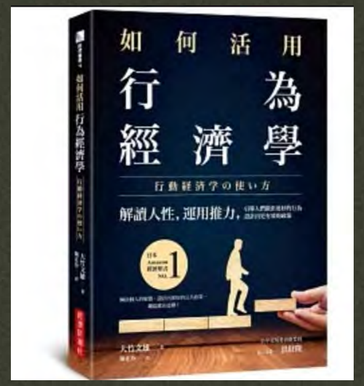
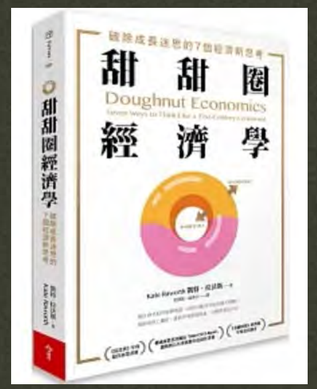
Sustainable issues in agri-food chain

CHIA-YI, LIU





2023/04/20

Chia-Yi, Liu 劉佳怡

Associate Professor, Department of Food Science,
Management group Tunghai University

❑ Personal

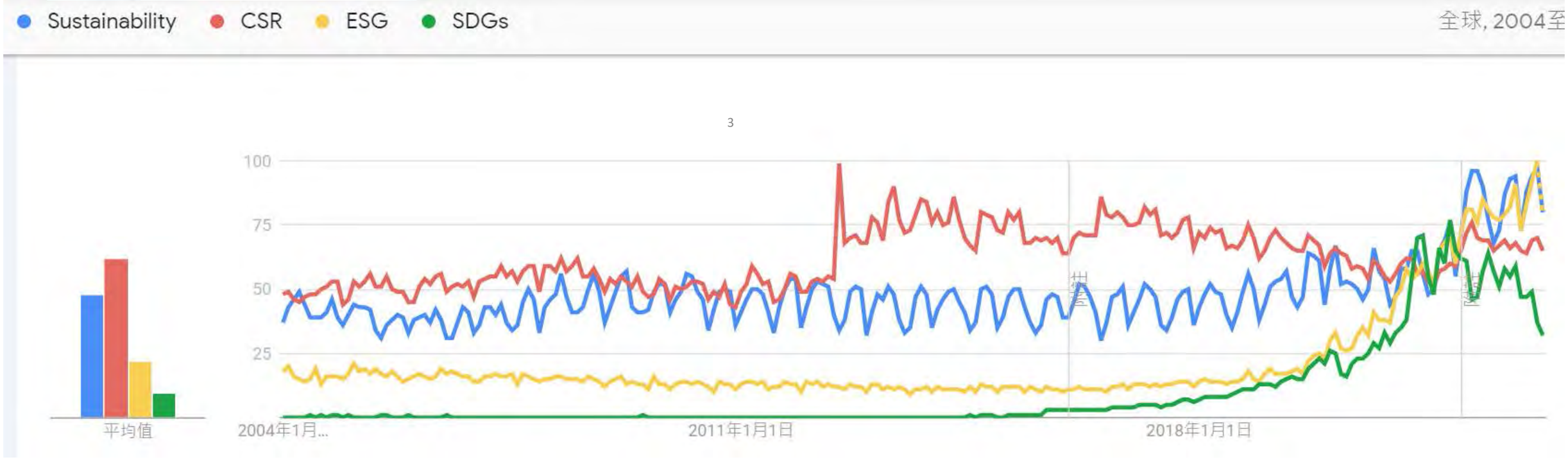
University/Department	Degree
International Business PHD. National Taiwan University, Taiwan	PHD
Industrial Economics Master National Central University	MBA

❑ Professional

Company	Position
Policy & Industrial Development Research Project, Division of System Innovation & Application, Photovoltaic Technology Center, ITRI, Taiwan	Associate Research
Tunghai University, Department of Food Science, Management Group	Associate Professor

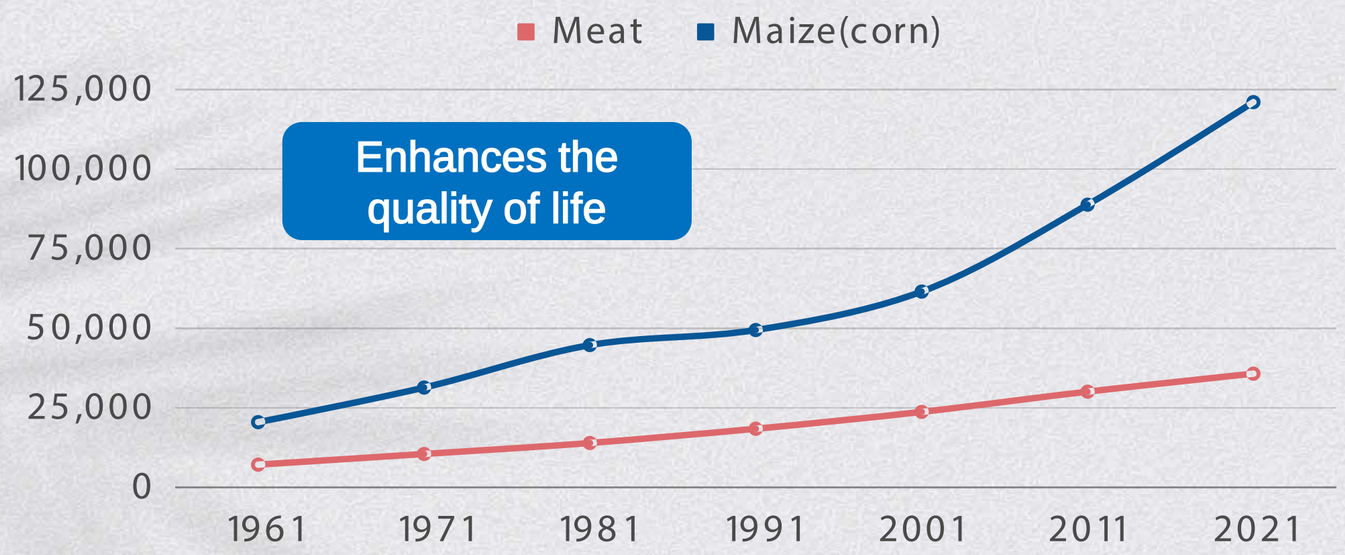
Sustainable issues in agri-food chain

1. What is sustainability? / What are sustainable issues in the agri-food chain?
2. What are we studying?
3. What is next?




What do we all seek in our life?

Production keeps growth



Reference: https://ourworldindata.org/agricultural-production#explore-data-on-agricultural-production

Goal 1

Economic Growth

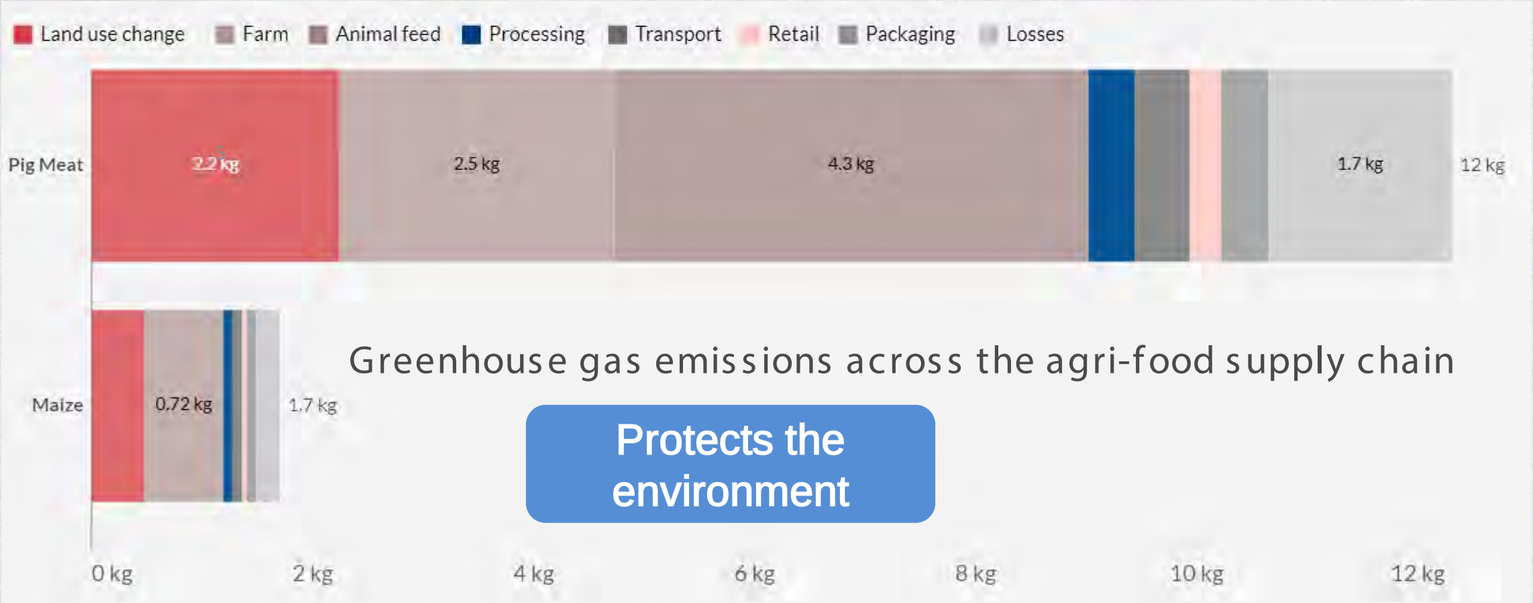
Goal 2

Environmental Problem

Goal 3

Market competition

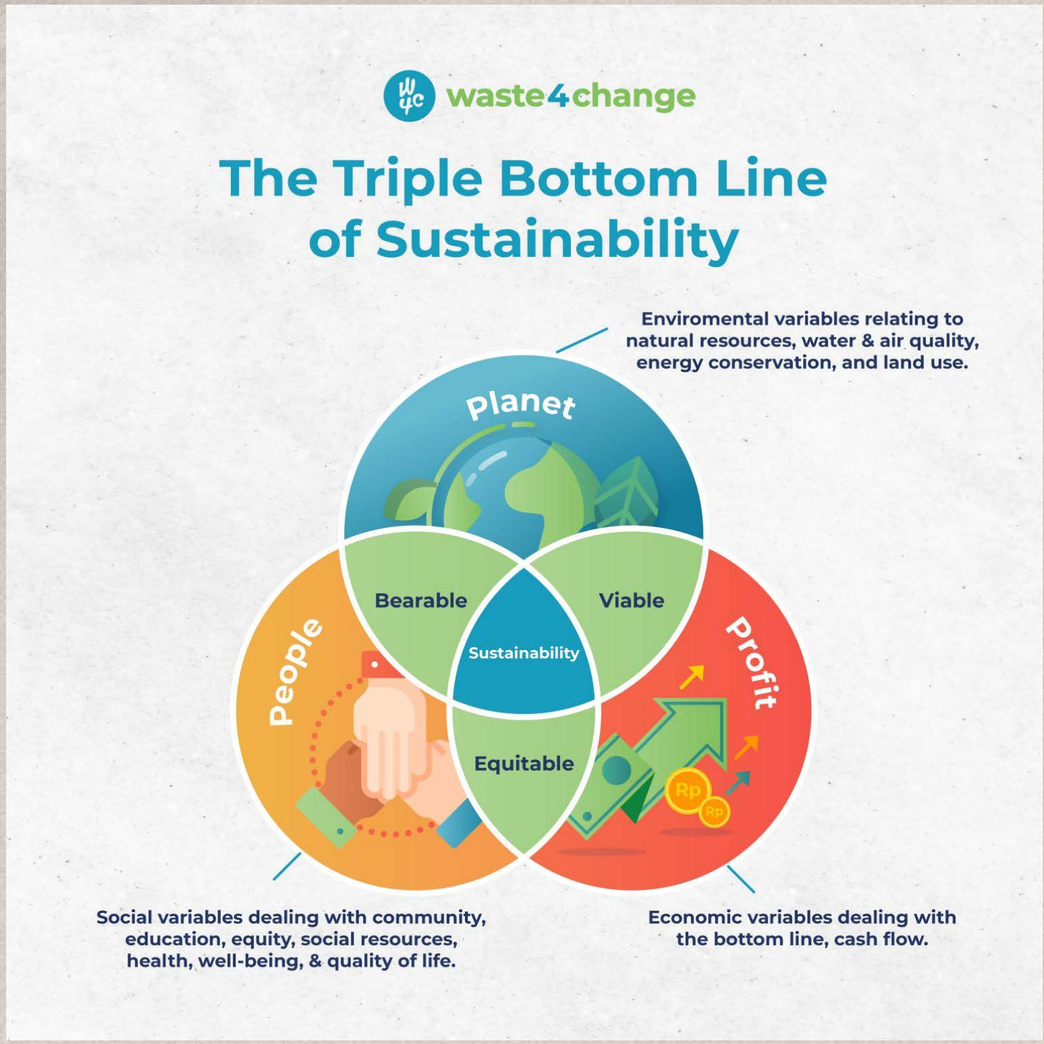
Ensures farmers can support themselves



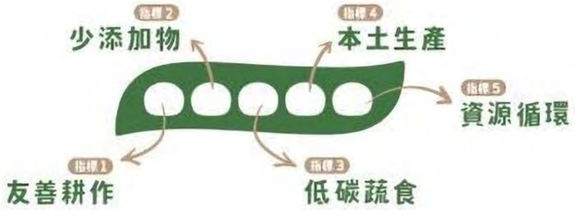
Reference:https://ourworldindata.org/environmental-impacts-of-food?insight=food-emissions-local#key-insights-on-the-environmental-impacts-of-food

Sustainablity

The ability to maintain or support a process **continuously over time**.

