program in Department of International Trade, National Pingtung University

¹⁶ Lin, Yi-Jie (2015), *The Effects of Lecture Style and Contents on Enhancing Young Students' Motorcycle Traffic Safety Knowledge*, Master's Program in the Department of Transportation & Logistics Management, National Chiao Tung University



After discussion with stakeholders, we found that memory does indeed affect student's defensive driving behavior, but students without a driver's license do not ride a scooter, so their outcome is only increasing hazard perception and defensive driving skills. Among students with a driver's license, memory further prevents riding accidents and casualties. We can clearly see different outcomes among students with and without a driver's license. The outcome among students without a driver's license is "Increased hazard perception and defensive driving skills" and among students with a driver's license is "Increased hazard perception and defensive driving skills."

"Prevent riding accidents and casualties" is an outcome that can be measured by an objective indicator, and the traffic accident rate involving scooters is the most representative indicator used in government statistics and literature, school statistics, the perception of the Project's stakeholders, and the perception of the general public.

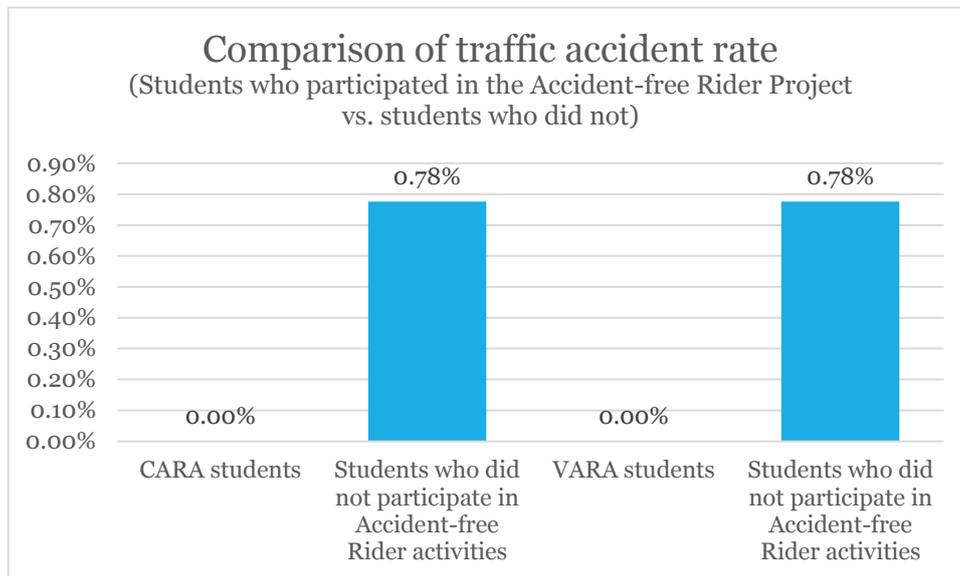
However, statistics and the basis for calculating traffic accident rate may vary with the survey method selected. After we looked into the current system for reporting scooter traffic accidents in universities in Taiwan, we found that military instructors are required to periodically report student traffic accidents to the traffic safety network platform, and the data originates from statistics and surveys of local police stations during the semester. The data is objective and reliable. Therefore, to understand whether or not students who participated in the course had the outcome "prevented riding accidents and casualties," we used students who did not participate in the course as a control group, and compared the two groups to see if there was a significant difference in the scooter traffic accident rate to provide evidence of the outcome.

After comparison, we found that the traffic accident rate of students who participated in conventional and VR Accident-free Rider activities was 0% during the assessment period, while the traffic accident rate of students who did not participate in Accident-free Rider activities was 0.78%¹⁷. We thus

¹⁷ The actual traffic accident rate of students who did not participate in Accident-free Rider activities was provided by the school within the scope of evaluation. The period of the statistics is the same as the



verified that the outcome "prevented riding accidents and casualties" did indeed occur among students with a driver's license who participated in conventional and VR Accident-free Rider activities.



In summary, students without a driver's license do not ride a scooter, so their outcome is only increasing hazard perception and defensive driving skills. Among students with a driver's license, the outcome will also include preventing riding accidents and casualties.

I thought the situations simulated in the VR game might occur; it left a deeper impression and felt fun.

Student who participated in a VR activity

The instructor's demonstration of the correct posture for riding, unparking a scooter, and carrying a passenger during the outdoor class left a deep impression. Learned that brakes are divided into front and back wheel brakes, and there is a difference in the braking ratio.

Student who participated in a conventional activity

Supplementary Information : Engagement with students who did not participate in the Project and before the Project participated

assessment period of the Project (2018.10.22-2019.04.30); the average traffic accident rate of students who did not participate in Accident-free Rider activities is calculated from the statistics. Traffic accident rate calculation method =Number of students injured riding a scooter/Total number of students



According to the research on the stakeholders' engagement in this research, there is no difference in the life experience and related background of the students who did not participate in the Project and the students who participated in the Project. The Project counts the changes of students in a back-and-forth test. Students who have not participated in the Project are also the object we want to explore, because the comparison between the two can clearly understand the changes and differences of students after participating in the Project.

We interviewed students who were not involved in the Project and students who participated in the Project. They all feedback to the school curriculum in junior high school and high school. Teachers will only pass the standard traffic safety concepts in static briefings, and only inform general traffic safety rules or regulations. However, at that stage, students are under the age of 18 and cannot obtain a scooter license, which cannot be combined with actual riding experience. Most of them give feedback that they have forgotten the traffic-related content taught in the course, even if they remember it is only regular content.

We further interview students who have not participated in the Project before the implementation of the Project. Students with a driver's license generally believe that scooter driver's licenses in Taiwan are very easy to obtain and have not heard of the concept of defensive driving. Students without a driver's license are not familiar with cycling and have no special impressions. Especially for the concept of defensive driving, including the establishment of hazard perception, braking, riding skills, etc., they cannot be specifically and clearly described. These feedbacks are the general impressions and concepts of students before participating in the Project. We use this feedback experience of students who have not participated in the Project, and then contact other students who have not participated in the Project, and we have the same proof. They generally don't have any concepts and impressions about braking skills, etc., but can express their established impressions for the test of driving licenses. This kind of feedback is obviously to give back to the students after the class. It can specifically describe the concept of defensive driving, the hazard perception, and can apply the correct riding skills. There are significant differences. Therefore, we can confirm that the Project has an impact on participating students.

In the verification phase, we also explain and discuss the results of the evaluation to students who have not participated in the Project. They also feedback that if they can participate in the Project in the future, they will help them understand the concept of defensive driving and learn the correct driving skills and knowledge.

(II) Military instructors

Accident-free Rider activities use a creative and fun way to transform traffic safety education on campus. With regard to the implementation method of this project, we expected it to affect the amount of time it takes military instructors to prepare teaching materials for traffic safety courses, and also reduce the number of traffic accidents involving students. After engaging military instructors, we found the unintended outcome "increased passion for teaching." Therefore, we specially reviewed the



relevant literature for this outcome to understand the factors that may potentially affect passion for teaching. We found that the research results of Lin Chan-Hsu (2016)¹⁸ showed a highly positive correlation between teachers' passion for teaching and innovative teaching methods. Innovative teaching methods include teaching philosophy, curriculum design, teaching strategies, and multiple assessment methods. This study verified the effect of the innovative and fun teaching materials and implementation methods of the traffic safety courses offered by the Accident-free Rider Project on military instructors' "increased passion for teaching." For the outcome chain of events pertaining to military instructors, please refer to Appendix 3-2.

Outcome name	Chain of events	Indicator/evidence of occurrence (Objective/Subjective)	Outcome counted or not?
Increased passion for teaching	Invite Cathay Century Insurance to their schools to use Accident-free Rider activity teaching materials to promote traffic safety; observe students doing well in class and gaining knowledge, skills, and relevant abilities; feel that Cathay Century Insurance's Accident-free Rider activities were very meaningful, and feel increased passion for teaching.	Stakeholder feedback from interviews and literature - Extent of increase in passion for teaching after participating in activities	Based on stakeholder feedback from the phase 1 interviews, degree to which outcomes occurred was significant. The average score of feedback from military instructors increased from 7 points to 10 points (0-10 points), and average importance score is over 4 points (0-5 points). According to the SROI principle of materiality, the outcome was determined to be material

¹⁸ Lin, Chan-Hsu (2016), *A Study on Teaching Enthusiasm and Instructional Innovation of Municipal Junior High School Teachers – A Case of the Shilin District in Taipei City*, in-service Master's program in Graduate School of Education, Ming Chuan University



Outcome name	Chain of events	Indicator/evidence of occurrence (Objective/Subjective)	Outcome counted or not?
			and thus included.
Reduced teaching plan preparation time	Before the Project intervened, military instructors needed to prepare the contents of traffic safety courses and teaching related affairs by themselves. After the Project intervened, course contents and implementation are entirely handled by the project team of Cathay Century, so military instructors no longer need to spend time preparing and teaching courses. After the event ended, Cathay Century provided professional teaching materials on defensive driving concepts and large number of accident cases to military instructors, so that they can use it to continue reminding	Stakeholder feedback from interviews - Felt a the pressure of preparing teaching plans lifted - Real reduction to teaching plan preparation time	Based on stakeholder feedback from the phase 1 interviews, degree to which outcomes occurred was significant. After discussion and verification with stakeholders in the interview process and verification phase, stakeholders replied that the outcome was not important and the average importance score was 2 points (0-5 points). According to the SROI principle of materiality, the outcome was determined to be not material and thus excluded.



Outcome name	Chain of events	Indicator/evidence of occurrence (Objective/Subjective)	Outcome counted or not?
	students of the importance of defensive driving, which saves military instructors time preparing teaching plans.		
Reduced effort handling student traffic accidents	Observe that students gain traffic safety concepts, knowledge, and abilities in the Cathay Century Insurance Accident-free Rider traffic safety activities; student traffic accident rate decreases, so military instructors require less effort handling student accidents.	Stakeholder feedback from interviews, and traffic accident statistics - Observe extent to which students gain traffic safety concepts, knowledge, and abilities - Comparison of traffic accident rates for students participating/not participating in Accident-free Rider activities	Based on stakeholder feedback from the phase 1 interviews, degree to which outcomes occurred was significant. After discussion and verification with stakeholders in the interview process and verification phase, stakeholders replied that there are many other factors that can make them reduce effort handling student traffic accidents, such as handing over directly to the police etc. Therefore, we reconfirmed



Outcome name	Chain of events	Indicator/evidence of occurrence (Objective/Subjective)	Outcome counted or not?
			with stakeholders the materiality of the outcome, and the average importance score was 2 points (0-5 points). According to the SROI principle of materiality, the outcome was determined to be not material and thus excluded.
Negative outcomes	N/A	N/A	Based on stakeholder feedback from the phase 1 interviews and phase 2 questionnaire survey, there were no negative outcomes.

The school offers a traffic safety promotion course to 1st year students every semester; I found that students were more interested in Cathay Century’s interactive teaching materials, learned more, and I felt it was more effective.

Military instructor

In the past, the traffic safety promotion course was mainly taught by military instructors or other instructors. Students forgot what was taught after the course ended. Now that they have hands-on experience, it leaves a deeper impression, so I feel that collaborating with Cathay Century's Accident-free Rider activities is very meaningful.

Military instructor



- (III) Collaborative partners
 a. Tainan Traffic Police Corps
 For the outcome chain of events pertaining to collaborative partner
 – Tainan Traffic Police Corps, please refer to Appendix 3-3.

