INTENTION, IMPACT AND COMMITMENT IN GEOGRAPHICAL INDICATION OF ORIGIN: THE CASE OF KINTAMANI BALI ARABICA COFFEE

Dissertation to obtain a Ph.D. degree
in the Graduate School Forest and Agricultural Sciences (GFA)
at the Department of Agricultural Economics and Rural Development
Faculty of Agricultural Sciences
Georg-August-University Göttingen, Germany

presented by
Lyla Rachmaningtyas
Born in Surabaya, Indonesia

Göttingen, December 2021

Thesis Committee:	Prof. Dr. Ludwig Theuvsen
	Dr. Verena Otter
	Prof. Dr. Xiaohua Yu
Examiner Board:	Prof. Dr. Xiaohua Yu
	Dr. Verena Otter
	Prof. Dr. Achim Spiller

Summary

Market extension and differentiation strategies that specify products based on the geographical indication of origins (GIs) play an important role in countering the impact of neoliberal policy in the agri-food industry. The World Trade Organisation (WTO) 1994 agreement on *Trade Related Aspects of Intellectual Property Rights* (TRIPs) motivates GIs product development and protection, which are implemented in the multifaceted legal and commercial systems of the scheme. Therefore, GIs scheme aims to protect intellectual property rights based on the territory of origin and to standardize the product quality of the entire supply chain. Given the strong development of consumer preferences for a single-origin product with quality and value assurance, other GIs worldwide have potentially significant opportunities. Despite the success of the global GIs model, there are still some overlapping issues with protection due to unclear interpretation of the institutional, scheme requirements, and policy interpretation in the global market.

The sustainability coffee schemes play important roles in supporting sustainable consumption and production in the global agri-food chains. One rising on demand sustainable agricultural product in this regard is from the Geographical Indication of Origins (GIs) scheme of coffee. GIs schemes itself have been established as collective properties that represent the products reputation toward specific region, quality improvement and production method based on assimilation of local community tradition and international standard of sustainable agriculture practices. GIs schemes also show to have economic, social and environmental impacts on farmers' livelihood and serve to contribution on Sustainable Development Goals (SDGs) in broader perspectives.

As the fourth largest producer in the world, Indonesia has ideal geographical and climate conditions for many varieties of GIs coffee plantations. Coffee is an important agricultural commodity that serves as a crucial economical source for smallholder farmers. Indonesia GIs coffee also has a huge potential market due to the changing global consumer preferences for specialty products with particular concern on the single origin and sustainability. Global policies in the agri-food industry have differentiated the Indonesia specialty markets and opened a niche for export with low capacity. Moreover, the Covid-19 pandemic which affected the whole economy has not changed consumer preferences for sustainable coffee products but rather opened a new marketing strategy.

For those reasons, Kintamani Bali Arabica Coffee (KBAC) scheme is selected as our case study. KBAC scheme is the first GIs certified coffee in Indonesia and considered as reference model of other GIs development in Indonesia. KBAC was established with an interesting framework, combining local culture, Hindu beliefs and sustainable farming practices. Traditional farmers' community, *Subak Abian*, has already established and maintained those local culture and beliefs in their agricultural practices, which technically are coherent with the sustainable agricultural practices. Considering the importance of GIs scheme, it is necessary to have lessons learned from each stage of KBAC scheme development not only to improve future development of itself, but also to motivate many more potential GIs schemes.

In early stage, there is an important lesson in regard of farmers' intention to adopt the KBAC scheme. Following scheme implementation in further stages, the impact of adopting the scheme emerges as one important issue. In the longer stage of scheme implementation, there is also farmers' commitment to implement the scheme, which is also crucial to scrutinize. The main body of this dissertation consists of three papers corresponding to those three important issues in GIs scheme. The papers are based on primary data collected throughout a farmer household survey in Bangli regency of Bali province in 2019. We interviewed 300 farmers using structured questionnaire consisting of farmer and farm characteristics, production process, farming practices, institutional setting, and economic activities as well as marketing information and farmers' cognitive responses in regard of KBAC scheme.

Several studies have analysed KBAC scheme implementation. However, we identified some gaps that we could complement with the papers in the dissertation. Previous studies on adoption and sustainable impact of coffee schemes have primarily focused on international sustainability schemes. Very few studies analysed the GIs schemes adoption and evaluation, particularly the case of KBAC scheme. In term of the early stage of KBAC scheme implementation, very few studies examined the cognitive perspective of the intention to adopt. In addition, still only a limited number of studies accommodated complex factors of human behaviour. Concerning impact evaluation of GIs scheme, there are only few studies that comprehensively implemented three pillars of sustainability impact assessment. On the longer stage of KBAC scheme implementation, there is a lack of studies that consider farmers' moral development and psychological attachment in the commitment to sustainable farming practices.

After a general introduction, the first main paper of the study aimed to analyse the determinant factors of behavioural intention to adopt KBAC scheme. Partial least square structured equation modelling (PLS-SEM) is applied to solve the objective based on developed behavioural intention integrated model of theory of interpersonal behaviour (TIB) and diffusion on innovation (DOI). The findings imply that perceived relative advantage, habit, evaluation of outcome, norm, self-concept, and perceived trialability consecutively contribute to the intention to adopt Kintamani Bali Arabica Coffee scheme. Further analysis also shows that perceived relative advantage and habit have high positive direct effects towards the intention to adopt KBAC scheme. These findings emphasize some policy implications for supporting productivity and market reputation, validating cost and benefits of participating in the scheme, promoting cultural values and improving farmers' access to information.