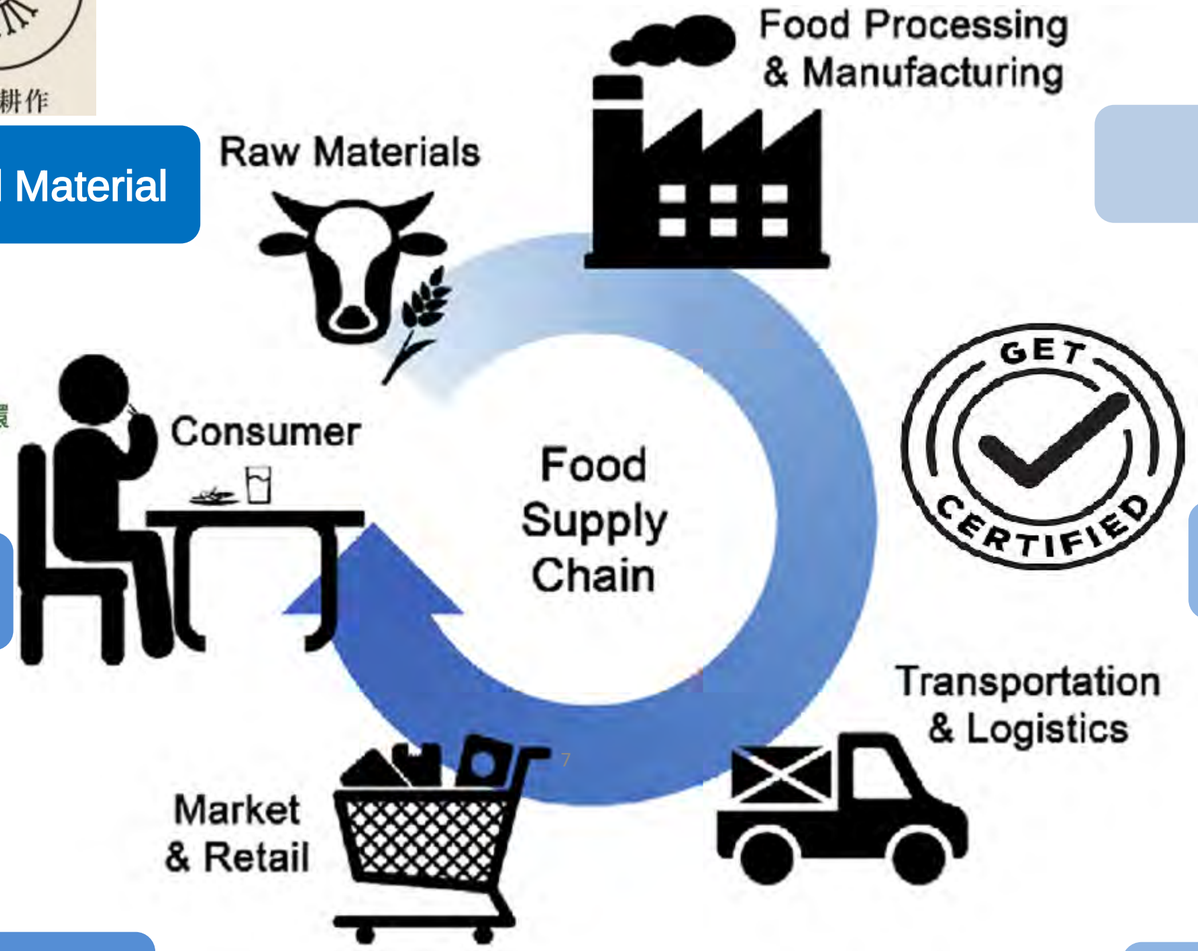


Chemical Material



Information asymmetry

Food wast/ Food packaging



Overprocessed foods

Food shortage

Carbon dioxide

Sustainable issues in agri-food chain


食物轉型
從i開始
我就是影響力！
家樂福推動食物轉型，攜手眾多相同理念的小農、供應商夥伴推動
健康飲食、友善生產、在地支持及負責任的生產與消費，
護地球生生不息！
改變的時候到了，現在開始，在賣場選購價格牌上
註明「從i開始」品項，一起加入永續行動，
用消費發揮影響力。
1 營養飲食
有小綠人標章或含豐富營養價值的蔬果
三日菌
2 無添加物
不使用或減少人工添加物
軟式餅乾麵包
3 有機產品
符合國內外有機認證標章的商品
家樂福有機特級杏鮑菇
4 生態農業
重視農地永續利用及土壤健康，並保護生物多樣性的農產品
家樂福嚴選金鑽鳳梨
5 在地創生
傳承地方文化、支持社區型小生產者及社區支持系統
原天然機能活化米
6 動物福利
符合友善飼養原則，或通過動物福利標章、友善雞蛋聯盟認證
透明餐盒吐司
7 永續漁業
來自永續漁場，避免對海洋污染與破壞，並善盡漁業管理責任
8 永續發展
減少碳排放，推動綠環經濟，重視公平貿易
9 減少塑料
使用回收再生包材或瓶器或支持裸賣、減少包裝
10 森林保育
FSC
透過永續森林驗證，優保森林及環境可持續發展
從i開始
主副各式地板保養清潔劑
永續發展
739ml毫升X1-01
259
元
35.05元/100ml毫升
11-010031-001
0310
W 1-354-16-023
0817939
017265
你支持哪一類的i商品！快到賣場尋找價格牌標籤為「從i開始」，或具有分類項目標示即為i商品，立即來尋寶！
快來找尋 i 商品！
從i開始
259
持家樂福聯名卡購買從 i 開始商品
即可集點登錄活動抽產地旅遊！
快來參與！


食物轉型 從i開始 我就是影響力！
一起尋找 i 商品
深度體驗產地旅遊
家樂福聯名卡友獨享
2023/4/1~12/31
於家樂福賣場內刷家樂福聯名卡/簽帳金融卡
購買「從i開始」商品，一項商品可集一點
至活動網頁登錄並且於該月份集滿10點即可參加產地旅遊抽獎!
※須登錄才能獲得抽獎資格，登錄連結以及產地旅遊資訊皆公布於官網
※每月累積集章數可透過APP內活動集章頁面之「每月點數」確認
(產地旅遊地點在屏東：萬巒履歷鳳梨田、枋山家樂福嚴選愛文芒果)

老鷹紅豆
麻糬
6入/盒

老鷹紅豆
牛奶燒
約100g/2入

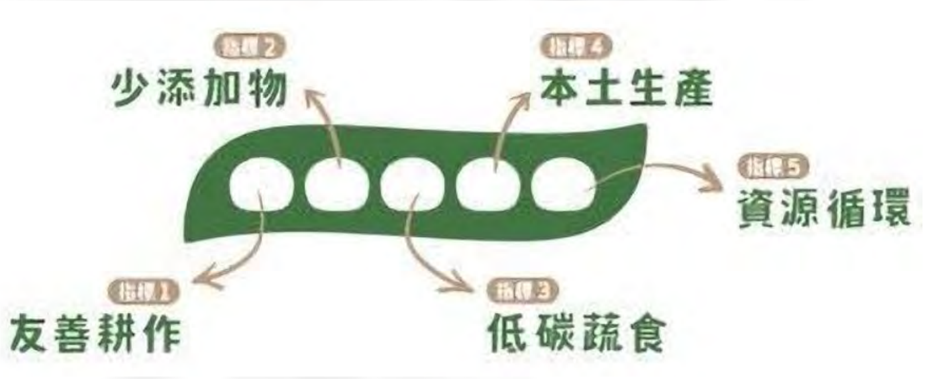
老鷹紅豆
紅豆湯
約400g/盒

老鷹紅豆
麵包
約102g/個

老鷹紅豆
麻糬麵包
約112g/個

詳見店內母親節預購目錄

老鷹紅豆派
約800g±5%/盒



What are we studying?

System view

01 Sustainable Model

Explored the complex relationships b/t major economic, social, and environmental indices.

WE ARE HERE

Supply side

Multiple Channels

02 Channel Strategy

Farmers' adoption of multiple supply channels.

Certification Pressure

03 Certification System

Alternative certification system for supply chain sustainability, named PGS.

Demand side

Sale Volume

04 Gap b/t cognition & consumption

How to turn to buy intention into consumption amount for sustainable products.

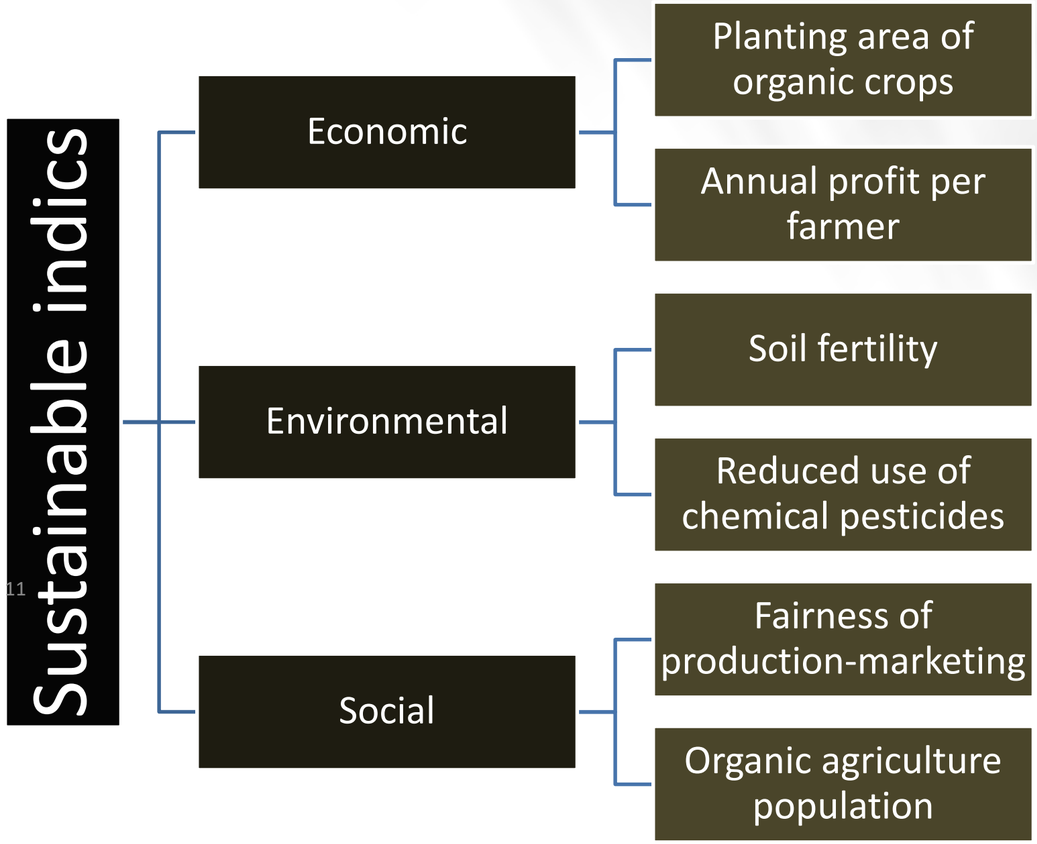
05 What is next?

How would a sustainable system be institutionalized?

Organic Agriculture

Organic Agriculture is a production system that sustains the health of soils, ecosystems, and people.