Outcome name	Chain of events	Indicator/evidence of occurrence (Objective/Subjective)	Outcome counted or not?
Reduced work time and further reduced workload	Sees the traffic safety teaching materials of Cathay Century's Accident-free Rider activity; invites Cathay Century to collaborating schools to promote traffic safety using Accident-free Rider teaching materials; routine work time reduced. The traffic police corps is responsible for promoting safety concepts to the public, so intervention of the Project saves Tainan Traffic Police Corps work time, and stakeholders provided feedback that it reduced their workload.	Stakeholder feedback from interviews - Actual traffic safety promotion labor cost savings - Actual work time saved	Based on stakeholder feedback from the phase 1 interviews, degree to which outcomes occurred was significant. Furthermore, stakeholders clearly replied the outcome's importance to them during the interview, and the average importance score among stakeholders was over 3 points. According to the SROI principle of materiality, the outcome was determined to be material and thus included.
Improved traffic safety curriculum design abilities	Stakeholders feedback that they did not have this outcome.	Stakeholder feedback from interviews - Extent of change in traffic safety curriculum design concepts/abilities	Based on stakeholder feedback from the phase 1 interviews, no significant



Outcome name	Chain of events	Indicator/evidence of occurrence (Objective/Subjective)	Outcome counted or not?
		after collaborating with Cathay Century Insurance	outcomes occurred. The change was 0 points (0-10 points) According to the SROI principle of materiality, the outcome was determined to be not material and thus excluded.
Negative outcomes	N/A	N/A	Based on stakeholder feedback from the phase 1 interviews and phase 2 questionnaire survey, there were no negative outcomes.

We originally used our own personnel for promotion, and shared videos of handling traffic accidents with students, but collaborating with Cathay Century saved some labor costs.

Past courses used presentations and example videos, but couldn't simulate riding on the road. Using a game allows actual situations to be simulated; we feel that the cross-use achieves better effects.

Tainan Traffic Police Corps



- b. Kaohsiung Motor Vehicles Office
For the outcome chain of events pertaining to collaborative partner
– Kaohsiung Motor Vehicles Office, please refer to Appendix 3-3.

Outcome name	Chain of events	Indicator/evidence of occurrence (Objective/Subjective)	Outcome counted or not?
Reduced work time and further reduced workload	Sees the traffic safety teaching materials of Cathay Century's Accident-free Rider activity; invites Cathay Century to collaborating schools to promote traffic safety using Accident-free Rider teaching materials; routine work time reduced. Kaohsiung Motor Vehicles Office is responsible for promoting safety concepts to the public, so intervention of the Project saves Kaohsiung Motor Vehicles Office work time, and stakeholders provided feedback that it reduced their workload.	Stakeholder feedback from interviews - Actual traffic safety promotion labor cost savings - Actual work time saved	Based on stakeholder feedback from the phase 1 interviews, degree to which outcomes occurred was significant. Furthermore, stakeholders clearly replied the outcome's importance to them during the interview, and the average importance score among stakeholders was over 3 points (0-5 points). According to the SROI principle of materiality, the outcome was determined to be material and thus included.
Improved traffic safety curriculum design abilities	Invite Cathay Century to collaborating schools to promote traffic safety using teaching	Stakeholder feedback from interviews - Extent of change in traffic safety curriculum design concepts/abilities after collaborating with	Based on stakeholder feedback from the phase 1 interviews, degree to which



Outcome name	Chain of events	Indicator/evidence of occurrence (Objective/Subjective)	Outcome counted or not?
	<p>materials for Accident-free Rider activities; in the process, interactions and exchanges provide better understanding of traffic safety curriculum design methods and equipment, which improves traffic safety curriculum design abilities; the design of teaching materials was also applied to the preparation of teaching materials for work.</p>	<p>Cathay Century Insurance - Actively search for resources and related diverse knowledge of relevant traffic safety textbooks - Teaching plans that applied the teaching material designs that were learned</p>	<p>outcomes occurred was significant. Furthermore, stakeholders clearly replied the outcome's importance to them during the interview, and the average importance score of Kaohsiung Motor Vehicles Office increased from 5 points to 7 points (0-10 points), which is over 3 points (0-5 points). According to the SROI principle of materiality, the outcome was determined to be material and thus included.</p>
<p>Negative outcomes</p>	<p>N/A</p>	<p>N/A</p>	<p>Based on stakeholder feedback from the phase 1 interviews and phase 2 questionnaire survey, there were no negative outcomes.</p>



Other supervisory units have begun developing VR teaching materials; this is a trend. Collaborating with Cathay Century has inspired some ideas for curriculum design. We are continuing to engage in exchanges with Cathay Century regarding design and production of VR equipment and teaching materials.

We actively contacted Cathay Century after seeing online that they had this system. Cathay Century was very friendly during the collaboration process; they were open to discussing all forms of collaboration. We think very highly of Cathay Century and believe that they have a strong sense of corporate social responsibility based on these activities and equipment.

Kaohsiung Motor Vehicles Office

(IV) Cathay Century Insurance

For the outcome chain of events pertaining to Cathay Century Insurance, please refer to Appendix 3-4.

Outcome name	Chain of events	Indicator/evidence of occurrence (Objective/Subjective)	Outcome counted or not?
Business development promoted	Collaborates with Kaohsiung Motor Vehicles Office and Tainan Traffic Police Corps to quickly promote traffic safety in collaborating schools; other private enterprises become more confident in Cathay Century after seeing its collaboration with the public sector; other private enterprises actively inquire about collaboration	Stakeholder feedback from interviews - the number of collaborating schools connected due to the implementation of this project - Actual quantity of successful business expansion due to the implementation of this project	Based on stakeholder feedback from the phase 1 interviews, degree to which outcomes occurred was significant. Furthermore, stakeholders clearly replied the outcome's importance to them during the interview, and the average importance score among stakeholders was over 4 points.



Outcome name	Chain of events	Indicator/evidence of occurrence (Objective/Subjective)	Outcome counted or not?
	<p>opportunities, and Cathay Century gained additional business development. Collaboration with the public sector (such as the motor vehicles office and traffic police corps) can help the private sector more quickly understand the business of Cathay Century. It also increases the private sectors' trust in Cathay Century. Collaboration with the public sector also led to business partnerships in the private sector.</p>		<p>According to the SROI principle of materiality, the outcome was determined to be material and thus included.</p>
<p>Positive corporate image enhanced</p>	<p>Promotion of traffic safety in collaboration with schools and partners makes more people aware of Cathay Century's traffic safety teaching materials for the Accident-free Rider Project; raises awareness of the project, and</p>	<p>Stakeholder feedback from interviews - Extent of agreement that there is improvement in Cathay Century Insurance's positive image due to the implementation of this project</p>	<p>Based on stakeholder feedback from the phase 1 interviews, degree to which outcomes occurred was significant. The average favorability of students, military instructors, and</p>



Outcome name	Chain of events	Indicator/evidence of occurrence (Objective/Subjective)	Outcome counted or not?
	<p>also causes others to approve of Cathay Century's corporate social responsibility, and thus improve its positive image. We also received positive feedback regarding the company from many people. Since cooperating with the school, so that more people who pay attention to this issue can understand Cathay Century Insurance, and because the course design is special, there are relevant reports and publicity. After stakeholders understand the content of Accident-free Rider activities, they think that Cathay Century Insurance is a socially-responsible corporate.</p>		<p>collaborative partners towards Cathay Century increased from 6 points to 9 points (0-10 points). Furthermore, stakeholders clearly replied the outcome's importance to them during the interview, and the average importance score among stakeholders was over 4 points. According to the SROI principle of materiality, the outcome was determined to be material and thus included.</p>
Negative outcomes	N/A	N/A	Based on stakeholder



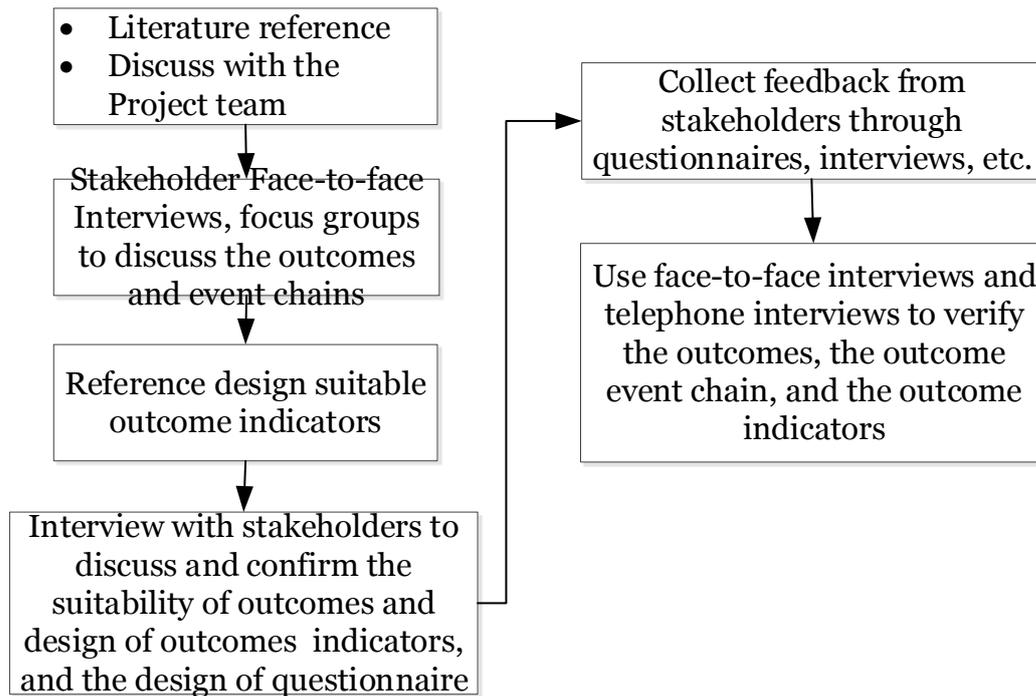
Outcome name	Chain of events	Indicator/evidence of occurrence (Objective/Subjective)	Outcome counted or not?
			feedback from the phase 1 interviews and phase 2 questionnaire survey, there were no negative outcomes.

Some private enterprises liked the way we collaborated with the public sector, and actively contacted us to inquire about traffic safety or relevant teaching materials and courses. Also, schools learned about our VR equipment and teaching materials through public sector introductions or in news and magazines, and actively inquired whether we can teach at their school. It seems like schools have transitioned from being passively contacted by us to actively contacting us.

Cathay Century

[Description of stakeholders' participation in assessing outcomes and finding indicators]

The design of the outcome event chain and indicators is mainly based on the feedback from the literature and the stakeholders, and the actual behavior, thoughts and cognitions of the stakeholders. The process of stakeholder participation is shown in the following flowchart:



The measurement of outcomes and outcome indicators in this report is also a qualitative and quantitative analysis. The qualitative data is mainly based on the content of stakeholder discussions, and the quantitative data is mainly based on research literature and questionnaire backfilling content, so as to avoid giving back too subjective. Stakeholders participate in the discussion at each important stage, and based on the results of the discussion, become an important basis for the next working stage. The outcome event chain and indicators are based on the feedback and literature of stakeholders.