The second paper aimed to evaluate sustainability impact of farmers' participation in KBAC scheme. We focused on evaluating three pillars of sustainability evaluation, including economic, social and environmental impacts. Theory of Change (ToC) was used to determine indicators in each pillar and its pathway through chain of change. For estimating impact evaluation, we established counterfactual analysis method using propensity scoring matching (PSM). Composite indexes of economic, social and environmental impact as well as aggregate sustainability impact were developed to solve the objectives. Overall, our findings indicate that participating in KBAC scheme provide higher economic, social and environmental impact on member farmers' livelihoods. In term of economic impact, the findings indicate that provided higher coffee yield and cost efficiency contribute to higher profit and income. While in terms of social impact, the scheme contributes to improve capacity building, standard of living, and gender participation of member farmers. The findings also indicate that participating in KBAC scheme contributes to maintain sustainable coffee practices and improve biodiversity and ecosystem related to the environmental pillar of sustainability. However, the findings also prove that sustainability impact of participating in KBAC scheme is all in all weak. The findings led to several policy implications to strengthen the sustainability impacts, including the need for improvement in the inputs, activities and expected output within pre- and post-harvest periods and rearrangement of institutional setting of KBAC scheme.

The third paper aimed to analyze the ethical commitment of farmers' participation in sustainable farming practises implementation. Partial least square structured equation

modelling (PLS-SEM) applied based on developed integrated model of Investment Model Scale (IMS) and Interactionist theory was developed to address the objective of the study. Our findings indicate that participation in the KBAC scheme itself not necessarily has significant contributions to farmers' ethical commitment on sustainable farming practices. In contrast, the findings suggest that investment size, expected relationship, self-identity, satisfaction, locus of control and quality alternative more likely contribute to farmers' ethical commitment on sustainable agricultural practices. Consequently, redeveloping the partnership and institutional arrangement is prerequisite for supporting and maintaining farmers' commitment in implementing sustainable farming practices of KBAC scheme.

Finally, each stage of lesson learned of this study contributes towards GIs development not only in Indonesia but also other countries. Therefore, this study suggests that the most important foundation on GIs scheme development is revitalisation and legalisation for Community of Geographical Indication Protection (CGIP). To synergy the role of each actor in the GIs value chain, stakeholders and business should optimize GIs partnership through bottom-up partnership. In addition, to validate the product quality, stakeholders and CGIP need to administer and manage the quality of improvement based on Code of Practice (CoP) of GIs product. Following this institution arrangement, it is important for stakeholders and CGIP to promote the accountability and reliability of scheme by providing certainty of its cost and benefits. The stakeholder should support the implementation of traditional knowledge in relation to traditional organisation for implementing sustainable practices. For sustaining the implementation of GIs scheme and increasing market recognition, buffer stock for post-production activities is needed to develop market opportunities. Additionally, the stakeholders and business should actively participate in market promotion activities to strengthen potential marketing strategies.

Acknowledgements

Alhamdulillahi Rabbil 'Alamiin, all praise be to Allah for the graces and love to all of my wonderful lifetime experiences. Furthermore, I wish to express my deepest appreciation to my supervisory committees; Prof. Dr. Ludwig Theuvsen and Dr. Verena Otter, thank you for your professional mentorship, trust and encouragement throughout my Ph.D study. I wish also delighted to have Prof. Dr. Xiaohua Yu and Prof. Dr. Achim Spiller for the constructive suggestions and inputs for my dissertation improvement.

I would like to recognize the Indonesian Ministry of Research, Technology and Higher Education (Ristekdikti) for awarding me with a postgraduate scholarship to pursue Doctoral study in Georg-August University of Goettingen. I would also appreciate Airlangga University, my home-based University for the keen interest on me to continue my study. Furthermore, I would like to extend my sincere appreciation for Georg-August University of Goettingen, chair of Agribusiness Management and Indonesia Endowment Fund for Education (LPDP) for providing me with the financial support to conduct field survey in Indonesia. For Goettingen International and ASta of Goettingen University, I am grateful for further assistances in the emergency financial support for finishing this study.

I am also grateful to Regional Economic Development Institute (REDI) for managing all necessaries for the survey activity, especially to Ibu Erlyn Yuli Astuti and Bapak Indra Nur Fauzi, Ibu Erna Widiastuti, Suatip, Kang Wawan and Ruzza; my pleasure to work with you. Thanks also for Indonesia Coffee and Cocoa Research Institute, Bali Provincial Government and my respondents for supporting us with information and hospitality during data collection. My survey team: Agustian, I Nyoman Mahendra, Saiful Rahman, Tamrin Taba, Mariun and Saharudin thank you for your commitment and dedication for conducting household interviews and recording the data. Thanks also for taking care of me during data collection in Kintamani. Furthermore, my special thanks also go to Bapak Mawardi, Atika Wijaya, Bapak Djoko, Lya Aklimawati and Falia for sharing and updating the information regarding the KBAC development. I am deeply grateful to Prof. Bustanul Arifin, Joao Borges, Gesa Busch, Dominich Lemken for all valuable inputs on my research.

I also would like to appreciate all members of the chair of Agribusiness Management, especially Martina Reichmann, the chair secretary. Ayobami Adetoyinbo and Caetano Beber for their insightful suggestions and support me to get through the long and difficult time of writing my dissertation. Special thanks should also go to the international office-gang on Blue Tower: Everton Vogel, Sara Bakhsh, Tian Yu, Malin Tiebel, Juliana for a cherished time spent together. To Kreuzbegring colleagues, Selina and Cali, Daniel Hermann, Niemeyer thank you for your warmth and friendliness.

My special thanks to all Indonesian families, especially Tante Evi Alrutz, uwak Tini Klein, Budhe Atiet Engel,and Tante Agit Joop for always support me and my family especially during difficult time of studies and encouraging us with their lifetime stories. Colleagues through PPI Göttingen and Kalam Göttingen, especially Rachma Sujarwo ”Asal Gowes”, Farah Pangestuty and Ferry Prasetyia, Cut Erika, Fuad Bahrul Ulum and Renianne, Edwin Setia and Aci, Santi “Berlima family”, Winda “Blumen” and Arieska. My neighbours at Kampoeng HRS family; Kak Laila Rasyid, Kak Cut Yun, Mbak Alma “Primrose” thank you for the special foods, encouragements and prays for my family. Thank you also for Yuliani Reni, Aunty Dewi Köhler and Onkel Megandani for your special attention to my family. I also want to use this opportunity to appreciate Prof Kilian Bitzer and family for the supports and kindness. To all teachers at Büntewelt Kindergarten, Bruder Grimm Schule, Felix Klein Gymnasium, SD Mugeb and Spemdalas, thank you for your smile, caring and patience to my children.