(IFOAM General Assembly, 2008)



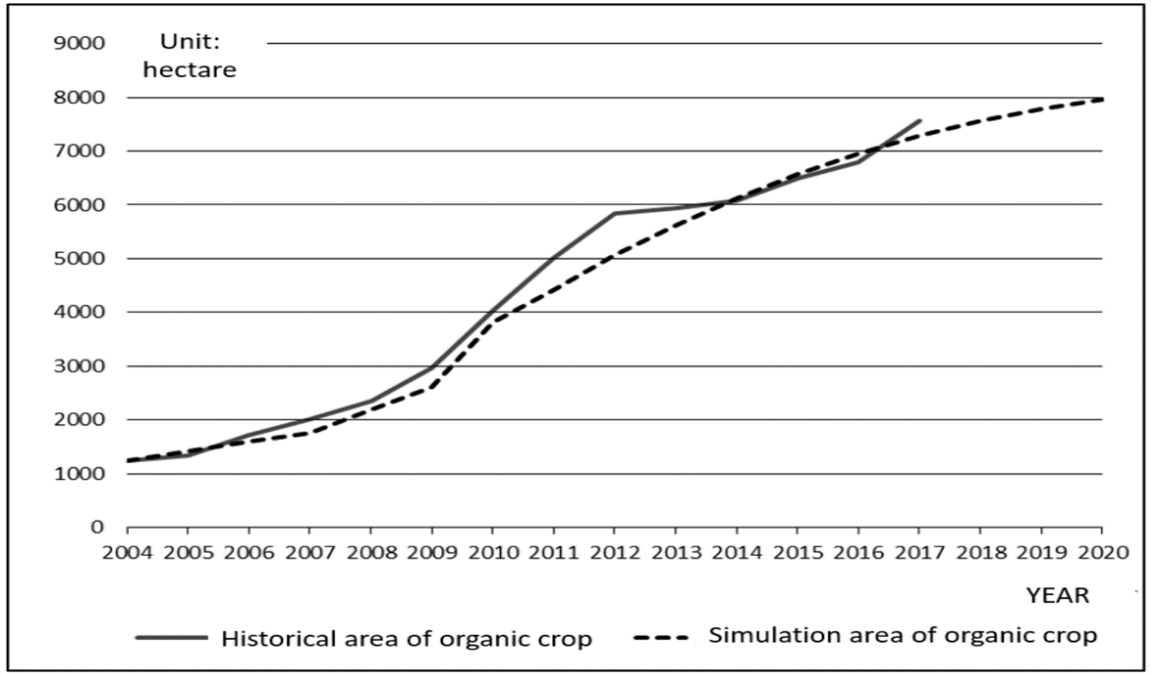
Literature gap

Few studies have considered the sustainability of organic agriculture from the perspective of system structure (Zhen and Routray, 2003).

How does organic agriculture contribute to sustainable development? Organic agriculture in Taiwan

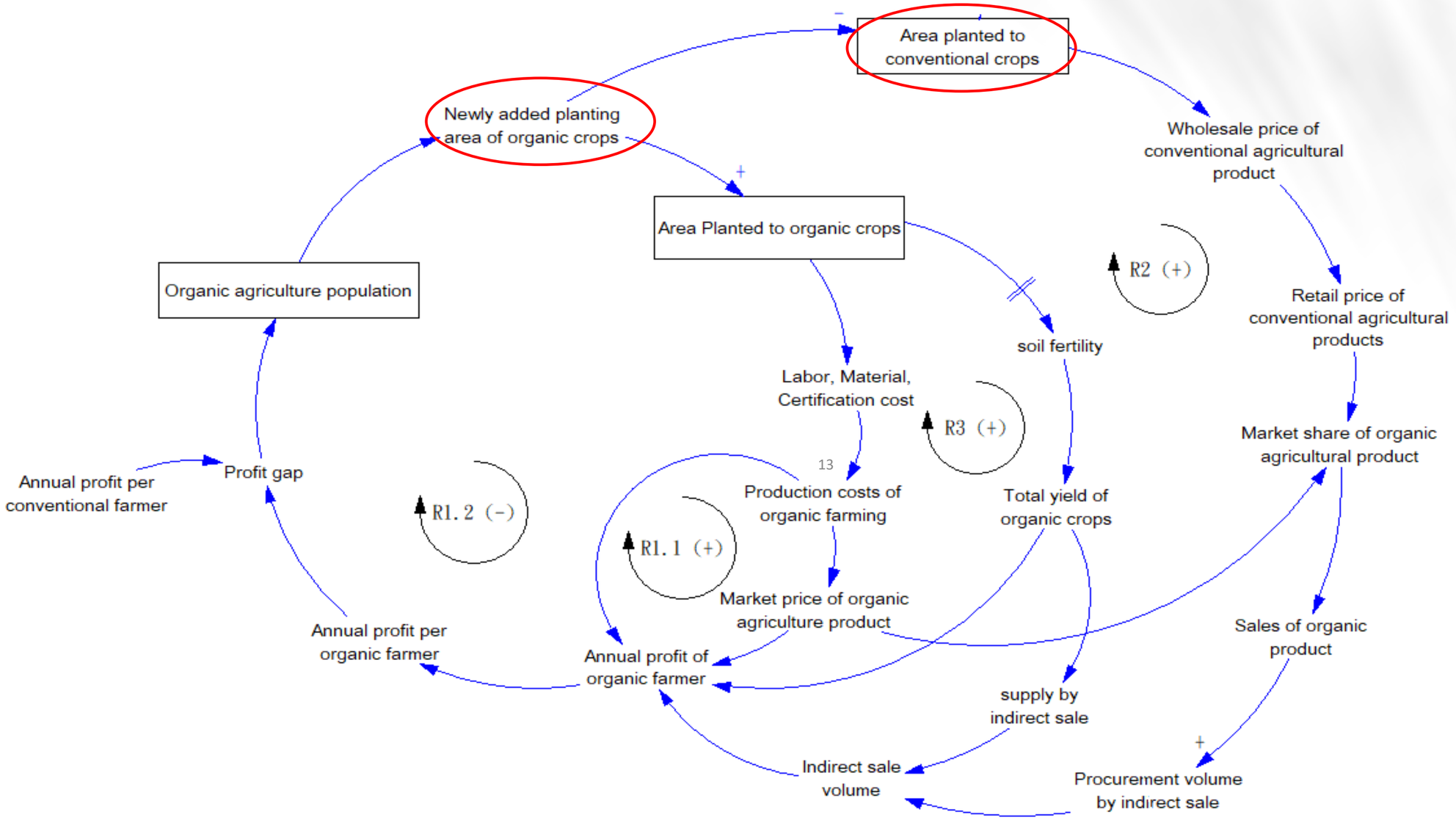
- **Purpose**: To clarify the sustainable structure of developing organic agriculture in Taiwan, **we explored the complex relationships between major economi and indices** and constructed a systematic model of organic agricultural development.

- **Methods**: System Dynamic; Simulation

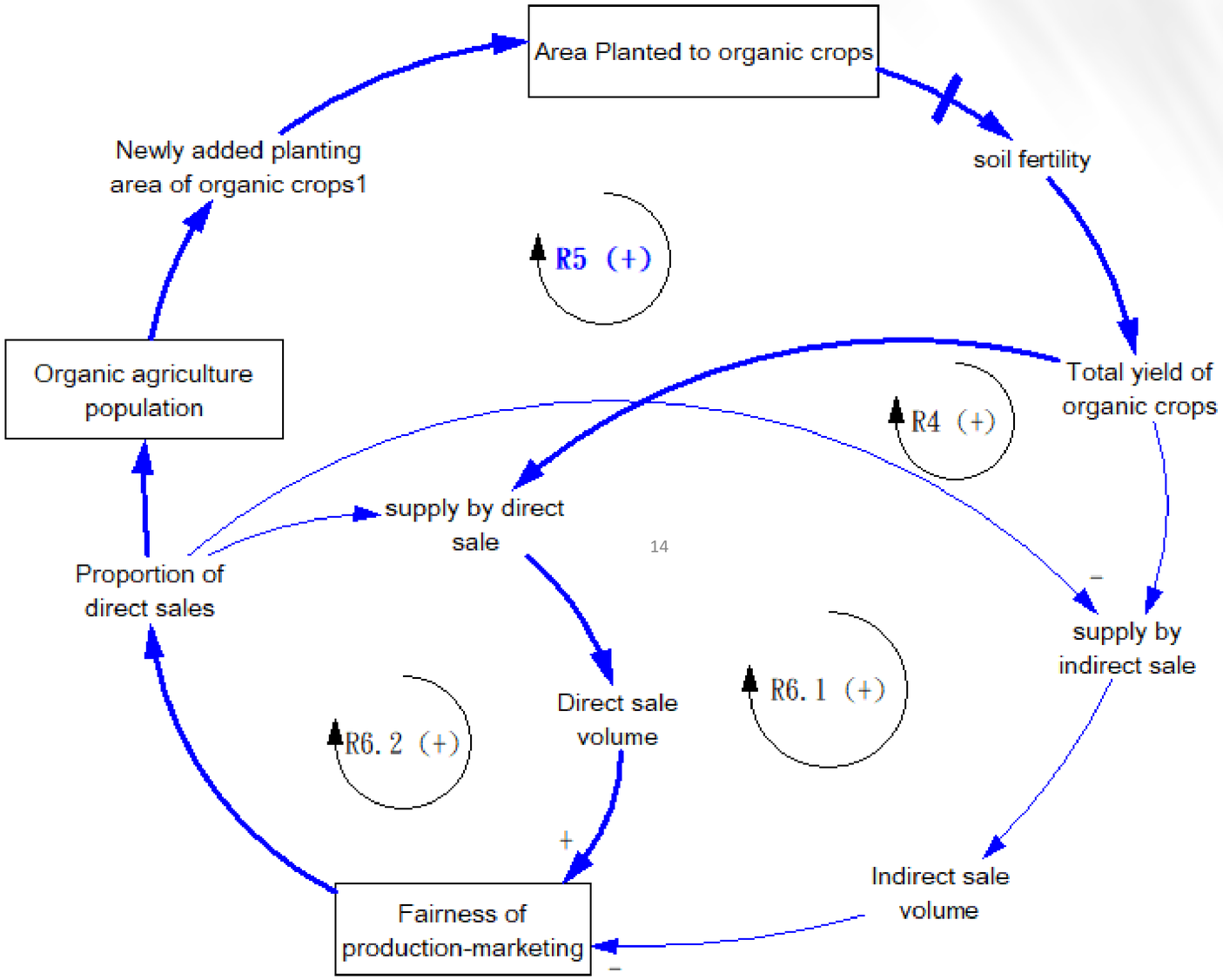


Chia-Yi Liu* and Hsieh, Chen-Yu (2023) How does organic agriculture contribute to sustainable development? Organic agriculture in Taiwan, International Journal on Food System Dynamics, (SCI) [Accepted & forthcoming]

(1) Organic farming techniques as key to environmental and economic improvement by indirect sales.

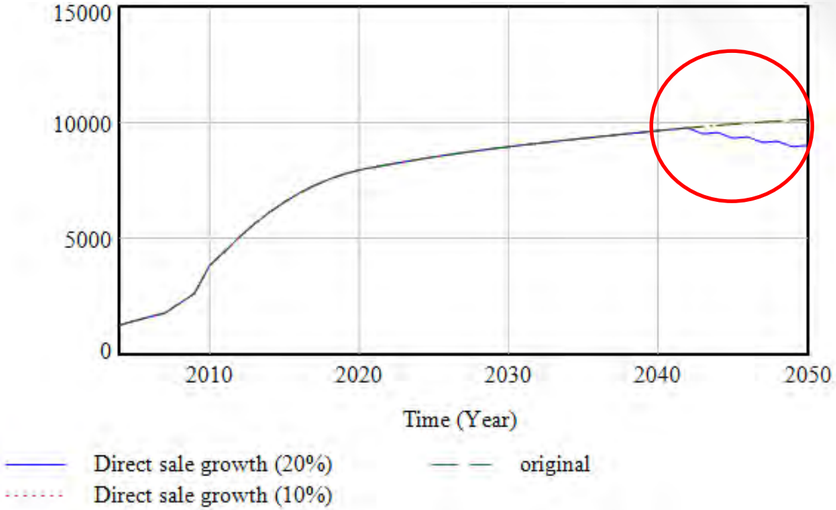


(2) Direct sales channels can strengthen environmental and social benefits.