III. Financial proxy for stakeholder outcomes

(I) Financial proxy research process

Financial proxies serve to convert the changes experienced by various stakeholders into a reasonable monetary value. This study discussed the outcome measurement method with stakeholders via a three-phase engagement process (qualitative and quantitative). We also referenced related literature¹⁹, such as other educational SROI certification reports, The Value of Business Involvement in Youth Development(p33-35), Computer Recycling and Education Project-Social Impact(p40-52) etc., or the financial proxies used in other SROI reports for similar outcomes, to understand potential financial conversion methods. We also discussed with stakeholders to verify that they understand conversion methods. After discussions with stakeholders, we found that stakeholders were able to understand methods that would result in the same degree of outcomes, or methods for directly converting costs/expenses/amounts, and they felt the conversion method was closer to

¹⁹ The Value of Business Involvement in Youth Development(p33-35), Computer Recycling and Education Project-Social Impact(p40-52)



how they felt. Hence, we used these methods to discuss suitable conversion methods and options for each outcome with stakeholders.

For each outcome, we found 1-4 types of methods that gave stakeholders a similar experience, or directly used the cost/expense/amount saved as a financial proxy, or used the same financial proxy with different frequencies or degrees ranked by value from low to high. We converted descriptions of the perceived value of outcomes in a way understood by stakeholders into options for choosing the value of an outcome, so that stakeholders can choose the option that best represents how they value an outcome. Furthermore, to prevent the choices of specific stakeholders from causing biased results, we included and calculated different value options selected by each stakeholder. In other words, a different ratio of stakeholders selected each option of an outcome, and then we calculated the outcome value of all stakeholders based on the weights. Hence, the value of an outcome is the average of all stakeholders.

For example, the outcome “Increased hazard perception and defensive driving skills” among students without a driver's license who participated in the conventional course is calculated below:

[Phase 1]: This study referenced related literature and discussed potential outcome conversion methods with stakeholders. After discussion, students felt the using other methods that would result in the same degree of change was better able to determine the value of the outcome “Increased hazard perception and defensive driving skills” that they gained from the Project. Students replied that “participation in driving lessons provided by the Directorate General of Highways” was the most similar way that could be used for conversion.

Phase 1: Discussion on financial proxies for outcomes (open discussion) (example)
Methods that may provide the same degree of outcomes include...
<ul style="list-style-type: none"> ■ <u>Directorate General of Highways Driving Training Course Fee</u> ■ Military training course ■ Subsidy for taking the driver’s license test ■ General safety promotions · · ·

[Phase 2]: After determining the conversion method students agreed with in phase one, we discussed the ranges of values with students , and found that students used driving lessons provided by the Directorate General of Highways in phase one as the baseline, with multiples of benefits as the best way for comparing and converting the outcome’s value. Hence, this study further discussed possible ranges of multiples with students, and designed the multiples into different options, also including an open option for students to describe their perceived value of the outcome. Finally, we compiled statistics of the each option selected by students, and then calculated the outcome value as a weighted average to ensure that we included the response of every stakeholder. Additionally, we verified calculation results with stakeholders, and discussed whether or not it matched how they felt. If it did not, we further discussed the



issue and made adjustments. The calculation process is the same for other outcomes.

Baseline

Phase 2: Calculating the Values of Outcomes (Example)		
Financial proxies	Pricing	Ratio selected by stakeholders
I don't think the Accident-free Riders course is less effective than the Directorate General of Highways' driving lessons	2,000	11%
I think the Accident-free Riders course is about as effective as the Directorate General of Highways' driving lessons	3,250	56%
I think the Accident-free Riders course is about twice as effective as the Directorate General of Highways' driving lessons	6,500	28%
I think the Accident-free Riders course is about three times as effective as the Directorate General of Highways' driving lessons	9,750	6%
Other; please specify:	Please specify	0%
Value of Outcome = $2,000 * 11% + 3,250 * 56% + 6,500 * 28% + 9,750 * 6% = 4,375$		

(II) Financial proxies

Increased hazard perception and defensive driving skills, prevent riding accidents and casualties, and how well students remember are all key factors in this study. We found from survey results that students that took the VR course seemed to remember better than students that took the conventional course. The survey of financial proxies also showed the same results; students without a driver's license who participated in the VR course have a higher weighted average score than students without a driver's license who participated in the conventional course. Hence, we divided students without a driver's license into two subgroups, students who participated in the VR course and students who participated in the conventional course. We summarized the financial proxies below:

Outcome name	Financial proxy	Stakeholders	Valuation of outcome (NT\$)	The process of stakeholder participation in determining financial proxies	Reference/s
Increased hazard perception and defensive driving skills	<ul style="list-style-type: none"> • Directorate General of Highways Driving Training Course Fee • School military training course • Driving classes subsidy • General safety promotion course 	CARA students without scooter driver's license	4,375	<p>Students felt the using other methods that would result in the same degree of change was better able to determine the value of the outcome. Therefore, we refer to other certified SROI reports²⁰ to discuss similar courses, lectures and other options that can achieve this outcome.</p> <p>In many comparative courses, the student feedback is relatively close to the "Director General Highway</p>	<p>https://www.thb.gov.tw/page?node=3aeeb988-137e-40ea-bbc4-b5dc4c45c5af</p>

²⁰ The Cornwall Exchange: A Social Return on Investment (SROI) Report, SROI of Taiwan Dream Project on Dahu Community etc.

Outcome name	Financial proxy	Stakeholders	Valuation of outcome (NT\$)	The process of stakeholder participation in determining financial proxies	Reference/s
		VARA students without scooter driver's license	4,909	<p>Driving Training Course", but for the benefits of the Project, students think that most of them are higher than the benefits of the course. In the absence of other suitable course alternatives, we discussed with the students the "Director General Highway Driving Training Course Fees" as a baseline, and designed different multiple options to allow students to choose the value of the outcomes.</p> <p>However, we also find that students have different choices about the value of the outcome. This report adopts a position of respect for the selection of stakeholders, and uses the weighted average method of calculating the values of each stakeholder as the basis for</p>	

Outcome name	Financial proxy	Stakeholders	Valuation of outcome (NT\$)	The process of stakeholder participation in determining financial proxies	Reference/s
				<p>pricing calculation. Therefore, based on the weighted average calculation, the outcomes are priced at approximately NTD 4,375 and NTD 4,909.</p> <p>Because there is no significant impact on management decisions, and in the case that the outcomes and indicators are the same, we choose not to re-group the molecular groups of stakeholders with different values. In the students' feedback, it is only considered that this is because everyone has different degrees of preference for the course, and there is no significant difference in outcomes (professional judgment).</p>	

Outcome name	Financial proxy	Stakeholders	Valuation of outcome (NT\$)	The process of stakeholder participation in determining financial proxies	Reference/s
Prevent riding accidents and casualties	Average non-property compensation for mental damages (minor/moderate injury) and average expenses for a bodily injury and property damage claims case	CARA students with scooter driver's license	362,833	Students felt that directly using cost was the best way to convert the outcome's value. After referring to relevant literature and discussing with experts and students, we understand that their car accidents and casualties can cause property damage and injury medical expenses, so we discuss with students to confirm the value of defensive driving skills learned in this project, which can prevent riding accidents and casualties. Students generally gave feedback that they could use the literature research survey and the actual average cost of property losses to	Estimation of Compensation for Damage Cost in a Traffic Accident ²¹ https://www.airtilibrary.com/Publication/alDetailedMesh?docid=10177159-200306-32-2-365-389-a 2018 Cathay Century Insurance claims data (bodily injury and property damage expenses)

²¹ Reference 4



Outcome name	Financial proxy	Stakeholders	Valuation of outcome (NT\$)	The process of stakeholder participation in determining financial proxies	Reference/s
				convert the pricing of outcomes, so they concluded that the pricing of the outcomes was about NTD 362,833.	

Outcome name	Financial proxy	Stakeholders	Valuation of outcome (NT\$)	The process of stakeholder participation in determining financial proxies	Reference/s
		VARA students with scooter driver's license			
Increased passion for teaching	<ul style="list-style-type: none"> Traffic safety course expenses Creative course expenses 	Military instructors	5,550	Military instructors felt the using other methods that would result in the same degree of change was better able to determine the value of the outcome.	Ministry of Education K-12 Education Administration Guidelines for Subsidizing Full-time High School

Outcome name	Financial proxy	Stakeholders	Valuation of outcome (NT\$)	The process of stakeholder participation in determining financial proxies	Reference/s
				<p>Therefore, we refer to other certified SROI reports to discuss similar courses, lectures and other options that can achieve this outcome.</p> <p>In many comparative courses, the military instructors' feedback are relatively close to the "traffic safety training course", so we conclude that the price of this outcome is calculated based on the average cost of the course of about NTD 5,550.</p>	<p>Professional Subject Teachers to Study or Conduct Research at Public and Private Institutions http://edu.law.moe.gov.tw/LawContent.aspx?id=GL000417</p>

Outcome name	Financial proxy	Stakeholders	Valuation of outcome (NT\$)	The process of stakeholder participation in determining financial proxies	Reference/s
Reduced work time and further reduced workload	Average labor actual cost saved per event	Tainan Traffic Police Corps	2,000	Based on discussions with collaborative partners, they feedback that the value of this outcome can be presented in a direct cost conversion manner. Therefore, the value of this outcome is calculated based on the actual reduction in labor costs of stakeholders' feedback. Therefore, based on actual conditions, the labor cost savings of the two units of collaborative partners were NTD 2,000 and NTD 9,136 respectively.	Average civil service salary multiplied by average hourly salary
		Kaohsiung Motor Vehicles Office	9,136		
Improved traffic safety curriculum design abilities	Average cost of outsourced development and equipment each year	Kaohsiung Motor Vehicles Office	1,250,000	The motor vehicles office replied that originally it planned to outsource a research project on future research directions and the most suitable equipment, but	Outsourcing research costs of practical experience

Outcome name	Financial proxy	Stakeholders	Valuation of outcome (NT\$)	The process of stakeholder participation in determining financial proxies	Reference/s
				the expense was saved after coming in contact with the Project, so it believes that the research project expense should be used as the financial proxy. Calculated based on average one-year outsourced research and development and equipment costs quoted by actual manufacturers.	
Business development promoted	Actual successful business development expenses	Cathay Century Insurance	62,000	Based on the feedback from Cathay Century, it gained additional business opportunities from the Project, and thus gained additional business performance and revenue. Hence, it replied that a suitable conversion method would be to use actual	Cathay Century Insurance Internal Management Report Information



Outcome name	Financial proxy	Stakeholders	Valuation of outcome (NT\$)	The process of stakeholder participation in determining financial proxies	Reference/s
				revenue as a financial proxy. Calculated based on the actual business income obtained as a result of the Project	
Positive corporate image enhanced	<ul style="list-style-type: none"> • Cost of newspaper, magazine, and news media exposure • Cost of design & production of promotion materials • Public Relations costs 	Cathay Century Insurance	300,000	Based on the feedback from Cathay Century, it gained a lot of exposure from the Project, so a suitable conversion method would be to use the cost of newspaper, magazine, and news media exposure as the financial proxy. Calculated based on average cost of newspaper, magazine, and news media exposure.	https://www.scooptw.com/%E5%BB%A3%E5%91%8A%E5%88%8A%E7%99%BB/

IV. Impact Factors in Relation to Stakeholders and Outcomes

In order to follow the SROI principle of Do Not Over-claim, we excluded influencing factors not caused by the project. The following four influencing factors were given consideration:

Adjusting Factor	Description
Deadweight	This refers to the percent likelihood of changes and outcomes occurring regardless of the implementation of a project; in short, it is the chance of the outcomes happening even if the project had not taken place. The deadweight for this project is based on the responses of the stakeholders in interviews and questionnaires, which are calculated as a weighted average.
Displacement	This refers to the proportion to which the outcome of the project only came about because problems were transferred to other places or displaced onto other people. There are no obvious issues of problem transference in this project. However, with consideration to the SROI principle of Do Not Over-claim, it is proposed that this factor be discussed in the sensitivity analysis and not included in the calculation of outcomes.
Attribution	This refers to the proportion of changes and outcomes brought about by this project that were the result of the contributions from other factors; in short, it is the chance that one cannot claim credit for the occurrence of the outcome. The attribution for this project is based on the responses of the stakeholders in interviews and questionnaires, which are calculated as a weighted average.
Drop-off	This refers to the rate at which the effects of the outcome diminish over time; in short, it is the rate at which benefits of the outcome decrease year by year. The drop-off for this project is based on the responses of the stakeholders in interviews and questionnaires, which are calculated as a weighted average.