Being mother and wife while struggling with a Ph.D tasks is indescribable challenging. I cannot through this journey without my incredible family. Therefore, I am extremely grateful to my love and inspiration Deniey Adi Purwanto, my angels Delisha and Nararya Purwanto. Thanks for your sacrifices, understandings, trust and prayers for completing this tough journey together; “I love you”. My deepest gratitude to my parents, Ibu Bapak Soewarto and Mama Papa Rusyadi, and all of my family who always give me endless supports and prays.

Table of Contents

List of Figures

List of Tables

List of Abbreviations

ATT	Average Treatment on Treated
AVE	Average Variance Extracted
BMP	Best Management Practices
CA	Cronbach's Alpha
CAFÉ	Coffee and Farmer Equity
CAPI	Computer-Assisted Personal Interviewing
CGIP	Community of Geographical Indication Protection
CIRAD	Centre on Agrarian Research for Development
CoP	Code of Practice
CR	Composite Reliability
CV	Convergence Validity
DOI	Diffusion of Innovation
FBAC	Flores Bajawa Arabica Coffee
GIs	Geographical Indication of Origin
HTMT	Heterotrait-Monotrait Ratio of Correlations
IC	Internal Consistency
ICCRI	Indonesian Coffee and Cocoa Research Institute
IPP	Industrial Property Protection
ISG	Indication of Source on Goods
KBAC	Kintamani Bali Arabica Coffee
MOTRAMED	Mediated Partnership Model
NCDT	National Coffee Drinking Trend
OS	Original Sample
PAO	Protection of Appellations of Origin
PDC	Pest and Decease Control
PLS-SEM	Partial Least Square Structural Equation Modelling
PSM	Propensity Score Matching
RIL	Reflective Indicator Loadings
SD	Standard Deviation
SDGs	Sustainable Development Goals
SIA	Sustainability Impact Assessment
SM	Sample Mean
SRMR	Standardized Root Mean Squared Residual
SSE	Sum Squared Error
SSO	Sum Squared Observation
TIB	Theory of Interpersonal Behaviour
ToC	Theory of Change
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
TRIPs	Trade Related Aspects of Intellectual Property Rights
UM	Maximization Model
VIF	Variance Inflation Factor
WTO	World Trade Organisation
4C	Common Code for the Coffee Community

CHAPTER I

GEOGRAPHICAL INDICATION OF ORIGIN OF KINTAMANI BALI ARABICA COFFEE: A GENERAL INTRODUCTION

1.1. BACKGROUND

1.1.1. Global Development of Geographical Indication of Origins (GIs) Scheme

In the past 20 years, the agri-food industry has undergone significant changes toward market extension and differentiation. This strategic shift was an attempt to counteract the impact of neoliberal policies on the agri-food industry and communities. Neoliberal policies, characterized by global competition, privatization and deregulation, have declined in agri-food industry prices and caused in socioeconomic consequences, therefore increasing poverty, unemployment, and declining income distribution (Piati & Dwiartama, 2020). The monopolistic competition in the agri-food industry resulted from neoliberal policy encouraging product differentiation. Market extension and differentiation strategies are achieved by specifying product characteristics and quality, as well as providing credible information on the product's territorial origin. Allaire (2018) stated, "the im-materialization of food and the institutionalization of quality." Therefore, agri-food industries can be defined beyond the type of soil and climate condition of a territory through GIs.

The World Trade Organisation (WTO) 1994 agreement on *Trade-Related Aspects of Intellectual Property Rights* (TRIPs) of article 22, paragraph 1[1], embodies the GIs as a distinctive sign or label referring to a specific territory or geographical origin possessing given attributes, qualities, and reputation (WIPO, 2019; Giovannucci *et al.*, 2009). According to Barham (2003) and Sylvander & Barham (2011), GIs develop their product

[1] Article 22, paragraph 1 of TRIPS defines geographical indication as:
"*Indication, which identify a good as originating in the territory of a member, or a region or locality in that territory, where the given quality, reputation or other characteristics of the good is essentially attributable to its geographical origin*".

differentiation based on genuine, humanity, and historical factors for targeting new agricultural paradigms, namely healthy and sustainable food systems. Bonanno *et al.*, 2020 described GIs as collective dimensions. GIs connect product reputation and unique characteristics, local production process, and community participation to protect the quality of property rights and support rural development.

GIs are not limited to commercial trading since they can function within a broader scope of initiatives, which can be established as multifaceted legal and commercial systems (Giovannucci *et al*., 2009). Therefore, they act as a legal system to protect specific attributes of the quality and reputation of a single country, region, or farm (UNCTAD, 2015). GIs assert their obligation to protect unique intellectual property rights based on social value and traditional knowledge from specific territories (Giovannucci *et al*., 2009; Teuber, 2010; Gangjee, 2016). On the commercial side, they are applied as a glocalization tool (Giovannucci et al., 2009). GIs align with global market orientation, relying on product quality, safety, and traceability measurements on their entire supply chain through the standard of scheme. Standardization is part of the capitalist strategy to efficiently produce and administer the product's quality (Bonanno, 2020). Therefore, GIs can democratize the challenge over the standardization of production processes from global corporate agri-food industries (Bowen, 2015; Parasecoli, 2017). Increasing product quality is important to revitalize industries targeting small-medium producers and communities within the current global competitive market (Giovannucci *et al*., 2009; Sekine & Bonanno, 2018; Piati & Dwiartama, 2020). Additionally, the standardization through the GIs scheme attempts to protect the consumer from the potentially inferior product of incorrect information on the true origin and quality (Giovannucci et al., 2009; Parasecoli, 2017).