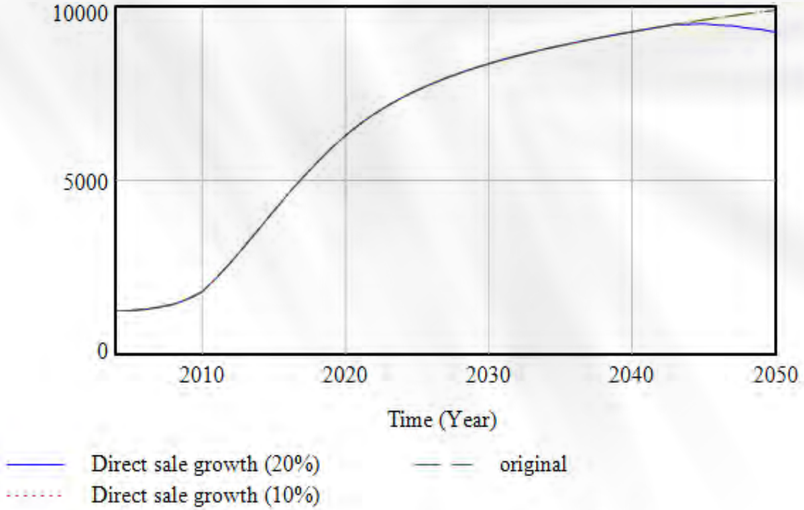


Sensitivity analysis for Proportion of direct sales

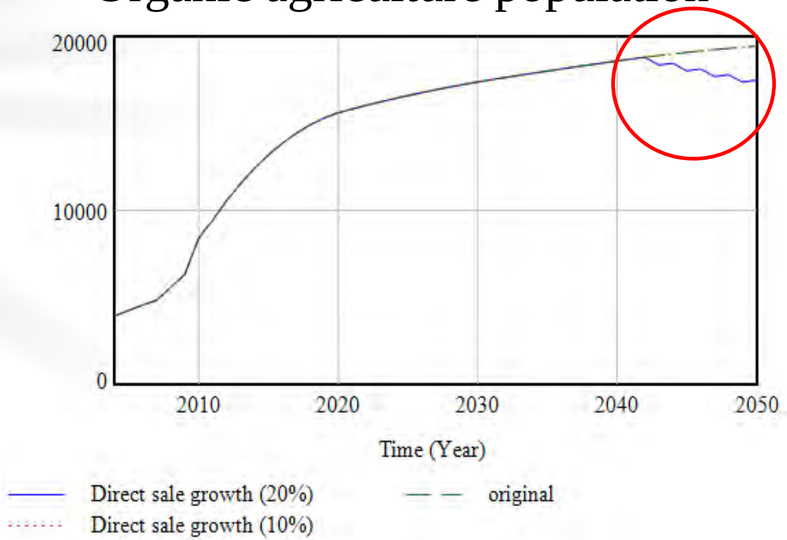
Planting area of organic crops



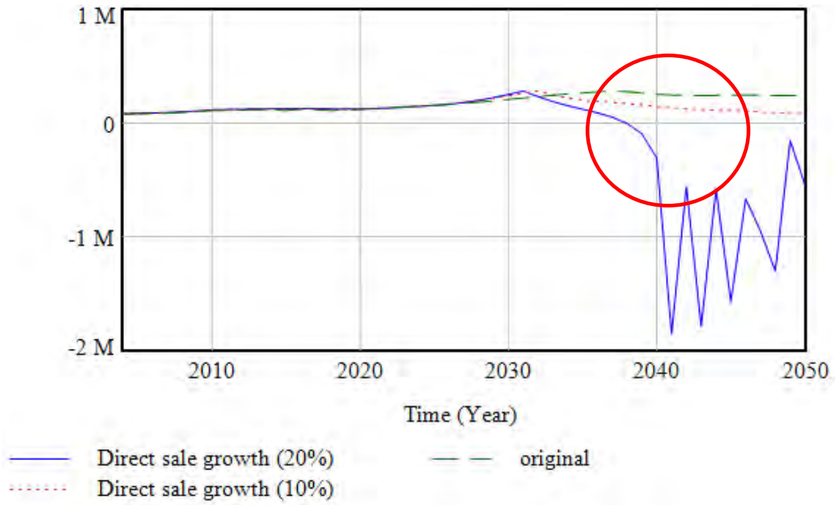
Soil fertility



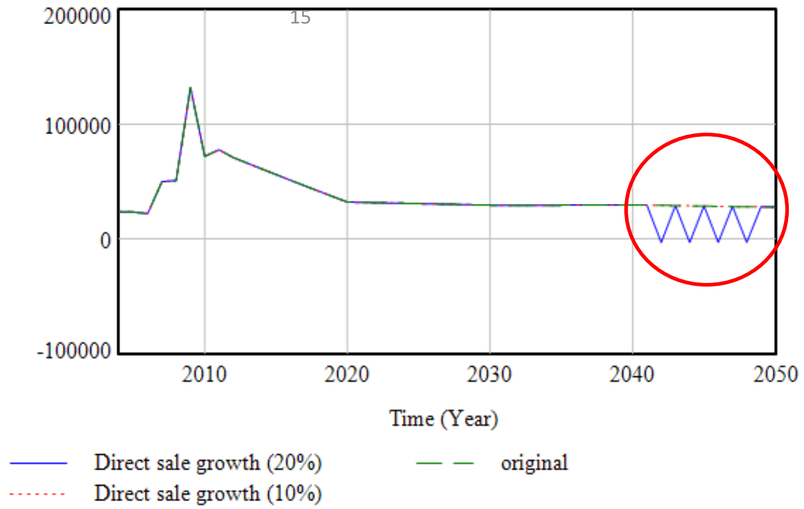
Organic agriculture population



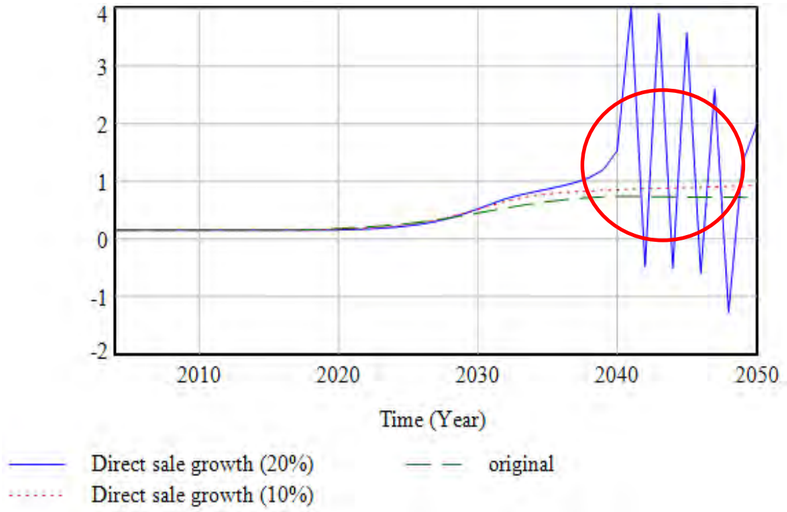
Annual profit per organic farmer



Reduced use of chemical peticides



Fairness of production-marketing



Concluison

- This study shows the **antagonistic and synergistic effects** between economic, environmental, and social indices.

- Based on the systematic structure of sustainable agriculture, **the multiple chain modes should be adopted.**

What are we studying?

System view

01 Sustainable Model

Explored the complex relationships b/t major economic, social, and environmental indices.

Supply side

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Farmers' adoption of multiple supply channels.

WE ARE HERE

Certification Pressure

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Demand side

Sale Volume

04 Gap b/t cognition & consumption

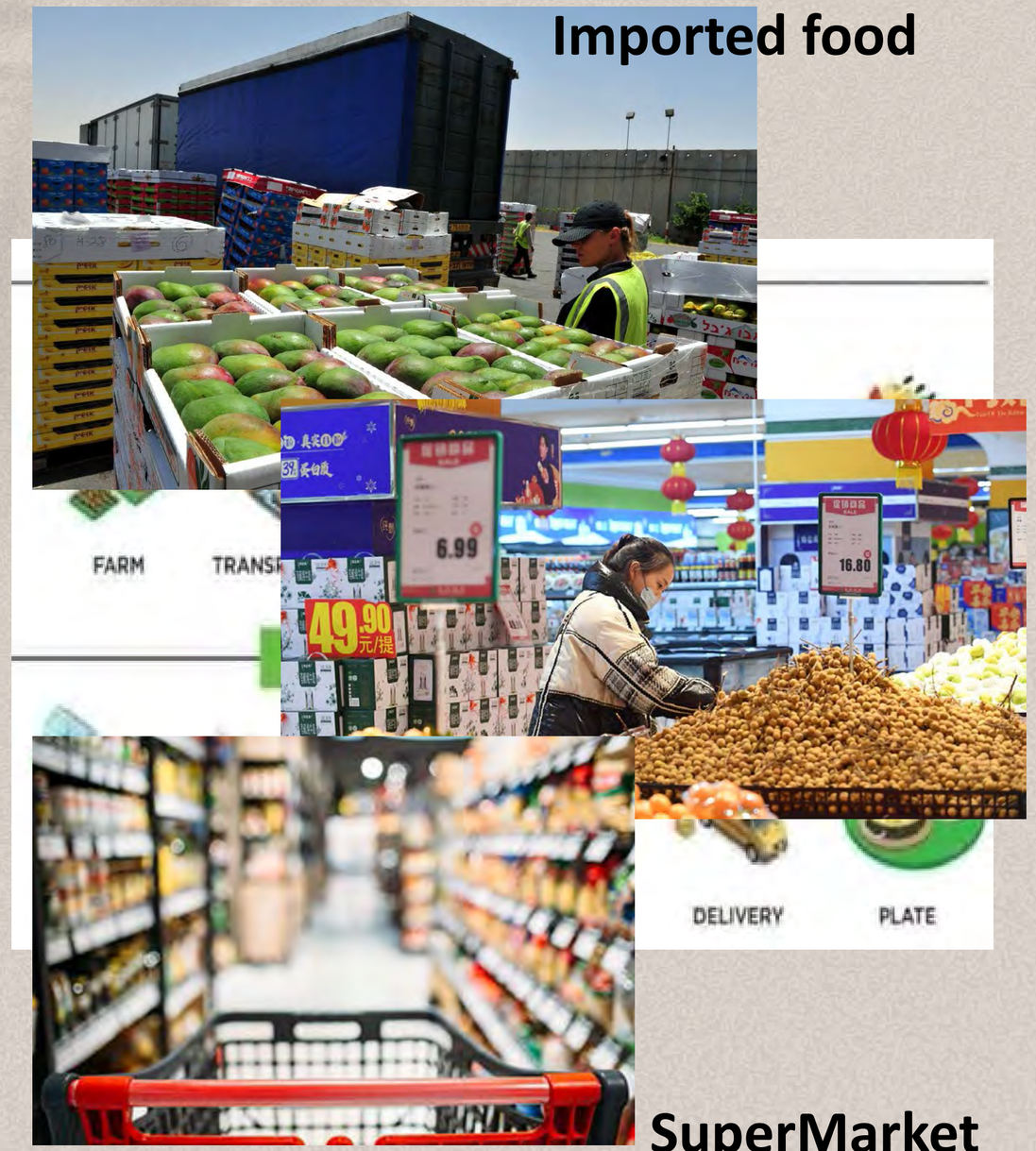
How to turn to buy intention into consumption amount for sustainable products.

05 What is next?

How would a sustainable system be institutionalized?

Long-term supply chains

Modes	Indirect sales channel
Meaning	Producers trade with consumers indirectly through at least one middlemen.
Function	Transactions are processed on a large-scale and efficiently through a specialized division of labor, and market supply and demand mechanism.
Economic Value	Based on the principle of **comparative advantage**: ■ Large-scale production and consumption are carried out in different regions. ■ Division of labor is conducted efficiently across, production, wholesale, logistics, and sale.
Social Risk	■ **Information and power asymmetry** between producer and consumer.



Short-term supply chains

Modes	Direct sales channel
Meaning	Producers trade with consumers directly.
Function	By reducing the geographic, spatial, and cognitive distance between producer and consumer. This mode builds more community involvement by enhancing the producer-consumer relationships.
Social Value	■ The **exchange** between production and market **information**. ■ Producers interact with consumers directly, and they **establish a relationship and share risks** with each other.
Economic Risk	■ Producers act diverse roles (e.g., producers and consumers), and the **processing efficiency is low**.

Farmer Market

Community-Supported Agriculture, CSA

Participatory Guarantee Systems, PGS

Complementarity of Multiple chains

Modes	Direct sales channel	Indirect sales channel
Meaning	Producers trade with consumers directly.	Producers trade with consumers indirectly through at least one middlemen.
Function	By reducing the geographic, spatial, and cognitive distance between producer and consumer. This mode builds more community involvement by enhancing the producer-consumer relationships.	Transactions are processed on a large-scale and efficiently through a specialized division of labor, and market supply and demand mechanism.
Value	■ **The exchange** between production and market **information.** ■ Producers interact with consumers directly, and they **establish a relationship and share risks** with each other.	Based on the principle of **comparative advantage**: ■ Large-scale production and consumption are carried out in different regions. ■ Division of labor is conducted efficiently across, production, wholesale, logistics, and sale.
Risk	■ Producers act diverse roles (e.g., producers and consumers), and the **processing efficiency is low**.	■ **Information and power asymmetry** between producer and consumer.

Multiple supply chain adoption

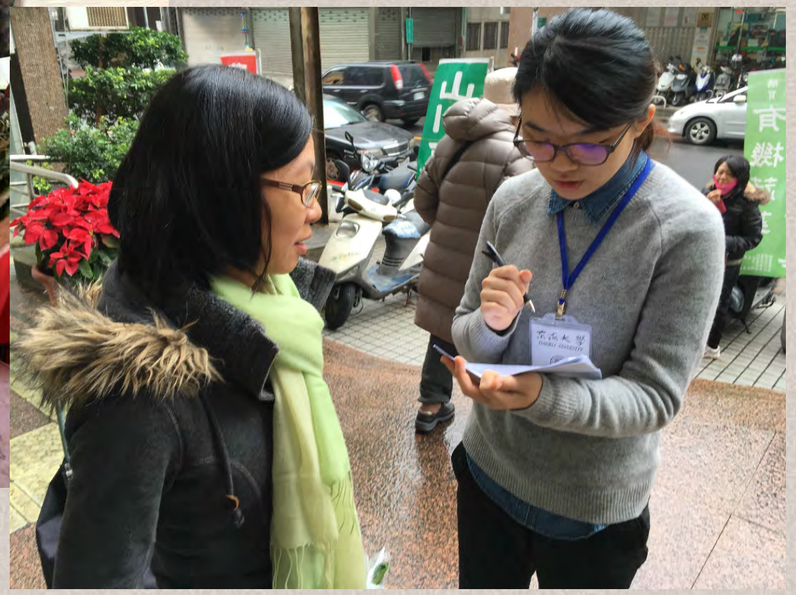
What factors enhance the adoption of multiple chains?