Due to the relatively complex concepts of adjusting factors, we used qualitative and quantitative methods for discussion with stakeholders. During qualitative interviews, we used examples that allowed stakeholders to easily understand the contents of adjusting factors. Even though stakeholders understood the concepts of adjusting factors after hearing our explanation, they were unable to specify the exact ratio of each factor. We found that using a five-point scale enabled stakeholders to more effectively respond during discussions. When asking students about attribution for “Increased hazard perception and



defensive driving skills,” we asked them: “In addition to participating in this activity, were there other channels or methods that also helped you increase hazard perception and defensive driving skills? It may be the experience shared by your parents, or something you learned online. Did other factors contribute a high percentage? Students could use a five-point scale to respond: very high, high, average, low, and very low.

As for the quantitative questionnaire, we further verified the adjusting factor ratio of each outcome. We then analyzed and calculated the average of all feedback in phase one and phase two, and then we verified calculation results with stakeholders in phase three. For example, deadweight for “Increased hazard perception and defensive driving skills” among students without a driver's license who participated in the conventional course is calculated below:

[Deadweight] If you had not participated in this activity, how likely is it that you would have the opportunity to gain the same level of change in “Increased hazard perception and defensive driving skills” through other ways?		
Responses	Deadweight	Actual ratio of stakeholder feedback
There are many ways to gain the same change.	100%	0%
There are other ways to gain the same degree of change.	75%	11%
Other ways have 50% likelihood.	50%	79%
The other ways are not bad but can't achieve the same effect.	25%	5%
These changes are irreplaceable.	0%	5%
Calculation of deadweight for “Increased hazard perception and defensive driving skills” =100%*0%+75%*11%+50%*79%+25%*5%+0%*5%=49%		

This project mainly evaluates the impact of teaching materials developed by Cathay Century Insurance for Accident-free Rider activities held at three schools to promote traffic safety concepts. Two types of activities (conventional and VR) were organized. We found that students responded that the VR activities had better results; they felt these activities were more effective and unique. The ratio of impact factors not belonging to the project for each outcome was lower among students who participated in VR the activity, as compared with conventional activity students.

In the feedback from military instructors, they stated that promotion of traffic safety is their duty at school. Hence, besides working with Cathay Century Insurance, there is also great opportunity to collaborate with other units, so deadweight is relatively high.

In the feedback from the collaborative partners Tainan Traffic Police Corps and Kaohsiung Motor Vehicles Office, even if they did not collaborate with Cathay Century in promoting traffic safety, they would still have had the opportunity to collaborate with other units, which reduced their work time and further reduced workload. Furthermore, for the outcome “improved traffic

safety curriculum design abilities,” stakeholders stated that there was a good chance they would have learned from other schools or R&D units if they did not collaborate with Cathay Century. They also learned and engaged in exchanges with other units at the same time. Hence, the deadweight and attribution ratios here are relatively high.

Cathay Century Insurance noted that it was very unlikely to be actively contacted by other units for business cooperation in the past. Among property insurance units, this is the only charitable and educational project. Hence, the ratio of other impact factors is relatively low for the two outcomes “business development promoted” and “positive corporate image enhanced.”

Finally, our judgment process relating to displacement is as follows:

1. Cathay Century Insurance stated that they are currently not planning, nor simultaneously implementing, any other traffic safety education-related charity activities similar to Accident-free Riders.
2. Stakeholders all verified that outcomes from this project will not affect or displace any other outcomes.

Based on the stakeholder feedback above, we determined that the outcomes from activities of the project result in no significant transfer problems. However, with consideration to the SROI principle of Do Not Over-claim, it is proposed that this factor be discussed in the sensitivity analysis and not included in the calculation of outcomes.

Stakeholder		Outcome(s)	Deadweight	Attribution	Drop-off
CARA students	Students who don't have scooter driver's license	Increased hazard perception and defensive driving skills	49%	53%	27%
	Students who have scooter driver's license	Prevent riding accidents and casualties	47%	43%	22%
VARA students	Students who don't have scooter driver's license	Increased hazard perception and defensive driving skills	48%	42%	26%



	Students who have scooter driver's license	Prevent riding accidents and casualties	47%	43%	22%
Military instructors		Increased passion for teaching	63%	50%	0%
Tainan Traffic Police Corps		Reduced work time and further reduced workload	50%	0%	0%
Kaohsiung Motor Vehicles Office		Reduced work time and further reduced workload	10%	30%	0%
		Improved traffic safety curriculum design abilities	75%	90%	50%
Cathay Century Insurance		Business development promoted	10%	0%	0%
		Positive corporate image enhanced	10%	0%	20%

Chapter 3 SROI Calculation²²

SECTION 1 PRESENT VALUE OF OUTCOME IMPACT

We use outcomes from stakeholder engagement described above to calculate impact; the method for calculating the value of outcomes is as follows:

$$\text{Value of outcome} = \text{Number of outcomes} * \text{Valuation of outcome} * (1 - \text{Deadweight}) * (1 - \text{Displacement}) * (1 - \text{Attribution}) * (1 - \text{Drop-off})$$

Stakeholder		Outcomes	No. of outcomes ²³	Duration (years)	Valuation of outcome (NT\$)	Value of Outcome			
Name	Total population/unit					Discount rate (%)	1.040% ²⁴		
						Year 1 (post-activity)	Year 2	Year 3	Total
CARA students without scooter driver's license	31	Increased hazard perception and defensive driving skills	18	1.22	4,375	18,943	3,036	0	21,979

²² Please refer to Appendix 4 for the impact map with detailed calculations.

²³ The number of outcomes is the number of people verified to have the outcome after stakeholder engagement (qualitative and quantitative). With stakeholders who responded that they did “not” have the outcome, we verified lack of the given outcome, or that the degree did not reach the standard for being calculated (the change did not surpass 2 points and the importance score did not surpass 3 points).

²⁴ The discount rate used in this report is the three-year interest rate for fixed deposits offered by Chunghwa Post, as of June 2019.

Stakeholder		Outcomes	No. of outcomes ²³	Duration (years)	Valuation of outcome (NT\$)	Value of Outcome			
Name	Total population/unit					Discount rate (%)	1.040% ²⁴		
						Year 1 (post-activity)	Year 2	Year 3	Total
CARA students with scooter driver's license	20	Prevent riding accidents and casualties	0.2 ²⁵	1.86	362,833	16,830	11,266	0	28,096
VARA students without scooter driver's license	51	Increased hazard perception and defensive driving skills	33	1.30	4,909	49,029	10,731	0	59,759
VARA students with scooter driver's license	42	Prevent riding accidents and casualties	0.3 ²⁶	1.86	362,833	35,343	23,658	0	59,001

²⁵ The traffic accident rate of students who did not participate in activities is subtracted from the traffic accident rate of students who did, and the result is multiplied by the total population.

²⁶ Same as Note 7.

Stakeholder		Outcomes	No. of outcomes ²³	Duration (years)	Valuation of outcome (NT\$)	Value of Outcome			
Name	Total population/unit					Discount rate (%)	1.040% ²⁴		
						Year 1 (post-activity)	Year 2	Year 3	Total
Military instructors	2	Increased passion for teaching	2	2 ²⁷	5,550	2,081	2,081	0	4,163
Tainan Traffic Police Corps	1	Reduced work time and further reduced workload	9 ²⁸	0.5	2,000	9,000	0	0	9,000
Kaohsiung Motor Vehicles Office	1	Reduced work time and further reduced workload	7 ²⁹	0.5	9,136	40,291	0	0	40,291
		Improved traffic safety curriculum	1	0.25	1,250,000	30,242	0	0	30,242

²⁷ Military instructors replied that they also learned from the dynamic interactions during the Project's course, which left a deep impression. Hence, they believe that the passion for teaching will continue to the courses in the following year.

²⁸ Reduces labor costs for 9 personnel within scope of assessment and period for this project.

²⁹ Reduces labor costs for 7 personnel within scope of assessment and period for this project.

Stakeholder		Outcomes	No. of outcomes ²³	Duration (years)	Valuation of outcome (NT\$)	Value of Outcome			
Name	Total population/unit					Discount rate (%)	1.040% ²⁴		
						Year 1 (post-activity)	Year 2	Year 3	Total
		design abilities							
Cathay Century Insurance	1	Business development promoted	1 ³⁰	1	62,000	55,800	0	0	55,800
		Positive corporate image enhanced	1	1	300,000	270,000	0	0	270,000
Present value by year						527,560	50,771	0	NA
PV						\$577,808			
Total inputs						\$175,256			
Social return on investment (SROI) ³¹						\$3.30			

³⁰ Since the valuation of outcome is calculated based on the total expenses for successful business development during the assessment period, the number of outcomes is 1.

³¹ SROI = Total present value/Total inputs

SECTION 2 SENSITIVITY ANALYSIS

Since the calculation of SROI takes qualitative and narrative information, which is not quantified, and assigns monetary value to it, there is a great deal of assumption and estimation involved. The SROI standards require that each analysis report include a sensitivity analysis and disclose relevant information, to ensure that the results are objective and verifiable.

The adjusting factors and financial proxies for this analysis report are calculated as weighted averages or the actual cost/expense. We add 10% to or subtract 10% from the original result of the SROI calculation, and adjust the four adjusting factors to 10% and 30% if they originally fell below 10% for any of the outcomes. Also, the outcomes of parents who were indirectly impacted were also included in the calculation. The outcomes “reduced riding accidents and casualties” among students with a driver’s license and “reduced effort handling student traffic accidents” among military instructors were excluded from the calculation, and all student outcomes were calculated using “Increased hazard perception and defensive driving skills.” We also tested adjustments to the outcomes and inputs of certain outcomes, and the arrived-at SROI sensitivity analysis range for this project was between 2.31 and 3.63.