The protection for GIs was motivated by various legal systems through national and international agreements, such as the Lisbon and Madrid System, trademarks laws, *sui generis,* and other agreements like TRIPs (WIPO, 2019). Long before the agreement, GIs were admitted through the Lisbon Agreement 1958 on Protection of Appellations of Origin (PAO), the Madrid Agreement 1891 for Indication of Source on Goods (ISG), and the Paris Convention 1983 of Article (1)2 on Industrial Property Protection (IPP) (Giovannucci et al., 2009). According to PAO, GIs refers to Appellations of Origin or *sui generis*. The statement clarifies the regions and countries which produce and acknowledge product characteristics and quality based on environmental and human factors.

Additionally, referring to Paragraph three (3) of the Paris Convention (IPP), the scope of definition industrial property is not only for "industry and commerce" but also encompasses agriculture and natural products, including coffee, tea, tobacco, and wines. Therefore, IPP and ISG define GIs as industrial property, which denotes indication of sources. GIs are typically associated with a specific geographical location within a country. From a legal perspective, there are four ways in which GIs can be protected, namely a special protection system or *sui generis*, certification marks, administrative business practices, and competition laws. (Giovannucci et al., 2009).

Products protected by GIs have been widely adopted and recognized under legal systems worldwide. According to the World Intellectual Property Organization (WIPO) (2019), in 2018, there were approximately 66,000 legally recognized GIs from 92 national authorities. Based on WIPO's report (2019), in 2018, Europe had 57.4% of GIs products in all regions, where Germany dominated the number of products at 15,566. The list is dominated by Asia (28.3%), with China contributing the largest number of GIs products (7,247). Regarding the type of legal system, the appellation of origin or *sui generis* is mostly adopted by European countries. 28 of the countries that are members of the *sui generis* system, seven are affiliated with the European Union (EU) (WIPO, 2019). France was the predominant producer of products, with a total of 5,977, followed closely by Italy, which produced 5,978. Germany implemented two types of GIs protection, namely the appellation system, which covered 6,289 products, and the *sui generis* system, which covered 7,276 products (WIPO, 2019; Piati & Dwiartama, 2020). In China, the trademark system was the preferred means of GIs protection, covering 4,867 products, as opposed to the *sui generis* system of 2,380 (WIPO, 2019). In 2018, approximately 50% of the total legal GIs products served were related to wines and spirits. Agricultural and food products accounted for 30% of the total, while handicrafts comprised approximately 3%.

The implementation of global GIs development regarding standards, requirements, and institutional structure is unclear (WIPO, 2019). Overlapping protection occurred due to different interpretations of economic policy. Consequently, it is hard to implement the protection since GIs products are marketed overseas. However, this overlapping can be a strategic value for market policy, especially for countries with market power (Bonanno, 2020). The United States (US), one of the largest agricultural-producing countries, interprets GIs as a trademark. The GIs are linked to private property as a company that can produce unrelated products to the territory of origin, history, and culture (Bonanno, 2020).

Therefore, the free trade competition policy for the US is still desirable. The European Union considers the concept based on the territory since culture, property of history, and environment are referred to as territory of origin (Bonanno, 2020; Sylvander & Barham, 2011). Long-rooted concepts of GIs, food valorization, and economic value were part of common awareness and legal understanding of European society (Lewin, 2009). The EU considered an inclusivity strategy to ensure marketing success by developing an effective corporation between industries and smallholder farmers, a multi-niche production process, a structured GIs institution, and scheme mechanism (Piati & Dwiartama, 2020). The protection covers a rich agricultural variety, namely vegetables, processed foods, and non-agricultural products, like handicrafts, ceramics, and furniture.

The success of the *sui generis* model in the EU after its development in 1992 has mostly influenced development of GIs across Asia (Hart, 2020). Additionally, the TRIPs agreement of 1994 has significantly strengthened development. This is important in negotiating in global market, creating product differentiation, and achieving market recognition for local products (Bowen, 2010; Hart, 2020; Piatti and Dwiartama, 2020). In Asian developed countries, such as the case of Nishio Matcha of Japan, both trademark and *sui generis* systems are adopted to revitalize rural development and improve the recognition of the products in global market (Sekine, 2022). Developing countries mainly apply the *sui generis* system, concentrating on protecting a single product. The case includes Kampot Peper of Cambodia, Hoa Vang Sticky Rice of Vietnam, Kintamani Bali Arabica Coffee of Indonesia, and Darjeeling Tea of India.

A comparison study on GIs development in Asia, such as Indonesia, Cambodia, Japan, and European Union, showed some failures in its implementation (Piatti and Dwiartama, 2020; Hart, 2020; Bonanno, 2020; Neilson *et al.*, 2018), and regions confronted the inclusivity of the GIs. The inclusivity relates to the failure to connect producers to GIs systems and establish the legal framework for GIs institution. Consequently, the GIs scheme fails to standardize the products even located in the same territory of origin. In Asian developing countries, a rigid production guideline is administered in GIs. The registration burdens the local producer because of additional modern practices in the production process. This guideline is claimed to be inappropriate for GIs products with heterogeneity characteristics. Additionally, in both Asia and EU countries, there was an issue of focusing more on establishing a new GIs product than on the impact on rural development.

1.1.2. GIs Development in Indonesia

Indonesia's concept of GIs was initiated by Law No. 14/1997, which amended Law No. 19/1992 following global agreement of TRIPs under WTO 1994. This was followed by the enactment of Law No. 15/2001, which focused on protecting brands and marks. Indonesia instigated its legislation by implementing Government Regulation No. 51/2007, drawing upon the history of utilizing "intellectual property rights" with the inspiration gained from developing GIs within the EU. In 2008, the country registered the first GIs product, namely Kintamani Bali Arabica Coffee. Furthermore, the GIs law protects a single product defined using the product's name and symbol referring to the territory where it was processed or grown. The latest law 20/2016 about Marks and Geographical Indication regulates Indonesian GIs under the same umbrella as Trademark law. This is also similar in most other countries, where GIs and trademarks are regulated under the same branch of law. Therefore, GIs allow consumers to understand product identification based on their territory.