Liu, C.-Y. and Lee, C.-Y. (2019), “Multiple supply chain adoption under uncertainty”, International Journal of Physical Distribution & Logistics Management, Vol. 49 No. 3, pp. 305-326 (SSCI). https://doi.org/10.1108/IJPDLM-10-2017-0312

Multiple supply chain adoption under uncertainty

- **Purpose**: test whether adopting multiple supply chains (MSCs) can manage uncertainty and mitigate the risk associated with a supply chain.

- **Methods**:
  - Matched questionnaire surveys
  - 112 respondents.



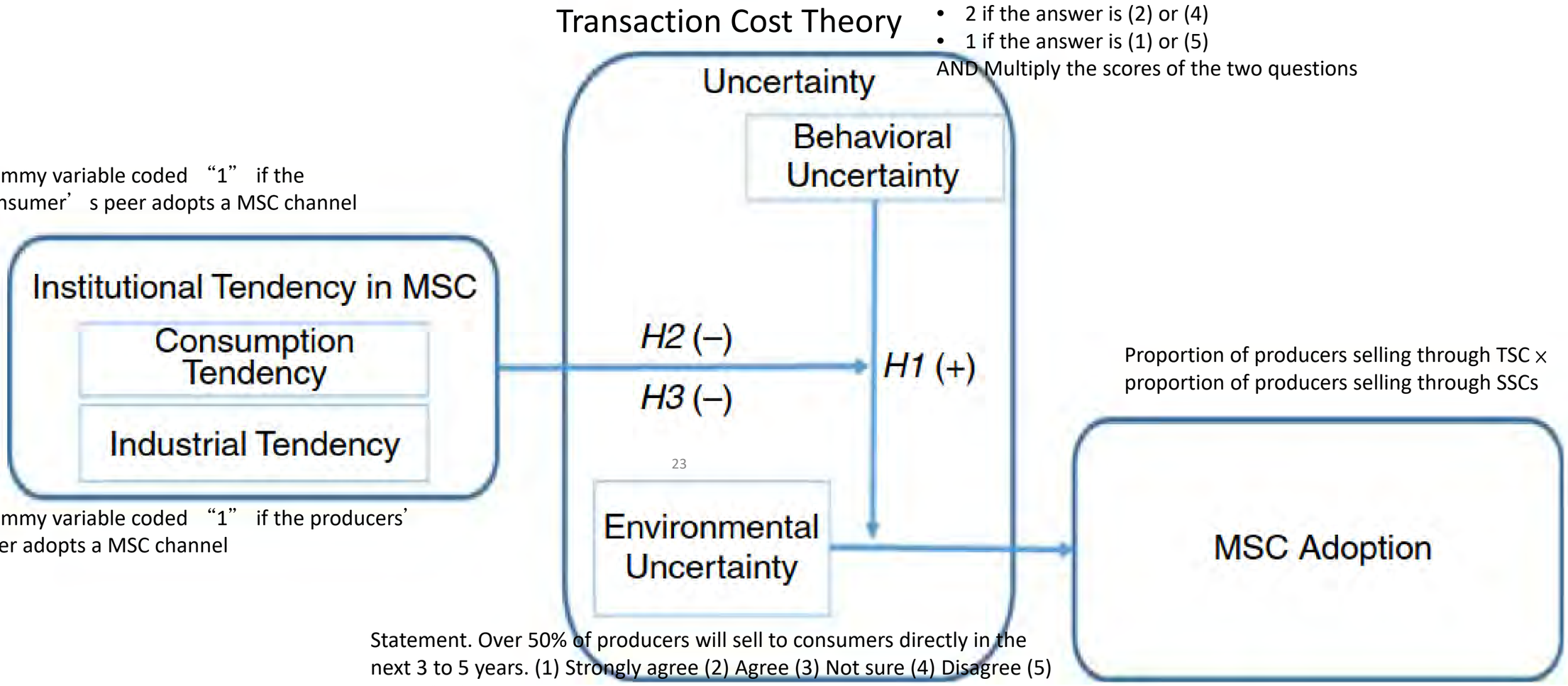
Rsearch Structure

Statement 1: Compared to TSC, a stable sales volume in each month can be guaranteed by selling to consumers directly
Statement 2: Compared to TSC, sale prices are higher if selling to consumers directly. (1) Strongly agree (2) Agree (3) Not sure (4) Disagree (5) Strongly disagree

- 3 if the answer is (3)
- 2 if the answer is (2) or (4)
- 1 if the answer is (1) or (5)

AND Multiply the scores of the two questions

Dummy variable coded "1" if the consumer's peer adopts a MSC channel



Dummy variable coded "1" if the producers' peer adopts a MSC channel

Proportion of producers selling through TSC × proportion of producers selling through SSCs

Statement. Over 50% of producers will sell to consumers directly in the next 3 to 5 years. (1) Strongly agree (2) Agree (3) Not sure (4) Disagree (5) Strongly disagree

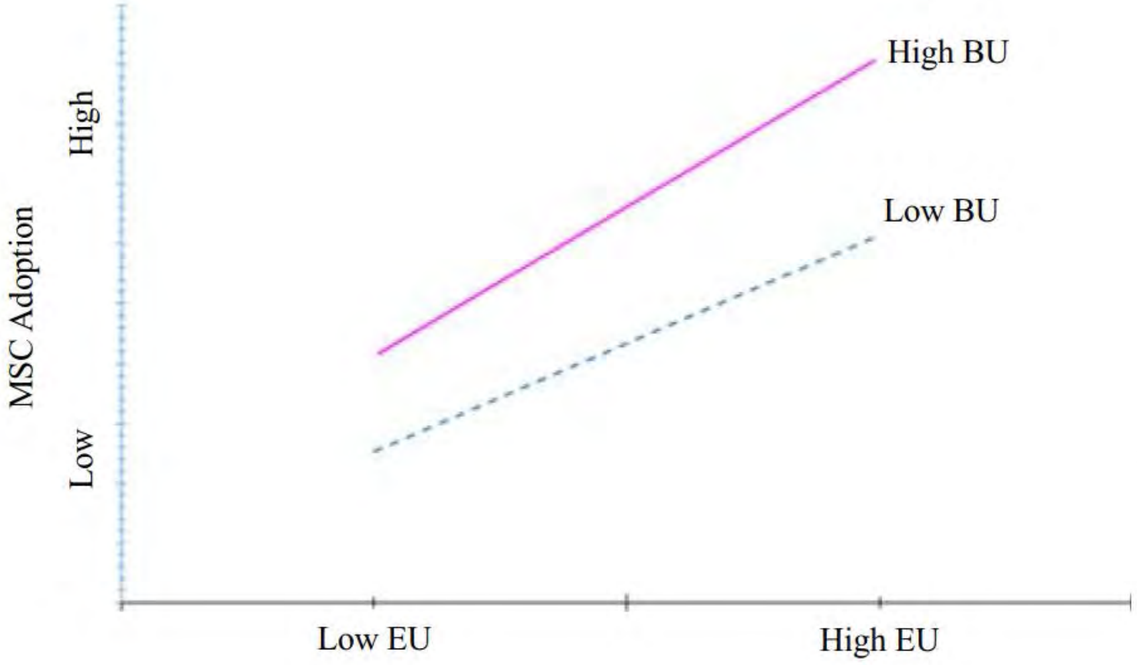
- 3 if the answer is (3)
- 2 if the answer is (2) or (4)
- 1 if the answer is (1) or (5)

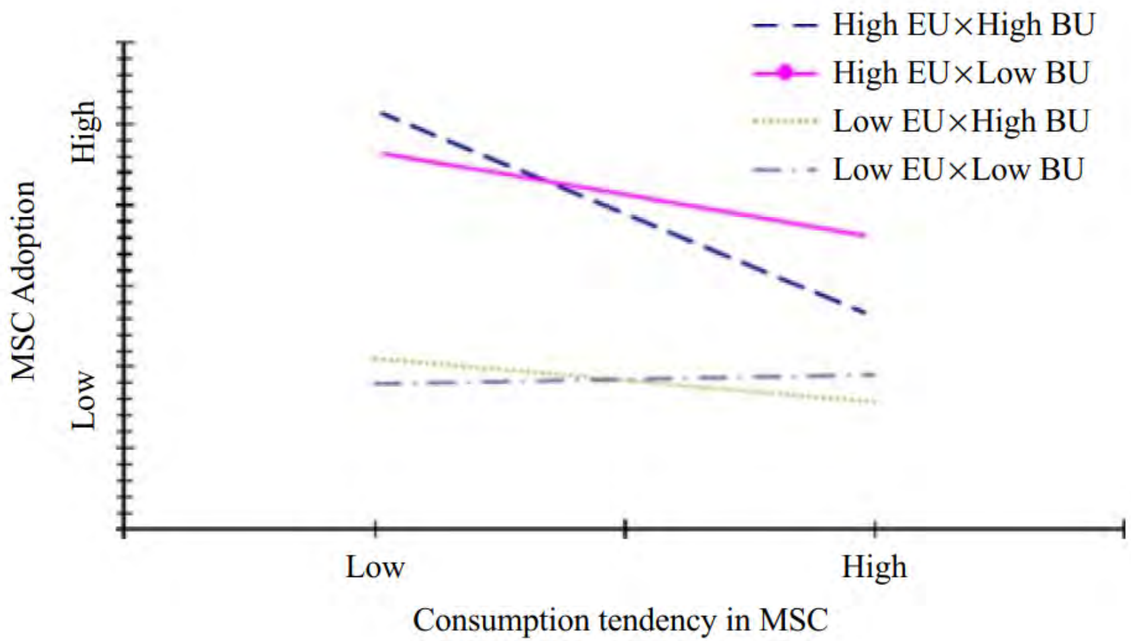
Rsearch Result I

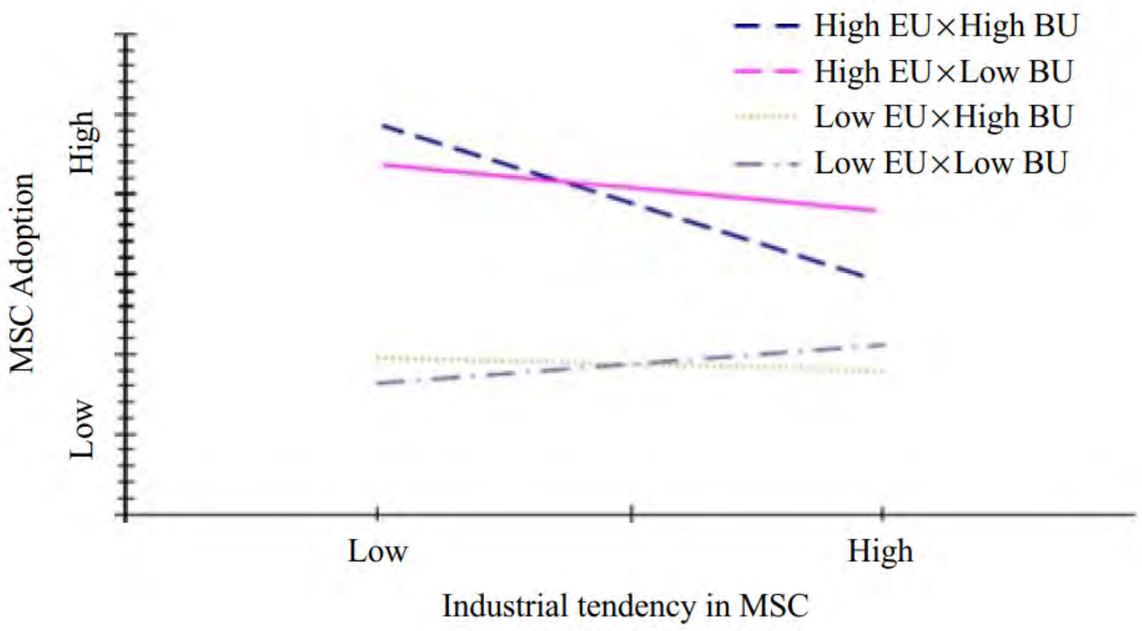
Dependent var	OLS regression ($Y =$ MSC adoption)					
Independent var	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Constant	−0.8252** (0.2570)	−0.8429** (0.2414)	−0.8488** (0.2419)	−1.063226*** (0.2788)	−1.0973*** (0.2484)	−1.2526*** (0.2972)
Education	−0.0207 (0.0899)	−0.0351 (0.0711)	−0.0354 (0.0712)	−0.0408 (0.0708)	−0.0131 (0.0695)	−0.0189 (0.0697)
Production scale	0.1773** (0.0579)	0.1951*** (0.0534)	0.1963*** (0.0539)	0.2003** (0.0557)	0.1613** (0.0562)	0.1651** (0.0592)
Distance	0.0952 (0.0689)	0.0871 (0.0633)	0.0873 (0.0634)	0.0944 (0.0633)	0.0912 (0.0631)	0.0948 (0.0633)
Environmental uncertainty (EU)		0.3176** (0.0885)	0.3162** (0.0881)	0.3459*** (0.0941)	0.3208** (0.0900)	0.3411** (0.0974)
Behavioral uncertainty (BU)		0.2431* (0.0955)	0.2486* (0.1065)	0.2369* (0.1102)	0.2112* (0.1057)	0.2019**** (0.1103)
EU × BU			0.0164 (0.0517)	0.2576**** (0.1411)	0.1597* (0.0725)	0.3185* (0.1318)
Consumption tendency in MSC (CT)				0.1972 (0.2285)		0.1618 (0.2334)
EU × BU × CT				−0.2714**** (0.1408)		−0.1937 (0.1400)
Industrial tendency in MSC (IT)					0.4381* (0.1976)	0.4229* (0.2013)
EU × BU × IT					−0.2156* (0.0904)	−0.1941* (0.0903)
n	112	112	112	112	112	112
VIF	1.08	1.06	1.08	3.38	1.55	3.24
Prob > F	0.0010	0.0000	0.0000	0.0000	0.0000	0.0000
R^2	0.0932	0.2694	0.2698	0.2801	0.3108	0.3165

Notes: Standardized OLS coefficients are presented. Standard errors are in parentheses. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$; ****$p < 0.1$

Rsearch Result II







Concluison & Discussion

Study's contribution

This study integrated the undersocialized and oversocialized perspectives (TCE and IT) to understand how uncertainties of supply chains may be diminished.