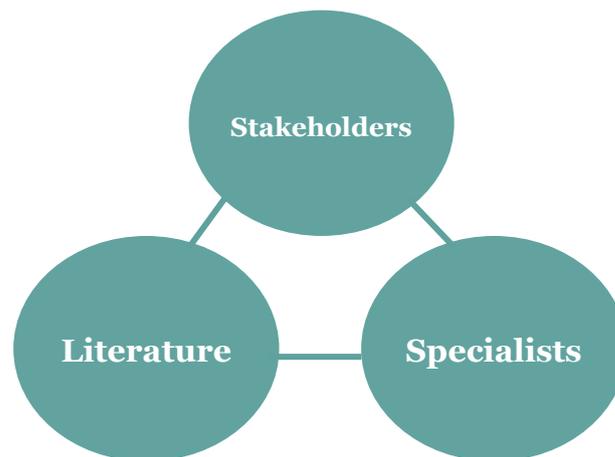
SROI	Adjustment	Details
3.63	SROI	Increased by 10%
2.97	SROI	Decreased by 10%
3.30	Deadweight	< 10% adjusted to 10%
3.30	Deadweight	< 10% adjusted to 30%
3.11	Attribution	< 10% adjusted to 10%
2.72	Attribution	< 10% adjusted to 30%
3.30	Drop-off	< 10% adjusted to 10%
3.29	Drop-off	< 10% adjusted to 30%
2.97	Displacement	0% adjusted to 10%
2.31	Displacement	0% adjusted to 30%
3.63	Stakeholders and Outcomes	The outcome “gained a sense of security” among parents was included and calculated as scooter-related equipment and maintenance expenses for their children. (NTD 1,750)
2.82	Outcomes and Value of Outcomes	The outcomes “prevented riding accidents and casualties” among students with a driver’s license and “reduced effort handling student traffic accidents” among military instructors were excluded



		from the calculation, and all student outcomes were calculated as “Increased hazard perception and defensive driving skills.”
2.99	Value of Outcomes	The financial proxy of the outcome of Cathay Century Insurance's “positive corporate image enhanced” was changed to the magazine’s general cross-page publication fee.(NTD 240,000)
3.29	Input	Calculated based on the average monthly salary of the military instructors hourly salary multiplied by the average hours of activity. (NTD 83,175/per month)

SECTION 3 VERIFICATION OF OUTCOMES

In the third phase engagement process to verify outcomes, we confirm all the outcomes and the content of the analysis with the stakeholders face-to-face or on the phone. In addition, to ensure that all of the research and analysis results are in line with the actual situation, we also referred to relevant literature³², stayed in close contact with experts, and held discussions with them during the engagement process. The verification process is as follows:



- I. Verification of the outcome chain of events
We drew the outcome chain of events from the results of the interviews and questionnaires, then we verified it with the various types of stakeholders. Since the outcome chain of events is taken from stakeholder feedback, most of the stakeholders agreed with what was depicted in the chain of events,

³² Refer to the Reference section for details.



which was the process in which the outcome occurred, during the verification phase. In the phase 1 and phase 2 engagement results, no stakeholders mentioned any negative outcomes. Hence, we specially discussed the situation with stakeholders during phase 3 to verify that no negative outcomes occurred.

II. Validation of calculation results

We explained to the stakeholders the logic behind the calculations and its meaning, and we further verified the importance and degree to which the outcome occurred to the stakeholders, in order to confirm whether they were consistent with the final calculations. The stakeholders all agreed with our calculation results, and felt that the results matched their perceptions and feedback.

III. Supplemental engagement

We verified important contents of the report face-to-face with stakeholders (e.g. students, military instructors, collaborative partners, and Cathay Century's project team) by conducting focus group interviews on December 2 and 5. We explained each important content in detail, and asked open questions to gain feedback from stakeholders. We summarized related contents below:

Contents that were verified	Special matters of discussion	Stakeholder feedback
Completeness of stakeholders	Whether or not parents, nearby hospitals, nearby police stations, nearby scooter repair shops, or other students who did not participate in project activities should be included in stakeholder analysis	Even though everyone enthusiastically participated in the discussion and proposed many hypothetical outcomes, such as the police having more time to enforce traffic rules or business getting worse for scooter repair shops, report users did not believe that the results would affect their decision. In the end, since no one could provide direct evidence and the stakeholders did not experience project activities, we maintained the original scope.
Correctness of descriptions and calculations of inputs and outputs	Verified the correctness of resources that were input	After verification, it was not necessary to adjust the original calculation method and basis, and the professional account that we inquired also did not make any adjustment recommendations.



<p>Discussion on the chain of events</p>	<ul style="list-style-type: none">• Discussed if each outcome is well defined and reconfirm the degree of change in the outcome and the importance to stakeholders.• Attempted to discuss negative outcomes, and even propose hypotheses or examples to verify if there was a negative outcome, such as waste of time or budget displacement.• Discussed whether or not the outcome "family fragmentation" should be included in the analysis.	<ul style="list-style-type: none">• Reexamined the chain of events and discussed it with stakeholders to verify their thoughts, recommend adjustments to the names of certain outcomes to better describe the contents of impacts. Moreover, we conducted a score measurement on the materiality of the Project to their impact in "Reduced teaching plan preparation time" and "Reduced effort handling student traffic accidents ". The degree of materiality of military instructors' feedback is relatively small, only 2 points (0-5 points). Therefore, according to the SROI principle of materiality, the outcome was determined to be not material and thus excluded.• Even though everyone enthusiastically discussed negative outcomes, it was limited to the imagination of other stakeholders, such as: business for teaching materials sold by the motor vehicles office would become poorer due to the course, or the number of military instructors would be reduced, but the imagined negative outcomes would be denied by actual stakeholders.• Since there were no special accidents during the assessment period
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		and scope, and there is no consensus regarding the chain of events and value, family fragmentation was not included as an outcome of the Project without sufficient evidence and support from stakeholders.
Discussion on the quantification of outcomes	Discussed the number of outcomes, duration, reasonableness of indicators, and basis of calculations	Stakeholders replied that the outcome is simple and the objective is clear, indicators that serve as evidence are from academic research and understood by the general public. Hence, no stakeholders questioned the quantification of outcomes during discussions and verified it was correct.
Calculation process of financial proxies and reasonableness of choices	Discussed the origin of financial proxies and why financial proxies are necessary	We engaged stakeholders and allowed them to choose financial proxies and valuation methods again, but still obtained the same result
Discussion on stakeholder subgroups	Discussed whether or not there are other factors that will affect subgroups, as well as the reasonableness of current subgroups	After conducting the focus group interviews with stakeholders, there were no dissenting opinions.
The decision process and reasonableness of adjusting factors	Explained the meaning of adjusting factors and calculation method again.	A vote was taken and stakeholders do not believe it is necessary to change the hypotheses
Final result	Calculated values and sensitivity analysis	Stakeholders did not have any specific opinions, and only said that the VR game was very interesting and hoped the game would become more popular. They also said that they hope to have more instructions related to concepts, such as how to handle an accident after it occurs, and some correct responses.



IV. Conclusion verification

With regard to the calculation, engagement, and verification process in this report, the project team does not believe calculations by others for project activities will be significantly different from the calculation results in this report, which match the expected management outcome of lowering traffic accident rates and improving defensive driving skills of college students.



Chapter 4 Conclusion

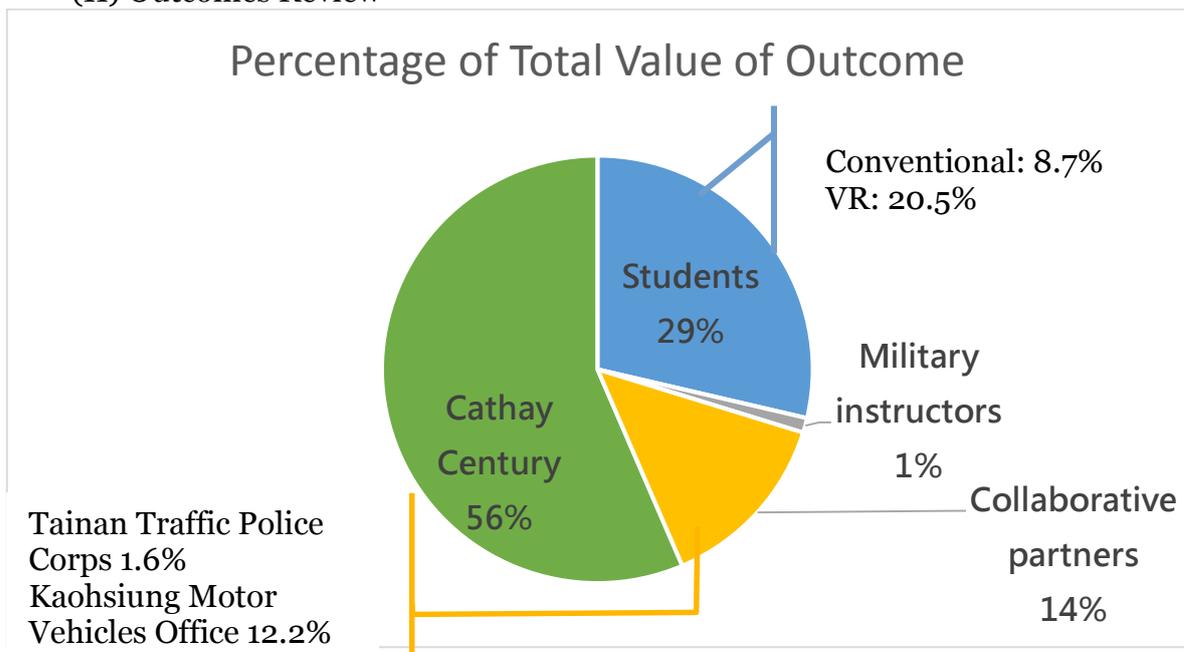
I. Results analysis

(I) Target Review

We verified the achievement of the project's targets through the stakeholder engagement results. It was found that the project targets were mostly achieved. The targets and the corresponding engagement results are as follows:

Project Target	Target Review
To protect students' safety when riding motor scooters, raise public awareness of risk management, and reduce the severity and frequency of accidents.	<ul style="list-style-type: none"> ✓ On average, 68% of students gained more confidence and were more sure of themselves when riding on the road. ✓ On average, 80% of students gained a better understanding of traffic risks and danger prevention concepts. ✓ On average, 65% of students gained Increased hazard perception and defensive driving skills. ✓ Students who participated in Accident-free Rider activities were not involved in any traffic accidents during the half-year in question (including winter vacation), and the school's traffic accident rate declined during the same period.