In contrast, businesses apply trademarks to distinguish and license their products from other companies. Accordingly, Indonesia GIs aims to maintain its brand image and reputation by creating a brand loyalty market. Until now, there were ninety-three (93) GIs products under the *sui generis* system registered in the Indonesia Ministry of Law and Human Rights (DJHKI, 2020). The products varied from agriculture and foodstuffs, furniture, sculptures, and handicrafts; around thirty-eight (38) of total GIs products are coffees.

GIs coffee has the advantage of linking a unique property of sensory issues resulting from the interaction of genetic and territorial factors, which is internationally accepted by grading, cupping, and profiling method. However, GIs coffee is not linked to providing an excellent sensory perception since it is hard to define coffee flavour and territory. Importantly, GIs coffee is valuable in connecting products, places, and people to promote three pillars of sustainable development, therefore economic, social, and environmental. The GIs coffee is produced from local coffee varieties planted in specific environments and soil characteristics, implementing quality improvement based on traditional community knowledge for complying with sustainability principles. In the last decades, some international organizations, such as the Committee on World Food Security (CFS) and Food and Agriculture Organization (FAO), have been promoting GIs scheme as a new scheme to introduce and connect smallholder farmers with sustainable agriculture

chains (Sekine, 2020). Scheme is considered an open alternative market compared to the conventional system and contributes to attaining Sustainable Development Goals (SDGs) mainstreamed collectively in many countries. In addition, GIs scheme are important in improving accessibility to sustainable farming practices (Wijaya *et al.*, 2017; Samper *et al.*, 2017). Some studies also suggested scheme link farmers to alternative markets for sustainable coffee (Neilson *et al.*, 2018; Samper *et al.*, 2017; Mawardi, 2009a) and generates higher income opportunities (Teuber, 2010; Barjolle *et al.*, 2017). In broader perspectives, GIs scheme support economic growth, poverty alleviation, well-being, and ecological and biodiversity improvement (Kimura & Rigolot, 2021). As a sustainability scheme, GIs assure sustainable production and consumption with the additional attribute of GIs.

Indonesia is positioned within the third and fourth waves of coffee, with several market niches emerging wherein consumers are increasingly focused on the specific qualities of the coffee beans. Specialty coffee increased these waves of consumption, introducing selected coffee based on its quality, trading, GIs, and sustainable production. Therefore, two (2) types of specialty coffee are administered under the international coffee and GIs scheme. International sustainability scheme based on production and trading process includes Fair-Trade Coffee, Common Code for the Coffee Community (4C)'s coffee, CAFÉ (Coffee and Farmer Equity), UTZ Kapeh, Rainforest Alliance, Smithsonian Bird Friendly, and Organic Coffee. The international development community commercially designs these trading scheme to achieve sustainable development goals for addressing ethical sourcing (UNFSS, 2018; Giovannucci *et al.*, 2013; Negi & Perez-Pineda, 2020). Farmers must voluntarily become members of scheme through cooperatives to gain access to information on new and modern farming practices. Membership becomes more prerequisite following scheme regulation as part of global market. The external auditor is appointed to ensure scheme regulations' traceability and knowledge. Meanwhile, the GIs scheme for coffee is based on bottom-up partnerships through the collaborative governance organized by the Community of Geographical Indication of Protection (CGIP) (Mawardi, 2009a, 2009b). The CGIP has an important role as the management board of the GIs scheme, assisting with the certification process and ensuring production and quality control. Since the GIs scheme is a communal right, farmers and the local community must be involved from the beginning of scheme development to the implementation. Farming

practice includes the combination of efficient local knowledge and modern farming practice.

Indonesian coffee is the most important agricultural commodity in global markets regarding production and value, serving as an economical source for smallholder farmers (Wahyudi *et al*., 2020; Dietz *et al*., 2019). Coffee is the third most important plantation after oil, palm, and rubber, contributing 16,15% of the Gross Domestic Product (GDP). The country is an archipelago with ideal geographical conditions for planting coffee. Types of volcanic soil, altitude, and weather contribute approximately to development of 100 varieties of coffee plantations. The country has reached a total coffee production of 12.4 million bags, equivalent to 743,181 tons, in 2020. Robusta varieties dominate 70% of coffee production, and approximately 94% is produced from smallholder plantations. This was calculated in 2020 when around 1.8 million smallholder farmers or 50 thousand workers depend on 1.22 million hectares of coffee plantations (Directorate General of Estate Crops of Indonesia, 2020). Domestic coffee consumption will reach 350 thousand tons or 5.8 million bags in 2020, with an average growth of 8% annually (ICO, 2020). The emerging global café culture and coffee *connoisseurs*[2] have an important contribution where millennials are most likely central to the Indonesian GIs market. The vibe of global coffee culture influences Indonesia through American-style shops. The youth have modified their consumption patterns and are actively involved in the coffee culture. This is exemplified by the participation in many coffee exhibitions, the pursuit of a barista profession, and patronage of local coffee businesses. In addition, the monopolistic power in the industry has opened an alternative specialty coffee market for local chains and businesses with small-quantity export (Astuti *et al*., 2015a; Ibnu et al., 2015). In 2020, approximately 50-60% of total production, equal to 379,35 thousand tons of Indonesian green coffee beans, were exported. The USA and EU are the main export destinations of Indonesian coffee, reaching consecutively 54 and 69.8 thousand tons at 202 and 146.8 million US$ in 2020 (Statistic Indonesia, 2021).