Social implications

- Different values of various supply chains
- Development of various supply chain modes.
- MSC adoption is a way to manage uncertainties resulting from spatial and psychological distance in the supply chain.

What are we studying?

System view

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Explored the complex relationships b/t major economic, social, and environmental indices.

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04 Gap b/t cognition & consumption

How to turn to buy intention into consumption amount for sustainable products.

05 What is next?

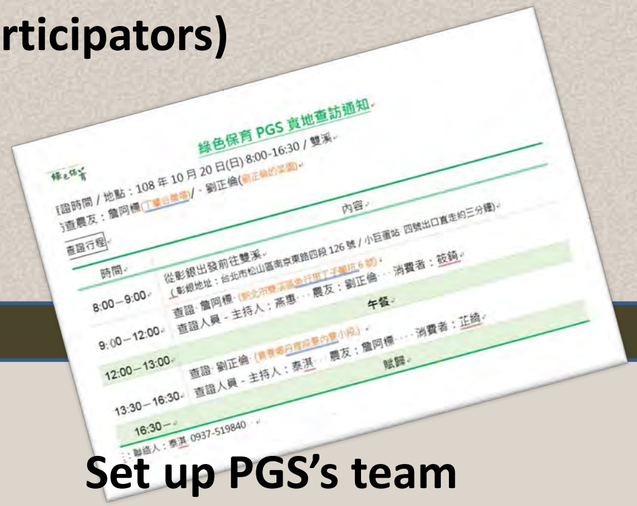
How would a sustainable system be institutionalized?

Alternative certification system for supply chain sustainability

Liu, C. Y. (2023). Alternative certification system for supply chain sustainability: how stakeholder alignment affects institutionalization. *International Journal of Physical Distribution & Logistics Management*, *53*(1), 115-132.

How PGS works?

Traning PGS members (for participators)



綠色保育 PGS 實地查訪通知

時間 / 地點：108 年 10 月 20 日(日) 8:00-16:30 / 雙溪

訪查農友：詹同樑(丁寶山農場) / 劉正倫(劉正倫的家園)

查證行程

時間	內容
8:00－9:00	從彰銀出發前往雙溪。 (彰銀地址：台北市松山區南京東路四段 126 號 / 小巨蛋站 四號出口直走約三分鐘)
9:00－12:00	查證：詹同樑(新北市雙溪區金仔埔下子厝庄 6 號) 查證人員：主持人：燕惠、農友：劉正倫、消費者：筱鈞
12:00－13:00	午餐
13:30－16:30	查證：劉正倫(東勢鎮分屋坑里分屋小段) 查證人員：主持人：泰淇、農友：詹同樑、消費者：正綸
16:30－	賦歸

製造人：泰淇 0937-519840

Set up PGS's team

Inspect, monitor, and certify compliance for regulation

Assessment Report

Summary meeting

Field verification

Social Sustainability of PGS in the Supply Chain

Fair Procedures

Build certification standards, PGS incorporates the suggestions of disadvantaged agrifood stakeholders as they jointly formulate recommendations.

Collective Assignments

PGS collective assignments are embedded in the certified processes, which include training, verification, ecological reporting, and field management.

Collective Intentionality

PGS participants are responsible for supervising and taking accountability for one another's actions.

The social impacts of PGS are embedded in members' interaction and relationship management.

Alternative certification system for supply chain sustainability

- **Purpose**: how **the alignment of disadvantaged agrifood stakeholders** (e.g., small/applicant farmers, local organizations, consumers, and volunteer auditors) might neutralize the negative effects of stakeholder heterogeneity (SH) on PGS recognition.

- **Methods**:
  - 113 multilateral matching questionnaires collected from 30 PGS activities of the Green Conservation Label managed by Taiwan's Tse-Xin Organic Agriculture Foundation (TOAF).
  - Hierarchical regression to test the hypotheses.

Rsearch Structure

Value congrence

A dummy variable. The value is 1 if the participants within the same PGS activity care about ecology- and productivity. Otherwise, the value of VC is 0

Similar background

A dummy variable. The value is 1 if the respondent has similar farming experience with the same crop as any other participant within the same PGS activity; otherwise, it is 0

External community

A dummy variable. If a respondent belongs to the same EC as any other participant within the same PGS activity, the value is 1; otherwise, it is 0

Stakeholder Alignment

(developed by isomorphic logics)

- **Value congruence (H2)**
- **Similar background (H3)**
- **External community (H4)**

H2~H4

The number of roles for participants

Stakeholder heterogeneity

H1(-)

It combines the average scores of the items from three categories (e.g. Fair constitutive procedure, Collective assignments and Collective intentionality) to evaluate the degree of respondents' recognition of the sustainable value of PGS.

PGS recognition

Rsearch Result I

Independent variable	Model 1	Model 2	Model 3	Model 4	All Model 5a	VC effect VC = 1 Model 5b	VC = 0 Model 5c	All Model 6a	SB effect SB = 1 Model 6b	SB = 0 Model 6c	All Model 7a	EC effect EC = 1 Model 7b	EC = 0 Model 7c
	Dependent variable PGS recognition												
TPC Experience	4.9641***	2.1111+	1.9328	2.0940+	1.9328	3.4219+	0.1768	2.1386+	4.2216**	2.7642+	3.2405**	4.3530**	3.5471*
	(1.1171)	(1.2529)	(1.3422)	(1.1235)	(1.3422)	(1.6616)	(2.3615)	(1.0496)	(1.2591)	(1.4456)	(0.9241)	(1.1758)	(1.4757)
Gender	10.7142***	9.4132***	9.1943***	7.4452***	9.1943***	10.4344***	9.6839***	7.4970***	8.4604***	7.2558***	7.7962***	5.8383***	8.0737***
	(0.6407)	(0.8276)	(0.9291)	(0.8507)	(0.9291)	(1.3497)	(1.5736)	(0.7644)	(1.2471)	(1.0205)	(0.8440)	(1.3302)	(1.3229)
Stakeholder Heterogeneity (SH)		−1.7408*	−1.7925+	−1.4795*	−1.7925*	−0.9823	−3.0978**	−1.4662*	1.7524	−1.5226*	−0.9677+	2.0355	−1.2787+
		(0.7437)	(0.7516)	(0.5634)	(0.7516)	(1.0756)	(0.9839)	(0.5562)	(1.0782)	(0.6682)	(0.5608)	(1.9823)	(0.7110)
(Hypothesis 1)					(Hypothesis 2)			(Hypothesis 3)			(Hypothesis 4)		
External Community (EC)		6.4561***	6.4042***	3.6298**	6.4042***	6.1147***	6.0538**	3.6384**	4.7461**	−0.5639			
		(1.0474)	(1.0596)	(1.1384)	(1.0596)	(1.4921)	(1.8372)	(1.1282)	(1.334)	(0.9361)			
Similar Background (SB)			0.7588	0.1898	0.7588	1.9467	−0.6131				0.3999	1.6610	−1.6480
			(1.3833)	(1.3551)	(1.3833)	(2.1699)	(1.5760)				(1.2803)	(2.0894)	(1.4096)
Value Congruence (VC)				6.2931***				6.3029***	7.1001***	2.9929*	7.4575***	7.7249***	7.3830***
				(0.7359)				(0.7295)	(0.8486)	(1.0909)	(0.6522)	(0.8587	(1.1853)
Num of observations	113	113	113	113	113	61	52	113	37	76	113	51	62
Variance inflation factor (VIF)	1.05	1.17	1.22	1.20	1.22	1.32	1.26	1.16	1.47	1.13	1.16	1.28	1.17
Jarque–Bera Normality test (Ho: data is normality, *P*-value)	0.041	0.055	0.047	0.054	0.047	0.12	0.09	0.059	0.62	0.034	0.0296	0.0538	0.0391
Adj-*R* squared	0.6565	0.7234	0.7240	0.7952	0.7240	0.7524	0.7175	0.7951	0.8905	0.7841	0.7779	0.8003	0.7856

Note(s): 1. ( ) is SE: Standard error. 2. ***$p < 0.001$; **$p < 0.01$, *$p < 0.05$, +$p < 0.1$. 3. The coefficients of ordinary least squares are standardized coefficients

Concluison

- PGS allow underprivileged actors to enact solutions collectively to address social inequities and ecological problems through fair procedures, collective assignments and collaborative intentionality.

- This study transformed isomorphic logics, including coercive, mimetic and normative isomorphisms, into a mechanism with which individuals can build a governance structure that helps disadvantaged agrifood stakeholders develop alternative institutions by pooling their resources.

- PGS members who leverage VC, SB and EC will have a greater chance of successfully overcoming their institutional disadvantages.

What are we studying?

System view

01 Sustainable Model

Explored the complex relationships b/t major economic, social, and environmental indices.

Supply side

Multiple Channels

02 Channel Strategy

Farmers' adoption of multiple supply channels.

Certification Pressure

03 Certification System

Alternative certification system for supply chain sustainability, named PGS.

Demand side

Sale Volume

04 Gap b/t cognition & consumption

How to turn to buy intention into consumption amount for sustainable products.

WE ARE HERE

05 What is next?

How would a sustainable system be institutionalized?

How does buy intention turn to consumption amount for sustainable products?

Reasons:

- Consumers demonstrate low interest in SRP (social responsible products). SRP market shares are very low (De Pelsmacker, Janssens, et al. 2005).
- The major priorities of most comsumers: quality/taste, performance and, most of all, price (Leire and Thidell, 2005).
- The analysis techniques are too simplistic to reveal the complexities of motivation (Hughner et al., 2007).
- The classic marketing concepts care not suitable for SRP marketing and communication (Davis, 2013).

劉佳怡 (20XX).永續的購賣意圖如何促進消費投入? 產品認知價值與親社會規範效果. *組織與管理*, TSSCI, R&R1.

Sample Selection Bias

Reasons:

- Consumers demonstrate low interest in SRP (social responsible products). SRP market shares are very low (De Pelsmacker, Janssens, et al. 2005).