(II) Outcomes Review

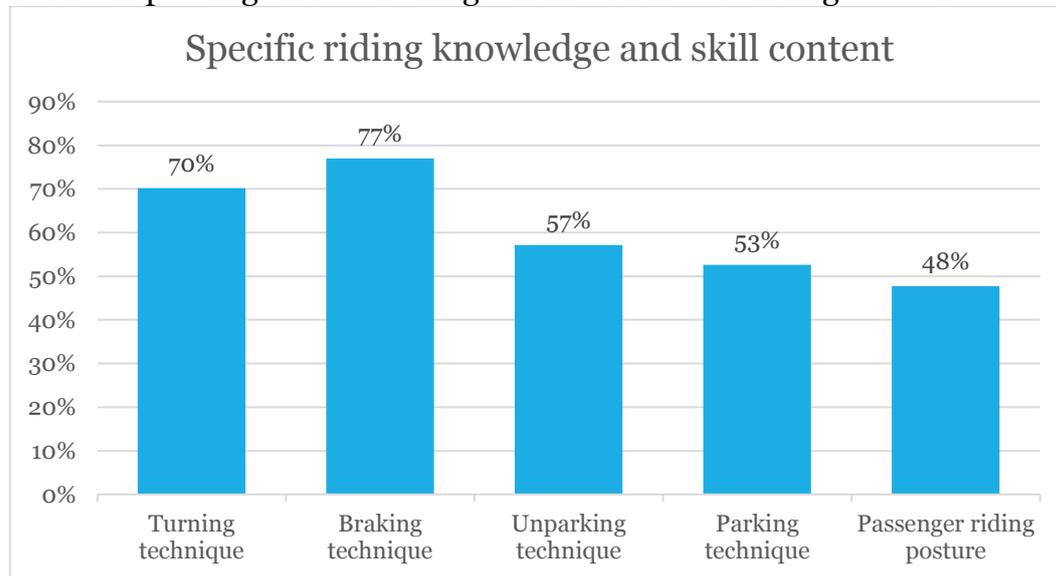


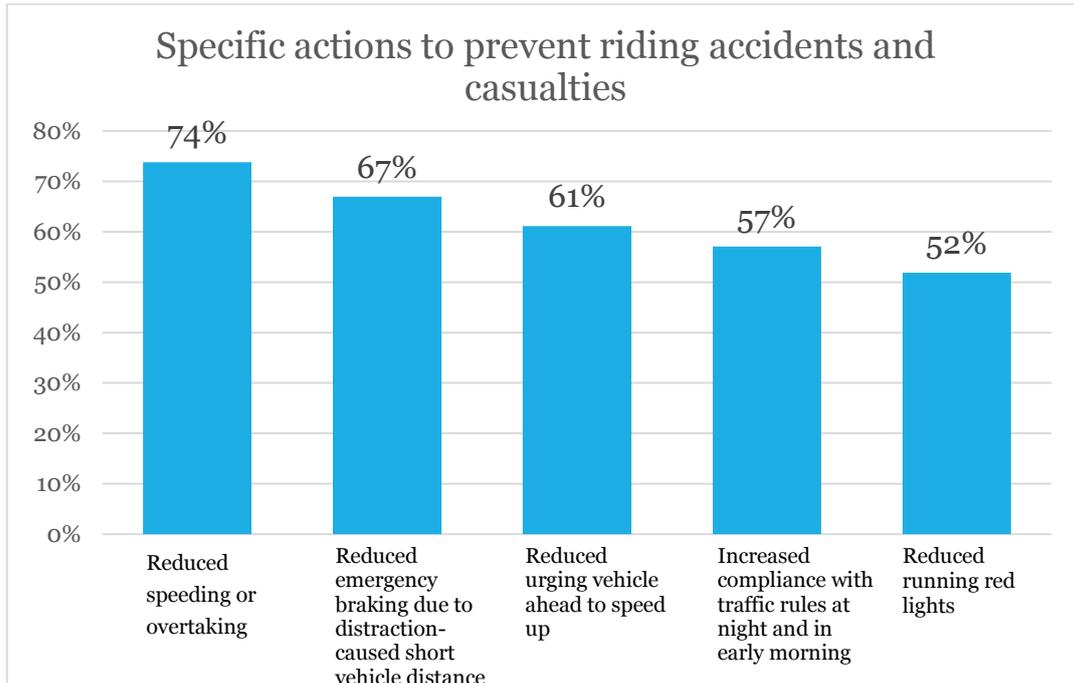
Cathay Century Insurance is the most affected stakeholder of this project, accounting for 56% of total outcome value. This shows that implementation of the project not only affects others, but also generates considerable outcomes for



the implementer. Students are the second most affected stakeholder of this project; the value of their outcomes accounts for 29% of the project's total value of outcomes. Collaborative partner outcomes accounted for 14% of the total value of outcomes, making them the third most affected stakeholders of the project. Within this, outcomes for the Tainan Traffic Police Corps accounted for 1.6%, and outcomes for the Kaohsiung Motor Vehicles Office accounted for 12.2%. Last are military instructors, who account for 1% of total outcome value.

We took a closer look at the outcomes that students, the most directly affected group of stakeholders, received from project activities; we found that within their hazard perception and defensive driving skills, they made the greatest improvements in braking and turning knowledge and skills, which also made a relatively deep impression. Furthermore, with regard to specific actions to prevent riding accidents and casualties, we found that the concepts students learned from the activities, warnings in videos, and VR simulations clearly reduced speeding and overtaking when students are riding scooters.





II. Recommendations and conclusions

Based on the feedback and calculation results of the stakeholders, we summarized the following findings and suggestions, then held a discussion and gave a report to the Cathay Century Insurance project leader and supervisor, in hopes of achieving project optimization and maximizing social impact through the conclusions of this study.

Findings	Recommendations
<p>Finding 1: Critical for depth of impact</p> <p>Students can easily become distracted if they are not given the opportunity for hands-on interaction, resulting in students absorbing less from activities.</p>	<p>Increase the amount students absorb from activities</p> <p>Competitions between classes or interactive games with the teacher should be added to the activity design, to make students even more involved and create an even more energetic activity atmosphere.</p>
<p>Finding 2: Critical for expanding impact</p> <p>(1) Stakeholders directly affected by the activity are clear, but there is still room for improvement when it comes to the indirect benefits.</p> <p>(2). Stakeholders might not be able to express their feelings or impact</p>	<p>Expand indirectly affected stakeholders</p> <p>Students should be encouraged to share this Project and the concepts of defensive driving they learn from this Project with their parents to expand the impact of this Project.</p> <p>In the future, in order to optimize project management, we will</p>



Findings	Recommendations
<p>incurred on them if they have no relevant real experience.</p>	<p>(a) Collect and research more relevant literature before we interview with stakeholders.</p> <p>(b) Conduct more in-depth discussion with more relevant information with stakeholder, such as the potential consequences from insufficient defensive driving knowledge or skills, or the possible impact resulting from accidents.</p> <p>(c) Provide a complete picture of preliminary conclusion when verifying with stakeholders so that we can avoid misunderstanding and ensure the completeness and reasonableness of the SROI analysis.</p>
<p>Finding 3: Comply with the Principles for Sustainable Insurance³³</p>	
<p>Principle 1 “We will embed in our decision-making environmental, social and governance issues relevant to our insurance business”</p>	<p>Continue to promote campus activities</p>
<p>Develop/support education projects relating to risks, insurance, and ESG issues, and implement Accident-free Rider campus activities.</p>	<p>Continue to promote campus activities, communicate the important of traffic safety, and give students the opportunity to come in contact with Cathay Century Insurance, thereby raising Cathay Century Insurance brand awareness.</p>
<p>Principle 2 “We will work together with our clients and business partners to raise awareness of environmental, social and governance issues,</p>	<p>Raise stakeholders’ risk awareness and effectively manage risks</p>

³³ The Principles for Sustainable Insurance (PSI) were formally announced during a Rio+20 meeting, which was co-organized by the United Nations Environment Programme’s Finance Initiative (UNEP FI), the 48th International Insurance Society (IIS) annual conference, and the Brazilian Insurance Confederation, in Rio, Brazil on June 19, 2012. The PSI are guiding principles for the risks and opportunities derived from environmental, social, and governance (ESG) issues.



Findings	Recommendations
manage risk and develop solutions”	
The Zero-Accident Academy website allows customers to test different risk systems, uses interactive and diverse education methods, and effectively assesses drivers' ability to recognize hazards while driving.	Gather large amounts of risk data through the driving behavior questionnaire and hazard perception training course, then further analyze the data and provide it to schools and companies to raise their risk awareness and effectively manage risks.
Principle 3 “We will work together with governments, regulators and other key stakeholders to promote widespread action across society on environmental, social and governance issues”	Continue to work with government agencies
Jointly promote motor scooter traffic safety education activities in cooperation with government agencies, and enhance government agencies' curriculum development capacity.	Through Accident-free Rider activities, work with government agencies to promote motor scooter traffic safety concepts on campus; increase the frequency of interactions and exchanges with government agencies, and increase opportunities for business expansion.
Principle 4 “We will demonstrate accountability and transparency in regularly disclosing publicly our progress in implementing the Principles”	Continue to track and update the benefits and impact of the Accident-free Rider Project
We expect to disclose Accident-free Rider activity benefits in the PSI Disclosure Report.	Periodically communicate and interact with stakeholders, and disclose information for stakeholders to fully understand project contents and relevant measurement information.

We will use the experience gained from the SROI assessment process, including in-depth interactions with stakeholders, and understanding shareholders' impacts from and perceptions of the activities; through this



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experience and understanding, we will continue to utilize Cathay Century Insurance's core competencies in risk assessment and loss prevention to make timely strategy adjustments and optimize activities/projects, thus continuing to work step by step to protect the society and people of Taiwan.



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Appendix 1 Interview Outline and Questionnaire

➤ Interview Outline

Measures	Interview Questions
Outcomes	What changes have been made to you personally, the groups you represent, or the people around you after collaborating/participating in the Cathay Century Insurance Accident-free Rider Project (including: thoughts, actions, perception, and emotions)? Were there any negative changes?
Deadweight	If you did had not collaborated/participated in the Accident-free Rider Project of Cathay Century Insurance, would it still be possible for the above changes to have taken place?
Attribution	Are there other factors that contributed to the above changes taking place?
Displacement	Did the outcome of the activity transfer problems to other places?
Drop-off/Duration	How long did these changes last? Did they gradually decrease over time?
Degree of Importance	Please rank the above changes according to their degree of importance to you.
Pricing	Are there other channels that could achieve the same changes as the ones accomplished by this project? What would be the cost of these channels?
Other	Were there any other unexpected changes? Please explain. Do you have any other thoughts or suggestions regarding Cathay Century Insurance and Accident-free Rider activities?

➤ Questionnaire contents (for students)

Basic information	Gender; age; does or does not have a driver's license
Taking the outcome of "Increased hazard perception and defensive driving skills" as an example, each outcome is inquired about according to the following logic	
Outcome Verification	<p>From the Accident-free Rider activity, did you learn the correct posture, braking skills, and what to pay attention to when riding on the road?</p> <p><input type="checkbox"/> No, I did not gain/increase any hazard perception and defensive driving skills (0%)</p> <p><input type="checkbox"/> Yes, I gained/increased a little hazard perception and defensive driving skills (25%)</p>



	<input type="checkbox"/> Yes, I gained/increased some hazard perception and defensive driving skills (50%) <input type="checkbox"/> Yes, I gained/increased a lot of hazard perception and defensive driving skills (75%) <input type="checkbox"/> Yes, I gained/increased a huge amount of hazard perception and defensive driving skills (100%) <input type="checkbox"/> Other, please specify: _____
<p>Outcome Indicators</p>	<p>Which of the following “hazard perception and defensive driving skills” did you learn from the Accident-free Rider activity? (Choose all that apply.)</p> <input type="checkbox"/> [Turning technique] Slow down before entering the turn; maintain the same speed during the turn, and bring the scooter upright after exiting the turn. <input type="checkbox"/> [Braking technique] The correct braking technique is to use the front, back, and engine brakes at the same time. <input type="checkbox"/> [Unparking technique] When unparking, keep the handles and scooter level. Lift the front wheel up so the back wheel can touch the ground, then push the scooter forward. Keep the brake on while the center stand retracts, to prevent the scooter from sliding and to complete unparking. <input type="checkbox"/> [Parking technique] Keep the handles perpendicular to the scooter’s body. Keep the scooter straight and use your left hand to control the steering handle. Use your right hand to control the bracket and face the back of the scooter; use the tip of your right foot to step on the stand and move your center of gravity backward. Move your body near the scooter; the hand on the handle should not be exerting any strength. Use your right leg to step down, and use your right hand to lift the scooter up at a 45 degree angle, to set the motor scooter on the center stand and finish parking. <input type="checkbox"/> [Passenger riding posture] When carrying a passenger, the passenger must clasp their hands over the driver's stomach. The passenger's knees should be lightly pushing against the driver's thigh to maintain the same posture as the driver. The passenger's feet should be placed on the footrest to complete correct passenger posture. <input type="checkbox"/> I did not learn any of the above hazard perception or defensive driving skills <input type="checkbox"/> Other, please specify: _____
<p>Degree of change</p>	<p>Do you think you had any of the “increased hazard perception and defensive driving skills” change, before and after taking the Accident-free Riders course? (Please rate the difference before and after taking the course from 1 to 10.) Before participation: _____ points. After participation: _____ points.</p>