In light of the Covid-19 pandemic influence economies worldwide, the supply chain has not been immune, with a significant portion of global production experiencing moderate to long-term effects (ICO, 2020). The price instability of coffee is largely influenced by the fluctuations observed in global market. Price fluctuation occurred

[2] Coffee *connoisseur* is someone who not only coffee lover but knows about the coffee; type of beans, taste profile, quality, originality and sustainability product.

because of the instability on the supply side from the effect of global market shock affected by Covid-19 pandemic regulation. Regarding the moderate impact of the pandemic, this has worsened the Indonesia price fluctuations by 50%, from 60,000 IDR/kg to 36,000 IDR/kg in April 2020 to 2021 (Bappebti, 2023). The postponement orders by importing countries consequently decreased exports by 50% (Statistic Indonesia, 2021). The travel restrictions implemented because of the pandemic resulted in a profound impact on the populace's activities. Moreover, the coffee industry has suffered a substantial decline of 90% as a direct consequence (Tempo, 2020). According to ICO (2020), most consumers can enjoy their coffee at home through delivery orders or online shopping due to the closure of coffee shops. In addition, these consumers remain unchanged for a unique taste of specialty and GIs coffee (ICO, 2020; Specialty Coffee Association, 2021). In the long run, most countries faced changing or canceling contract fulfillment for marketing coffee (ICO, 2020). Farmers are burdened with the cost of production for pesticides and the decision to fertilize since farmers' income falls, and uncertainty rises due to the pandemic (ICO, 2020; Wulandari *et al*., 2020). This did not change the behavior to implement sustainable agricultural, environmental, and waste management practices (ICO, 2020). The moderate and long term-impacts emphasize some global opportunities for Indonesian coffee markets in the post covid-19 pandemic.

2. KINTAMANI BALI ARABICA COFFEE SCHEME

1.2.1. Socio-Economic Characteristics

Bali province as locus of our study, located in the eastern of Indonesia, is considered as the fourth largest coffee producer in Indonesia (Table 1.1.). Total coffee production accounted for nearly 16,000 tonnes in 2019, equivalent to 130 million IDR (Directorate General of Estate Crops of Indonesia, 2019). Furthermore, Arabica coffee production is calculated approximately 16 percent of total coffee production and 35 percent of the total coffee plantation area in Bali (Directorate General of Estate Crops of Indonesia, 2019).

Table 1.1. Coffee Production in Indonesia, 2019

Province	Arabica				Robusta			
	Area (ha)	Production (Ton)	Yield (kg/Ha)	Small Farmers (HH)	Area (ha)	Production (Ton)	Yield (kg/Ha)	Small Farmers (HH)
Sumatera	194,423	12,748	908	222,402	589,125	392,133	826	513,878
Jawa	46,632	20,029	770	215,237	145,092	84,270	676	381,330
Bali	**12,377**	**4,110**	**539**	**16,745**	**23,010**	**11,842**	**506**	**56,199**
NTB	1,741	473	615	1,935	9,991	4,612	627	12,089
NTT	17,996	7,018	577	29,965	46,804	14,033	518	84,719
Kalimantan	-	-	-	-	21,700	6,739	507	39,006
Sulawesi	54,876	21,285	702	91,565	57,413	20,165	538	98,227
Maluku and Papua	9,355	1,905	498	6,775	3,541	581	431	6,756
INDONESIA	**336,400**	**182,303**	**825**	**584,624**	**859,547**	**503,385**	**758**	**1,192,203**

Source : Directorate General of Estate Crops, 2019.

Kintamani Bali Arabica Coffee (KBAC) is the first Balinese arabica coffee to receive the national certificate of origin in 2008 and has been considered as a reference model of GIs coffee in the development of other GIs coffees in Indonesia (Wahyudi & Jati, 2010). According to the Code of Practice (CoP), KBAC scheme administratively covers plantations located in three regencies of Bali province, including Bangli, Badung and Buleleng regencies (Mawardi, 2009b). The coffee grows in the suitable homogenous soil and climate of a specific area in northeast Bali, at altitude over 900 meters on the slopes of Batur Mountain, one of Bali's active volcanoes. It is estimated that KBAC is planted on about 12,000 hectares of smallholder farms that employ more than 16,000 households. Assumed that there are four family members and two additional workers per household working on their coffee plantations, it is estimated that about 96,000 people depend solely on the production side of KBAC scheme (Statistics Indonesia, 2019). This study selected KBAC within Bangli regency for particular reasons. First, the 'Kintamani' term came from the name of a district in Bangli regency. Secondly, Bangli regency is considered as the centre of KBAC production as it has the largest coffee plantation and accounts for more than 60 percent of total Bali provinces coffee production established in the region (Directorate General of Estate Crops, 2019). Additionally, KBAC also benefits from Bali reputation as domestic and international tourist destinations, which potentially served as a regional branding of marketing strategy of KBAC product.

1.2.2. Overview of KBAC Scheme Development

Kintamani Bali Arabica Coffee scheme was proposed as a pilot project of GIs certified coffee in Indonesia in 2002, which motivated with some valuable experiences. At the time where specialty coffee was initially a rising product, Indonesia faced several intellectual property disputes rather than directly trade in the international market (Mawardi, 2009b). Named after the product, the KBAC scheme was established under chapter 56 of Indonesian Law No 15/2001 regarding trademarks, following TRIPS of World Trade Organisation (WTO) (Mawardi, 2009b) and formally issued with Decree 51 of 2007 regarding Geographical Indications of Origin to perform the protection system. Based on those regulatory umbrellas, the KBAC scheme is not meant merely as a commercial trading scheme, but a regional-based commodity protection with its particular agricultural practices, including planting, harvesting, processing and quality control, up to the marketing strategy.

Initiated in 2001 through the pilot project of Mediated Partnership Model (MOTRAMED), the KBAC certification scheme aimed to develop a sustainable agriculture of the Arabica coffee of Kintamani through an integration of an established traditional farming institution and a set of sustainable farming practices. The MOTRAMED is a collaborative bottom-up partnership that include local farmers, local roasters and *Subak Abians* for actively participate in KBAC quality improvement. This program was managed by the Indonesian Coffee and Cocoa Research Institute (ICCRI) and the International Cooperation Centre on Agrarian Research for Development (CIRAD), supported by other stakeholders including local and provincial governments and French Embassy. For marketing the product, the program succeeded to invite one exporter as a single market distribution to market KBAC.