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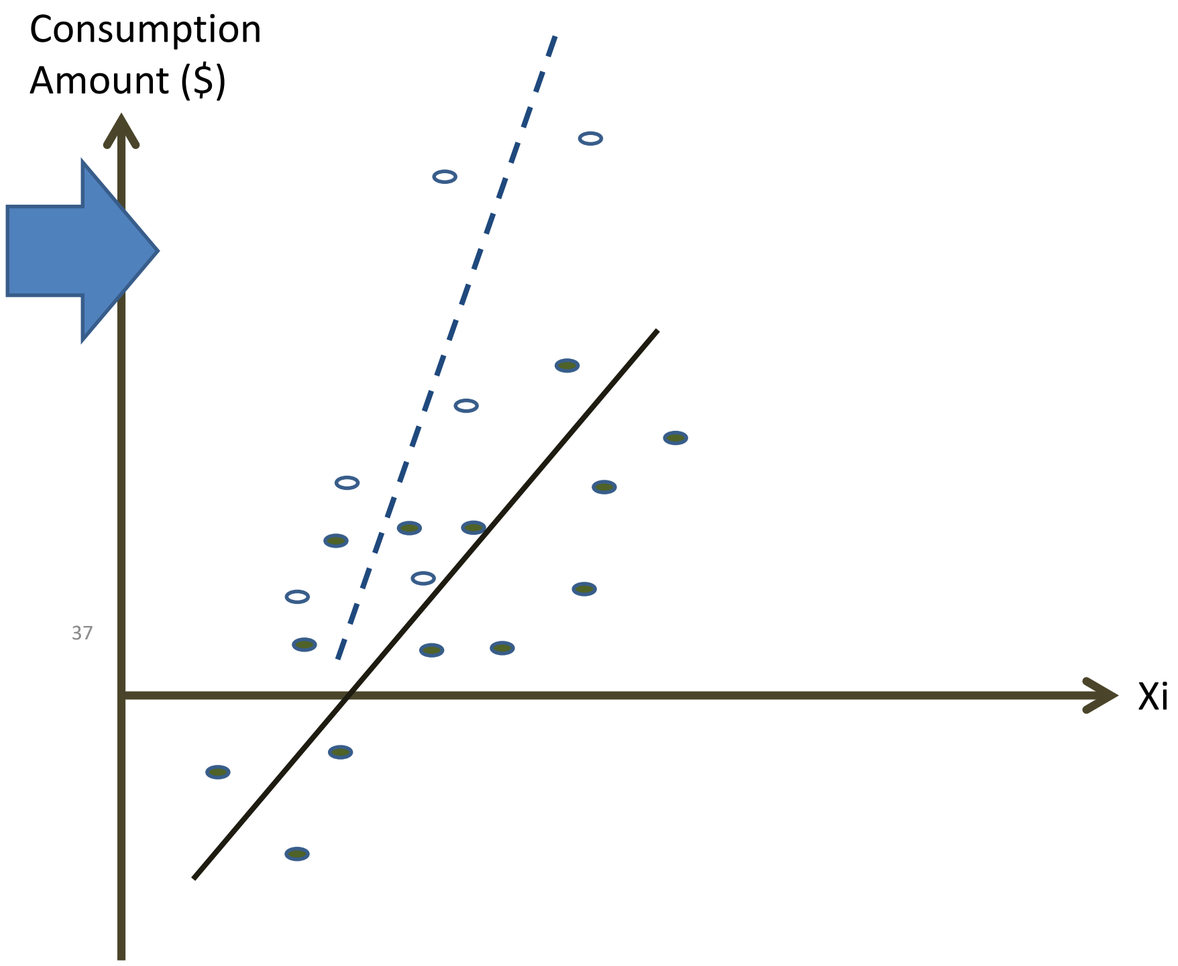

Heckman Two-Stage Model

First Stage (Probit model)

- Consumers demonstrate low interest in SRP (social responsible products). SRP market shares are very low (De Pelsmacker, Janssens, et al. 2005).

- The major priorities of most comsumers: quality/taste, performance and, most of all, price (Leire and Thidell, 2005).
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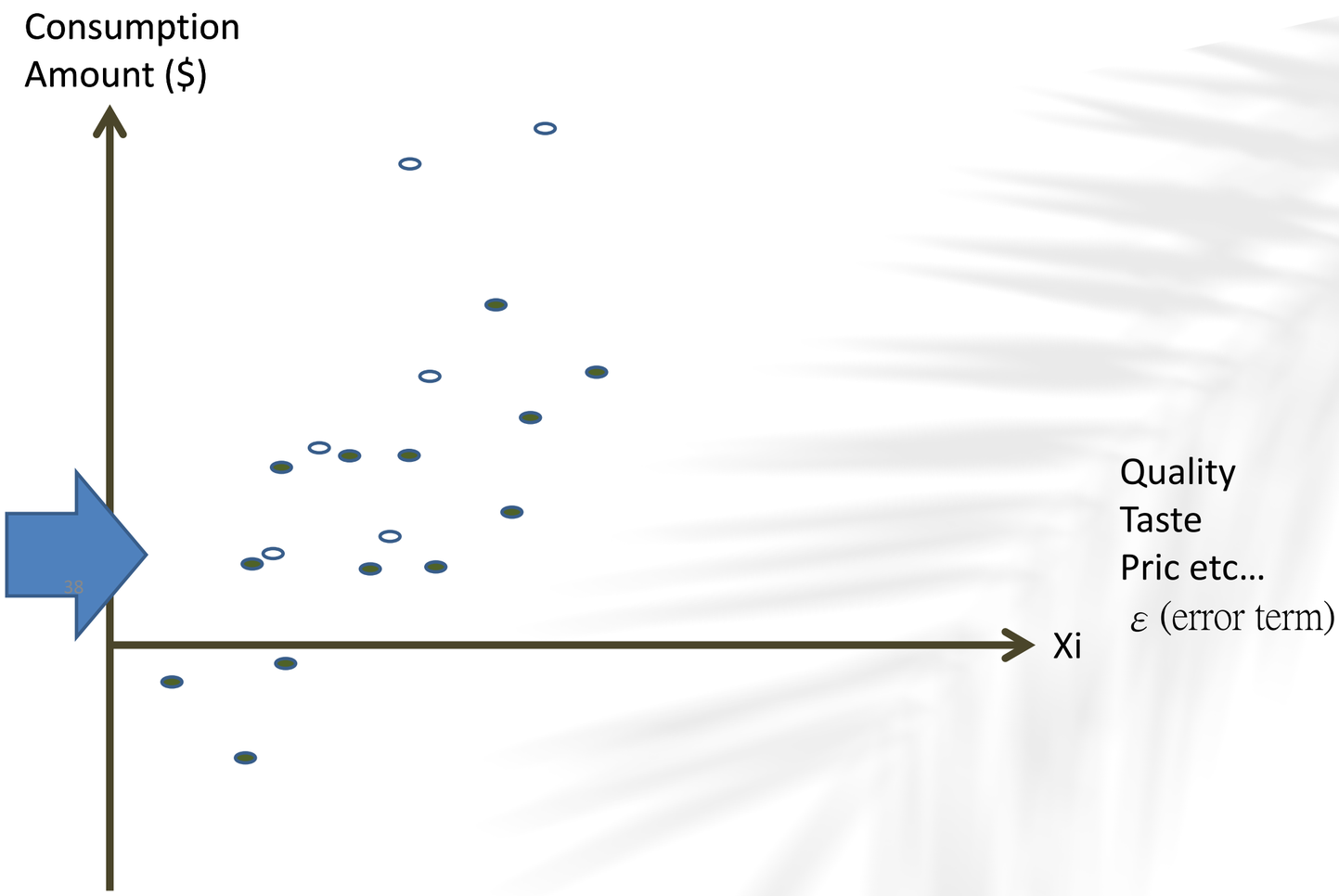
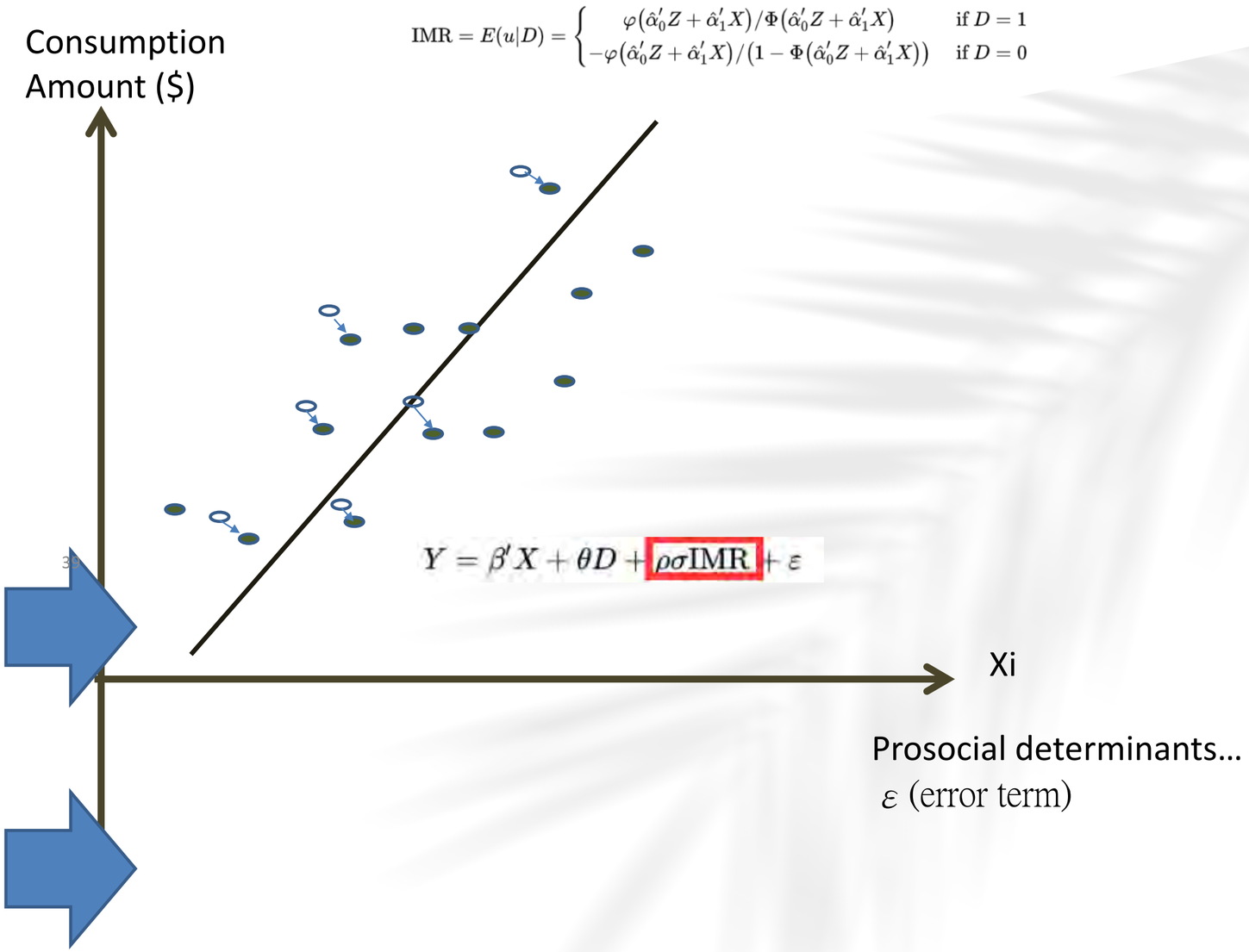


Heckman Two-Stage Model

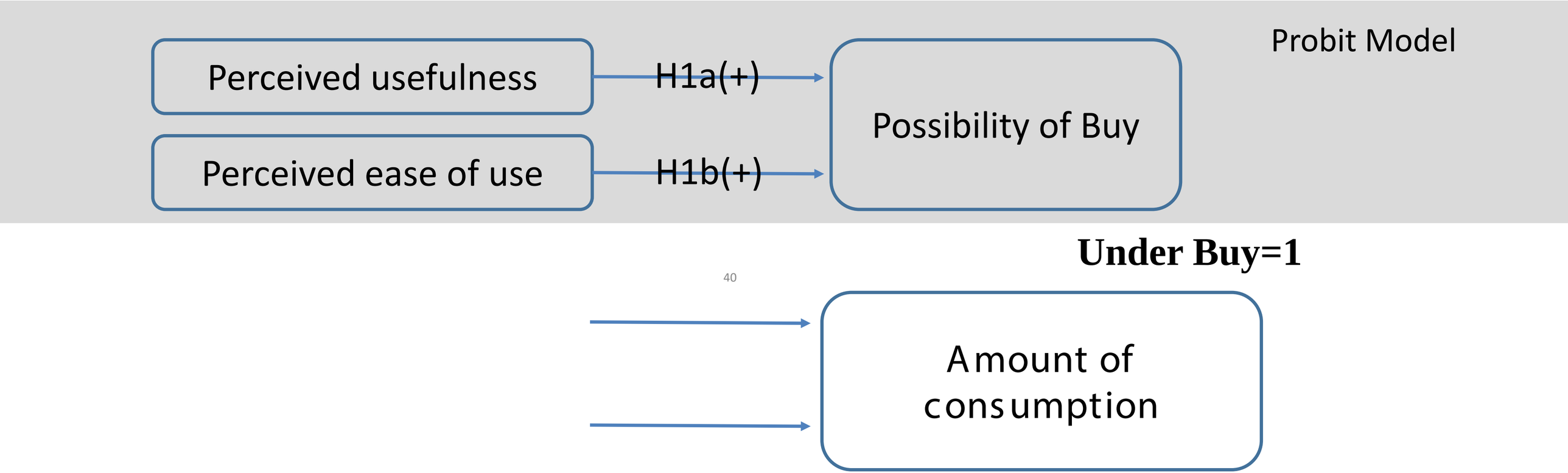
Second Stage (OLS)

- Consumers demonstrate low interest in SRP (social responsible products). SRP market shares are very low (De Pelsmacker, Janssens, et al. 2005).
- The major priorities of most comsumers: quality/taste, performance and, most of all, price (Leire and Thidell, 2005).
- The analysis techniques are too simplistic to reveal the complexities of motivation (Hughner et al., 2007).
- The classic marketing concepts care not suitable for SRP marketing and communication (Davis, 2013).



How does buy intention turn to consumption amount for sustainable products?

■ **Purpose**：this study aims to explore the antecedents of buying decisions and consumption amounts separately.