Deadweight	<p>If you had not participated in this activity, how likely is it that you/the students would have the opportunity to gain the same level of change through other ways?</p> <ul style="list-style-type: none">a. 100%, There are many ways to gain the same change.b. 75%, There are other ways to gain the same degree of change.c. 50%, Other ways have 50% likelihood.d. 25%, The other ways are not bad but can't achieve the same effect.e. 0%, These changes are irreplaceable.f. Other, please specify: _____
Attribution	<p>In addition to participating in this activity, were there other channels or methods that also helped you/the students gain the following changes? What is the degree of contribution of these factors to this change?</p> <ul style="list-style-type: none">a. 100%, This activity takes full credit!b. 75%, It was mostly due to this activity!c. 50%, Half of the contribution was due to this activity!d. 25%, It was mostly due to other reasons!e. 0%, The change had nothing to do with this activity!f. Other, please specify: _____
Displacement	<p>Did the outcome of the activity transfer problems to other places?</p> <ul style="list-style-type: none">a. 100% Transferred to other placesb. 75% Mostly transferred to other placesc. 50% Transferred to other placesd. 25% Mostly transferred to other placese. 0% Not transferred to other placesf. Other, please specify: _____
Duration	<p>After the activity ends, how long do you think these changes you have gained in the past will last?</p> <ul style="list-style-type: none">a. Within 1 yearb. 1 to 2 yearsc. 2 to 3 yearsd. Other, please specify: _____



Drop-off	Will the changes become less obvious over time? How much will the benefits decrease in the second year compared to the first year? a. Will not decrease; effects will stay the same in the second year b. Decrease by about 25%; effects may decrease a little bit in the second year c. Decrease by about 50%; effects may decrease by half in the second year d. Decrease by about 75%; small portion of effects may remain in the second year e. Other, please specify: _____
Valuation of outcome	Which of the following items would give you the same feeling or value as the [Increased hazard perception and defensive driving skills] you gained the from Accident-free Rider activity? a. Roughly the same hazard perception and defensive driving skills I could learn from two military education classes b. Roughly the same hazard perception and defensive driving skills I could learn from one motorscooter road traffic safety seminar held by the Directorate General of Highways, Police Department, or Motor Vehicles Office c. Roughly the same hazard perception and defensive driving skills I could learn from a motorscooter training course with the government's new Motorscooter Riding Training Subsidy d. Roughly the same as participating in an interactive motorscooter safety activity, in which an instructor demonstrates riding techniques and gives chances to practice the techniques e. Other, I think _____
Other outcomes	Have you experienced any changes or impact that was not mentioned above? Please explain.
Other suggestions and thoughts:	Do you have anything you would like to say to Cathay Century Insurance?

Appendix 2 Number of stakeholders engaged

Stakeholder		Total population/unit	Phase 1 ^{Note 1} (No. of interviewees)	Phase 2 ^{Note 2} (No. of questionnaires)	Phase 3 ^{Note 3} (No. of interviewees)	Total engagement
Students	CARA students	51	30	51	13	94
	VARA students	93	45	61	13	119
Parents		144	6	NA	NA	6
Military instructors		2	2	NA	4	6
Collaborative partners ^{Note 4}	Hsinchu Safety Educational Center	1	1	NA	NA	1
	Tainan Traffic Police Corps	1	1	NA	2	3
	Kaohsiung Motor Vehicles Office	1	1	NA	2	3
Cathay Century Insurance		1	2	NA	5	7

Note 1 : The first phase of the interview was conducted immediately after the implementation of the Accident-free Rider activity.

Note 2 : The second phase of the questionnaire survey will be conducted approximately six months after the implementation of the Accident-free Rider activity.

Note 3 : The third stage interview is carried out after the completion of the statistical analysis of the second phase (about 1 to 2 months from the second phase)

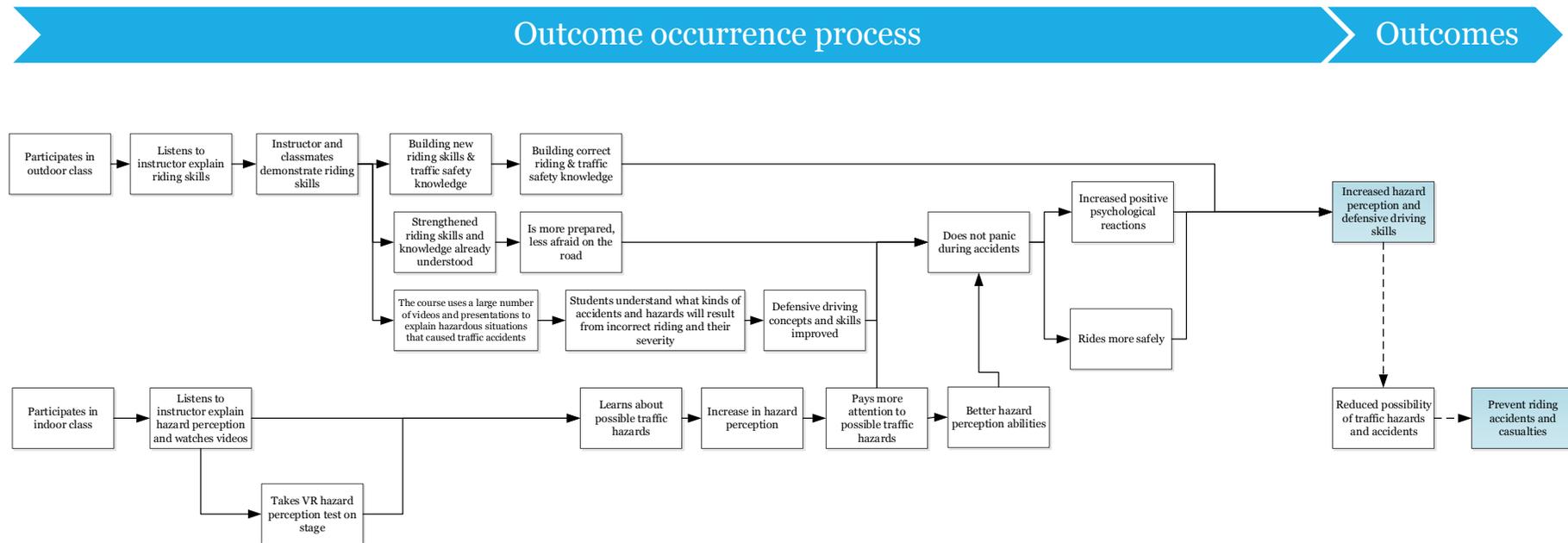
Note 4: With regard to collaborative partners, we engaged organization managers with an in-depth understanding and direct contact with the Project, in order to determine how they were impacted and their changes after coming in contact with the Project.

Due to the large number of student stakeholders, we engaged different students in the phase 1 interviews and phase 2 questionnaire survey. Furthermore, to fully understand the impacts and changes of different stakeholders, the number of person-times we engaged each type of stakeholder was greater than the total population of the type of stakeholder. After engaging parents, we found that the impact was relatively indirect, so parents were not included in the calculation and only included in the sensitivity analysis. The collaborative partner Hsinchu Safety Educational Center did not have any significant impacts or changes, so only its inputs were included in the calculation.

Appendix 3 Stakeholders' Chain of Events

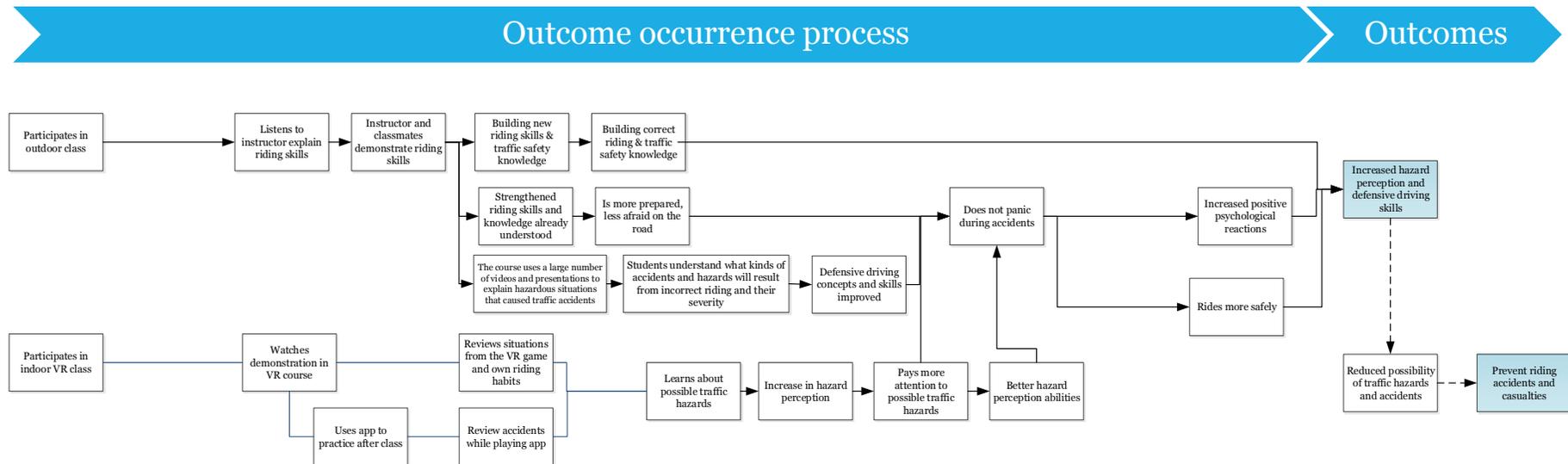
1. STUDENTS

a. CARA students



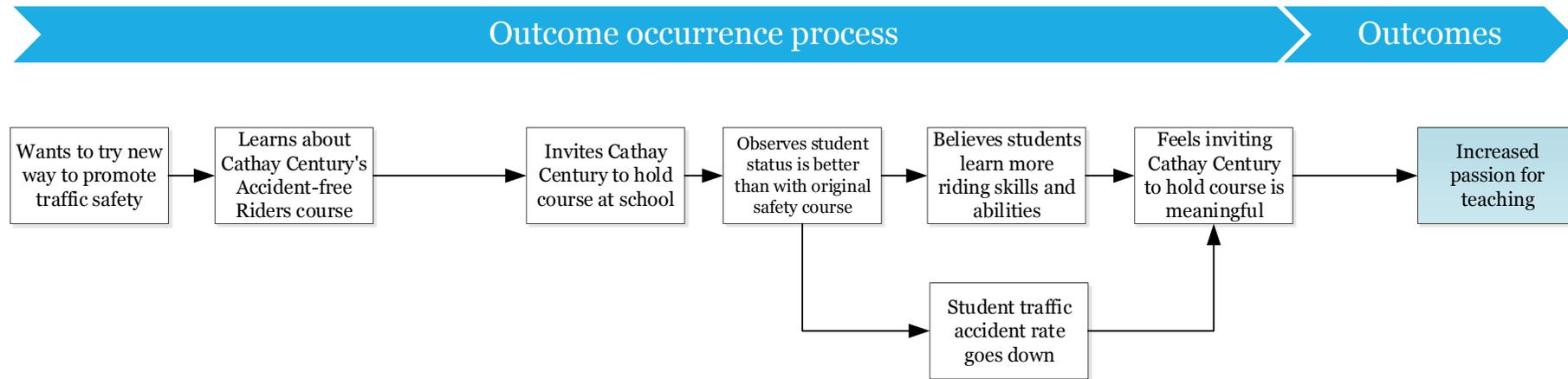
Note: The dotted line shows the process of how “students with a driver's license participating in conventional Accident-free Rider activities” arrived at the ultimate outcome “reduced riding accidents and casualties.”