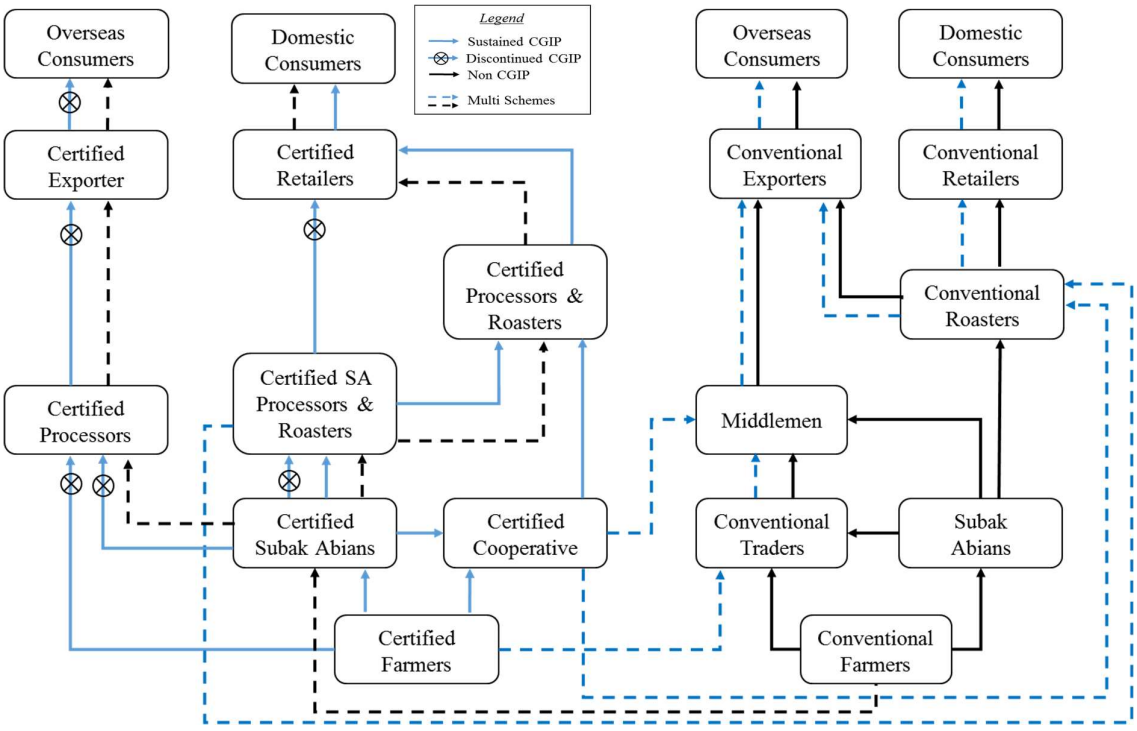
The KBAC scheme developed within an interesting framework. It is a combination of local wisdom and sustainable farming practices based on the traditional philosophy for life in Bali. The philosophy derives from Balinese spiritualism and belief, known as '*Tri Hita Karana'*, which literally describes the three reasons for prosperity based on the implementation of three types of harmony, including harmony among fellow human beings, harmony with nature and environment, and harmony toward God. Traditional farmer groups refer as *Subak Abian* established based on those *Tri Hita Karana* spiritualism and belief and became the most common establishment in farmer community in Bali. The *Subak Abian* integrates agricultural practices, religion and social activities that

are written in the internal regulation called '*awig-awig*' (Wijaya *et al*., 2017; Mawardi, 2009a). Thus, sustainable farming practices in KBAC scheme technically are already part of the *Subak Abian*. These practices include supporting traditional farming practices (i.e. organic farming, water and waste management); changing harvesting method from strip picking to cherry picking; adopting new technology of processing (i.e. wet processing); introducing grading quality; introducing taste evaluation; developing business partnerships; food safety evaluation; and establishing internal monitoring system. All those quality improvement practices described in the CoP of KBAC scheme and considered as a collective action toward quality improvement (Mawardi, 2009a).

To prepare all necessary requirements toward GIs certification and ensure the implementation of the KBAC schemes, MOTRAMED established the Community of Geographical Indication Protection (CGIP) as a managing group. Some *Subak Abians* were included as members of CGIP as farmers' representatives. Together with local and provincial government representatives, certified roaster, ICCRI, CIRAD and PT Indo CafCo were also appointed as members of CGIP Advisory board[3]. All stakeholders played their roles according to the CoP for managing KBAC scheme. CGIP was established in 2005, four years after the MOTRAMED partnership initiated. During those years, the quality improvement programs of MOTRAMED continued to develop. To support the program, technical assistance, machines, tools and loan were provided to the members. Through the MOTRAMED partnership, farmers marketed coffee using the single door market, where PT Indo CafCo, an exporter company was committed to buy KBAC products via a certified processing unit (Figure 1). In this regard, PT Indo CafCo is a certified exporter and roaster company. This strategy allowed member farmers and *Subak Abians* to have a shorter and fixed relationship compared to the conventional non-CGIP chain. It took a yearlong from 2007 to 2008 for CGIP to propose and finally get granted the national GIs certification.

[3] In the CGIP, ICCRI play roles as mediator and quality control institution, and PT Indo CafCo as partner exporter (certified exporter as the GIs protection effectively prevailed).

Figure 1.1. Arabica Kintamani supply chain in domestic and international markets



Source: summaries from in-depth interview with KBAC stakeholders during the survey.