Rsearch Result I

表 4. Heckman 第一階段估計結果

獨立變數	依變數	Probit 回歸 有機消費與否		
		模型 1	模型 2	模型 3
年齡		0.0902*	0.0928*	0.0920*
		(0.0376)	(0.0377)	(0.0379)
所得		0.0550	0.0545	0.0508
		(0.0373)	(0.3766)	(0.0379)
家庭人口數		-0.0678+	-0.0743*	-0.0741*
		(0.0375)	(0.0377)	(0.0377)
有機專屬通路(農夫市集)		-0.4652	-0.0824	-0.0922
		(0.0745)	(0.0753)	(0.0756)
感知有用性			0.1746***	0.0739
			(0.0371)	(0.0498)
感知易用性				0.1513**
				(0.0500)
Num of obs		1160	1160	1160
Wald Chi2/F		11.19	33.86	42.95
Prob > chi2		0.0245	0.0000	0.0000

Note: 1. () is S.E.: Standard error. 2. *** $P < 0.001$; ** $P < 0.01$, * $P < 0.05$, + $P < 0.1$

2. The coefficients are standardized coefficients.

$$\mathrm{IMR} = E(u|D) = \begin{cases} \varphi(\hat{\alpha}_0' Z + \hat{\alpha}_1' X)/\Phi(\hat{\alpha}_0' Z + \hat{\alpha}_1' X) & \text{if } D = 1 \\ -\varphi(\hat{\alpha}_0' Z + \hat{\alpha}_1' X)/(1 - \Phi(\hat{\alpha}_0' Z + \hat{\alpha}_1' X)) & \text{if } D = 0 \end{cases}$$

How does buy intention turn to consumption amount for sustainable products?

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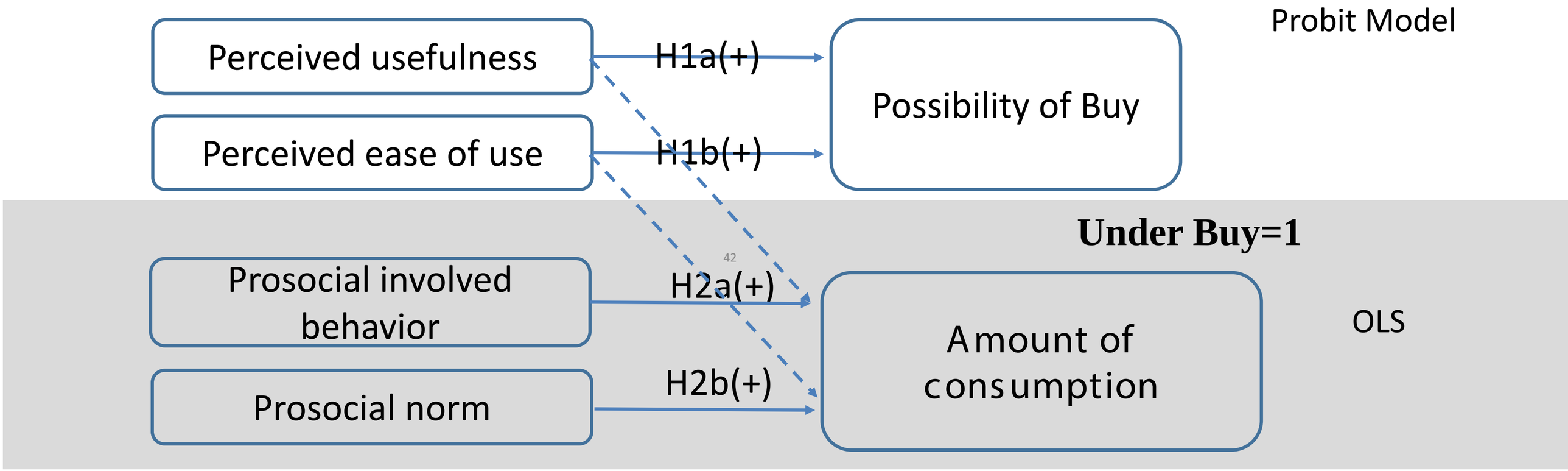


Rsearch Result I

表 5. Heckman 第二階段估計結果

依變數	OLS 回歸					
	有機消費金額(單筆平均)			有機消費年總金額		
獨立變數	模型 1	模型 2	模型 3	模型 4	模型 5	模型 6
所得	0.1993***	0.1873***	0.1820***	0.1575***	0.1495***	0.1449***
	(0.0397)	(0.0398)	(0.0399)	(0.0386)	(0.0385)	(0.0384)
家庭人口數	0.1728***	0.1706***	0.1633***	0.1567***	0.1553***	0.1489**
	(0.0397)	(0.0395)	(0.0396)	(0.0440)	(0.0437)	(0.0438)
有機專屬通路(農夫市集)	0.2975**	0.3039**	0.2628**	0.4236***	0.4277***	0.3922**
	(0.0983)	(0.0973)	(0.0997)	(0.1116)	(0.1111)	(0.1122)
感知有用性	0.0471	0.0252	-0.0145	0.0609	0.0464	0.0119
	(0.0532)	(0.0538)	(0.0543)	(0.0555)	(0.0557)	(0.0558)
感知易用性	0.1686**	0.0884	0.0657	0.1558*	0.1029	0.08335
	(0.0559)	(0.0630)	(0.0645)	(0.0610)	(0.0684)	(0.0704)
個人親社會規範		0.1516*	0.1487*		0.0999+	0.0974+
		(0.0636)	(0.0629)		(0.0573)	(0.0566)
親社會活動涉入性			0.1040*			0.0902*
			(0.0473)			(0.0414)
調整樣本誤差(λ) (Inverse Mills ratio)	-0.1198**	-0.1242**	-0.9992*	-0.1506***	-0.1535***	-0.1323**
	(0.0415)	(0.0416)	(0.0433)	(0.0363)	(0.0364)	(0.0381)
Num of obs	566	566	566	566	566	566
VIF	2.29	2.28	2.23	2.29	2.28	2.23
Adj-R squared	0.1472	0.1571	0.1641	0.1481	0.1524	0.1577

Note: 1. () is S.E.: Standard error. 2. *** $P<0.001$; ** $P<0.01$, * $P<0.05$, + $P<0.1$

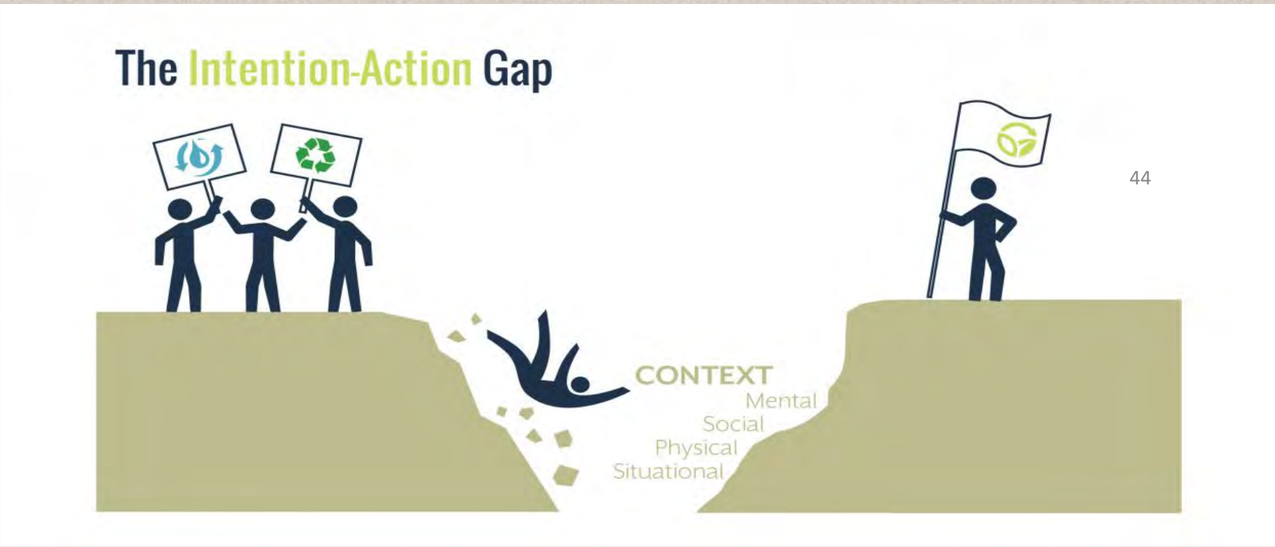
2. The coefficients of OLS are standardized coefficients.

分節符號 (下一頁)

Concluison

Study‘s contribution

- By Heckman's two-stage model, this study confirms that sample selection bias exists under analyzing organic buyers.
- Based on economic and social views, this study distinguishes the causes of buying and consumption amount.
- Consumers' perceived values for products (such as perceived ease of use or usefulness) cause their buying decision, but the personal moral norm and activities involvement of prosocial are the critical factors for enhancing consumption amount.



Social implications

- For potential consumers of sustainable products, the sustainable value initiative should emphasize the benefits of products for individuals.
- For strengthen consumption, it is necessary to build a community, and then through community activities to shape their cognition.

What are we studying?

System view

01 Sustainable Model

Explored the complex relationships b/t major economic, social, and environmental indices.

Supply side

Multiple Channels

02 Channel Strategy

Farmers' adoption of multiple supply channels.

Certification Pressure

03 Certification System

Alternative certification system for supply chain sustainability, named PGS.

Demand side

Sale Volume

04 Gap b/t cognition & consumption

How to turn to buy intention into consumption amount for sustainable products.

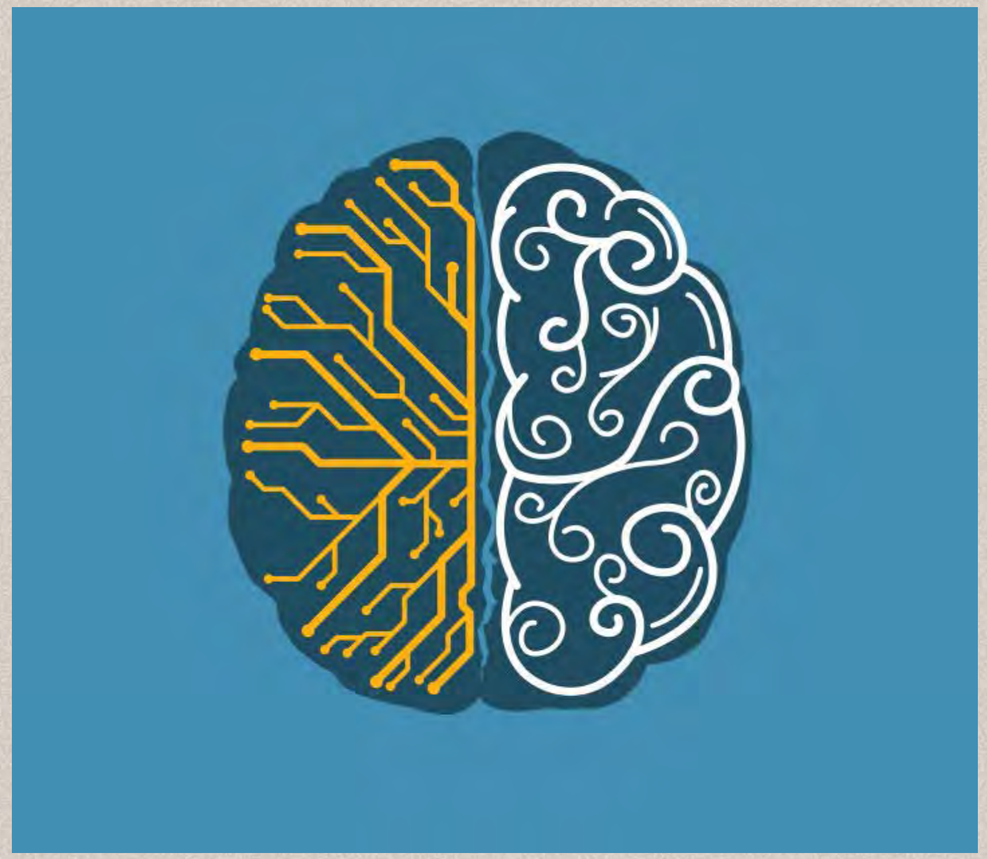
05 What is next?

WE ARE HERE

How would a sustainable system be institutionalized?

What is Next?

Future study rest on an interpretive paradigm which takes into account the **social complexities of consumption** rather than on rational decision making(Davis, 2013).



- Reflective & Automatic System
- Procrastination & Present bias
- Mental accounting
- Social preference

Key Takeaways

01

Sustainability

The ability to maintain or support a process continuously over time.

02

System view

the multiple chain modes should be adopted.

03

Multiple chain

MSC adoption is a way to manage uncertainties.

04

Alternative Certification

- PGS is the way of underprivileged actors' solution
- stakeholders's alignment

05

Gap of Intention-behavior

The determinants of buying decisions and consumption are different.

06

What is next?

From traditional economics to behavioral economics

What do we all seek in our life?

(Economic)
Material life

(Social)
Relationship

(Enviroment)
Spiritual life

To benefit others is to benefit ourselves

Thank you

FEEL FREE TO REACH OUT TO ME WITH ANY QUESTIONS OR CONCERNS.

for your time!