b. VARA students



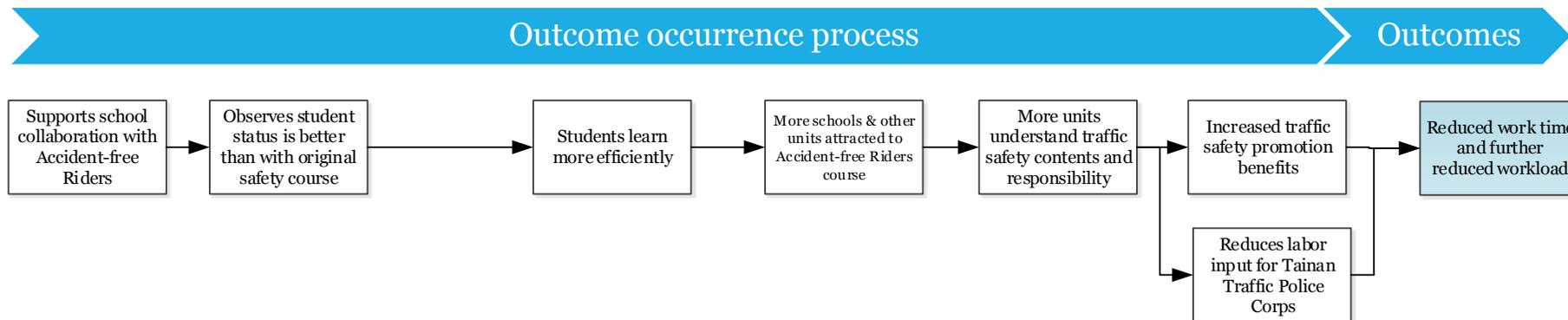
Note: The dotted line shows the process of how “students with a driver's license participating in VR Accident-free Rider activities” arrived at the ultimate outcome “reduced riding accidents and casualties.”

2. MILITARY INSTRUCTORS

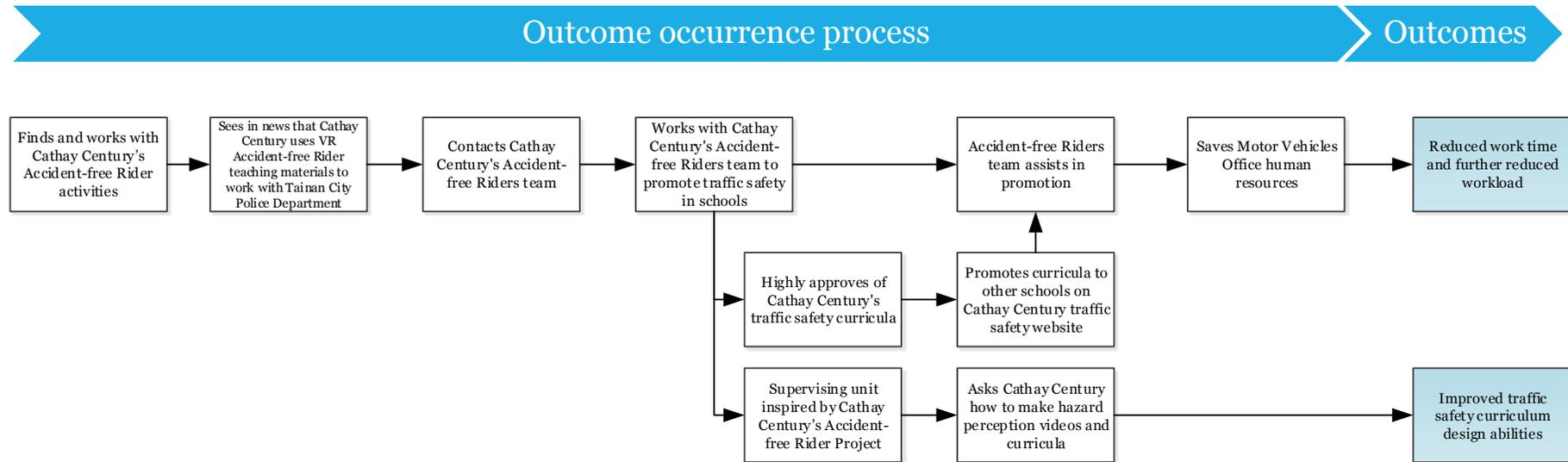


3. COLLABORATIVE PARTNERS

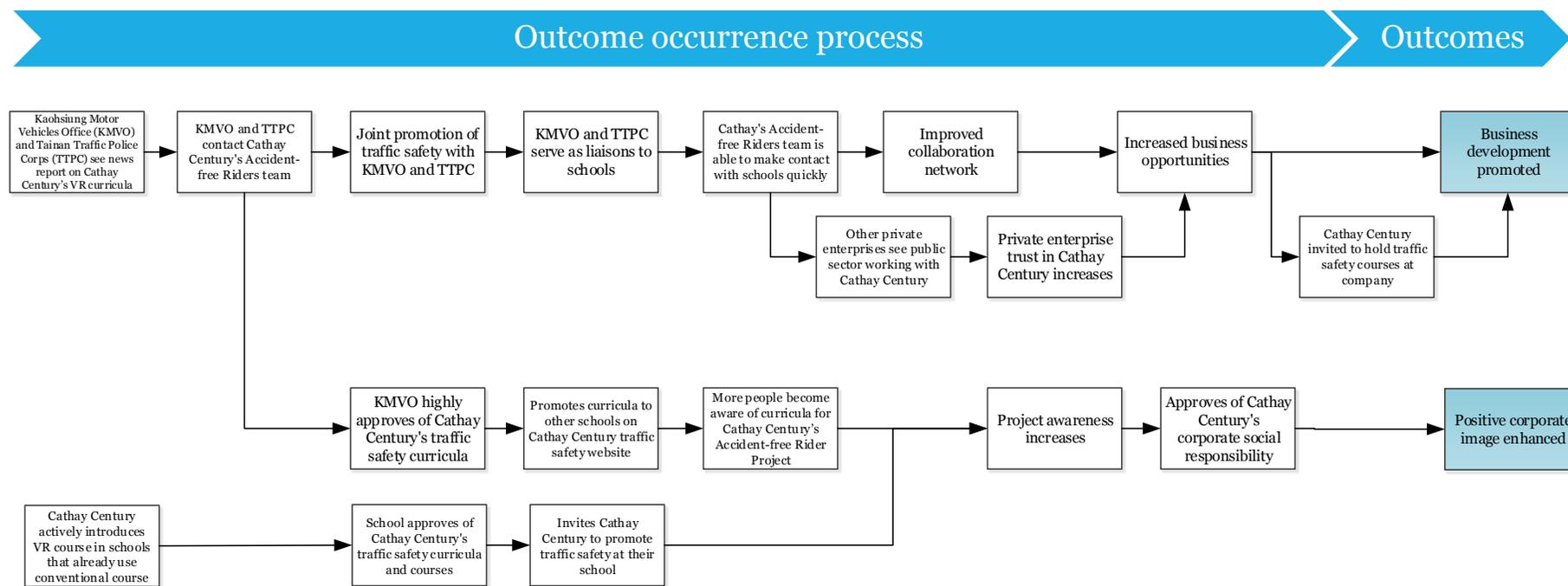
a. Tainan Traffic Police Corps



b. Kaohsiung Motor Vehicles Office



4. CATHAY CENTURY INSURANCE



Appendix 4 Impact Map

Social Value UK - 影響力地圖

Spreadsheet for developing SROI analysis. See guidance tab for further details.

Stage 1		Stage 2		Stage 3										Stage 4			Stage 5						
Stakeholders		Inputs		Outputs	Outcomes										Deadweight% (c)	Attribution% (e)	Drop off % (f)	Impact (G)	Calculating Social Return				
Who do we have an affect on?	Number of the stakeholders	What do they invest?	What is the value of the inputs in currency (NT\$)	Quantity	Chain of Events	Description	Indicator	Quantity	Duration	Financial Proxy	Value in currency (unit) (B)	Source	What would have happened without the activity?	Who else contributed to the change?	Does the outcome drop off in future years?	$G=A*B*(1-c)*(1-d)^n$	discount rate%	Year 1 (post-activity)	Year 2	Year 3	Year 4	Year 5	
CARA Students	31	Time		0	One	Participate in the listen to the	Increased hazard	Interview with	18	1.22	Directorate General	4,375	https://www.thirdsector.co.uk/social-value-impact-what-is-it/">https://www.thirdsector.co.uk/social-value-impact-what-is-it/	49%	53%	27%	18,943.36	18,943	3,036	0	0	0	
CARA Students with	20					Prevent riding	Interview with	0.2	1.88	Average non-property	362,833	Estimation of	47%	43%	22%	16,829.94	16,830	11,266	0	0	0		
CARA Students	51	Time		0	Two VR	Participate in the listen to the	Increased hazard	Interview with	33	1.30	Directorate General	4,909	https://www.thirdsector.co.uk/social-value-impact-what-is-it/">https://www.thirdsector.co.uk/social-value-impact-what-is-it/	48%	42%	26%	49,028.82	49,029	10,731	0	0	0	
CARA Students with	42					Prevent riding	Interview with	0.3	1.88	Average non-property	362,833	Estimation of	47%	43%	22%	35,342.87	35,343	23,658	0	0	0		
Military Instructors	2	Time	5,284		Invite Cathay Century to their	Increased passion for t	Stakeholder feedback from interviews and	2	2	Traffic safety course increases	5,560	Ministry of Education K-12 Education	63%	50%	0%	2,081.25	2,081	2,081					
Tainan Traffic	1	Time	0.00		Sees the traffic	Reduced work time and	Stakeholder feedback	9	0.50	Average labor cost	2,000	Stakeholder feedback	50%	0%	0%	9,000.00	9,000	0					
Kaohsiung Motor	1	Time	0.00		Sees the traffic	Reduced work time and	Stakeholder feedback	7	0.50	Average labor cost	9,136	Stakeholder feedback	10%	30%	0%	40,291.36	40,291	0					
	1	Time			Invite Cathay Century to	Improved traffic safety curriculum design	Stakeholder feedback from interviews	1	0.25	Average cost of sponsored	1,250,000	Stakeholder feedback from interviews	75%	90%	50%	30,241.94	30,242	0					
Cathay Century Insurance	1	Funding	48,510		Collaborates with Kaohsiung Motor	Business development promoted	Stakeholder feedback from interviews	1	1	Actual successful business development	62,000	Stakeholder feedback from interviews	10%	0%	0%	55,800.00	55,800	0	0	0	0		
		materials	55,961		Promotion of	Positive corporate	Stakeholder feedback	1	1	Cost of newspaper,	300,000	https://www.thirdsector.co.uk/social-value-impact-what-is-it/">https://www.thirdsector.co.uk/social-value-impact-what-is-it/	10%	0%	20%	270,000.00	270,000	0	0	0	0		
		Time	65,500																				
Hsinchu Safety	2	Time	0															0.00	0	0	0.00	0.00	
																		0.00	0	0	0.00	0.00	
total input			175,256															527,559.53	527,560	50,771	0.00	0.00	0.00



Global Value Exchange:

Present value of each year	527,560	50,249	0	0	0
Total Present Value (PV)	\$577,808				
Net Present Value (NPV)	\$402,553				
Social Return	3.30				