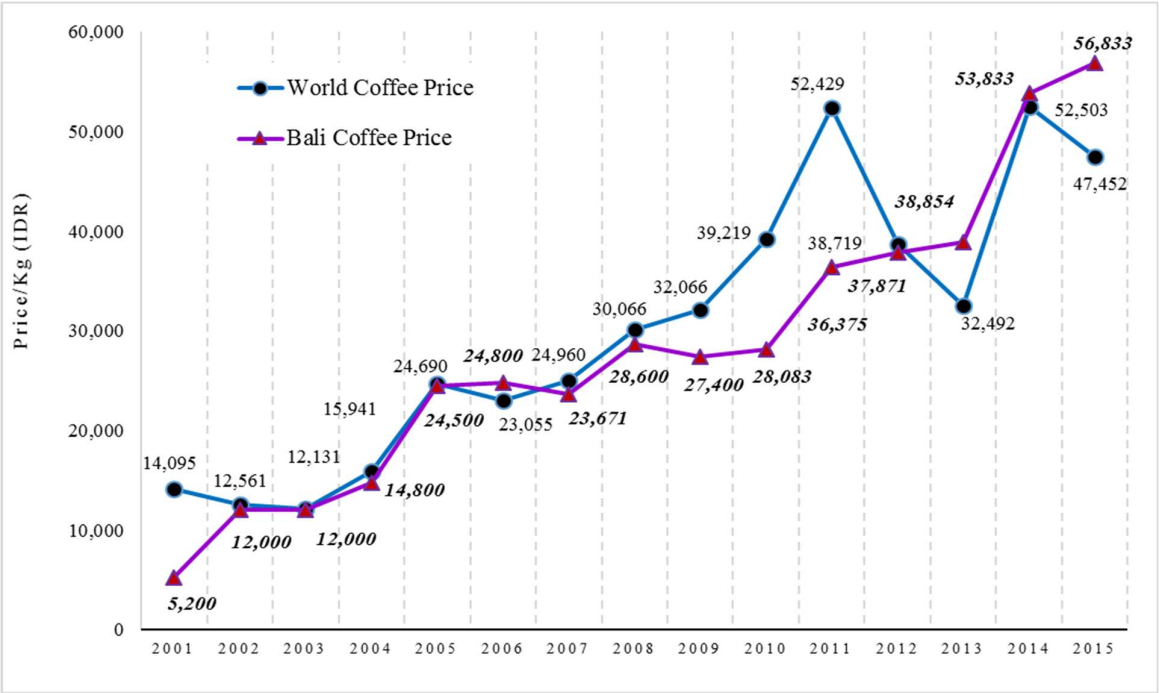
The KBAC scheme has affected farmers' livelihood. Shortly after the initiation of the MOTRAMED project in 2002, the Bali coffee price increased more than twice of the previous year (see Figure 1.2.). In the same time, world coffee price decreased by more than 10 percent of previous year; resulting in a narrowed gap between Bali and world coffee prices. To some extent, the narrower gap between Bali and world coffee prices indicates the competitiveness of Bali coffee in the international market. The increase of Bali coffee price was continued and even higher than world coffee price at some years at least until 2015. The increase of Bali price motivated more *Subak Abians* to join CGIP that was initially only focused on four *Subak Abians* (Mawardi, 2009a). From 2005 onward, more *Subak Abian* joined the CGIP each year, committing on the CoP of wet processing. Prior to the national GIs certification to the KBAC in 2008, 61 *Subak Abians* already joined the CGIP while Bali coffee price continues to increase steadily and closing the gaps to the world coffee price.

After national GIs certification granted in 2008, the MOTRAMED project ended and the partnership unfortunately did not proceed as expected. PT Indo CafCo ended the role as certified exporter in 2009, followed by ICCRI role as mediator of the project. In the same year, Bali coffee price declined while the world coffee price increased, creating a wider gap between both. Farmers attempted to survive by selling coffee individually to some conventional traders. In this regard, the collective action in terms of single door marketing and quality improvement within KBAC scheme was discontinued, which was visualized as the discontinuity of CGIP (Figure 1.1.). Farmers might even have lost their trust and commitment for conducting the KBAC practices based on CoP (Nelson *et al.*, 2018). Surprisingly, some certified *Subak Abians c*ontinued to trade with certified roasters and labelled the product as KBAC product, although the production process has not followed exactly the CoP scheme, represented as the multi scheme chain in the Figure 1.1. The worst part was that some farmers already converted from coffee to tangerine as the world coffee price crushed in 2012, followed by a decline of Bali coffee price in the preceding year. Consequently, coffee area and coffee production decreased by 20 percent and 2 percent respectively (Directorate General of Estate Crops, 2019).

In 2012, Bank Indonesia (the Indonesian central bank) and 64 *Subak Abians* initiated a CGIP Cooperative. This CGIP Cooperative expected to bring back the collective action and commitment to quality improvement under KBAC scheme and represent coffee farmers to sell KBAC (Wijaya *et al*., 2017). As alternative to the CGIP Cooperative, with the same motivation to maintain the CoP of KBAC scheme, some *Subak Abians* also developed an alternative certified chain. This alternative chain, which persists until recently, was developed by changing the role of the *Subak Abian* processors into certified private processors for KBAC scheme (Figure 1.1.).

This 'alternative' sustained CGIP's supply chain has been considered to be more efficient than the discontinued single door marketing chain, considering farmers to have more options to sell their product under KBAC scheme. The CGIP's management monitors the chain, including certified processors, roasters and retailers prior to issuance the KBAC certification. They also keep the price determination system as before, where it was determined by the quality of the bean. As the bean quality confirmed, the price in KBAC is decided accordingly to the basic price of world coffee price.

Figure 1.2. Arabica coffee price and world coffee price



Source : Wijaya *et al*., 2017

3. PROBLEM STATEMENTS AND RESEARCH GAPS

Considering contributions of GIs schemes to farmers' livelihood and to local communities and global development in broader perspectives, it is imperative to have some lessons learned from each stage of KBAC scheme development. In early stage, there is an important lesson needed to be learned regarding farmers' intention to adopt the scheme. The lesson is important not only to improve farmers' participation in KBAC scheme but also to develop other potential GIs schemes. Following farmers' implementation of KBAC scheme, there is also an important lesson regarding the impact of adopting the scheme. As a sustainability scheme, it is essential to learn how far the scheme has provided economic, social and environmental outcomes to farmers and their livelihood. On the longer stage, there is an important lesson of farmers' commitment to implement the scheme. This lesson is particularly essential so that the sustainability impact of the scheme could simultaneously proceed with the sustainability of the agricultural practices. Considering all these important lessons, this study is expected to contribute not only to other Indonesia GIs scheme development, but also other GIs scheme beyond Indonesia.

There are a growing number of studies on behavioural intention, impact evaluation and commitment to implement coffee GIs schemes. However, some gaps motivated this dissertation. First, most studies on adoption and sustainable impact of coffee schemes focused on international sustainability schemes, such as Fairtrade International, Organic, Bird Friendly, Rainforest Alliance and the Common Code for the Coffee Community (4C) (Dietz *et al*., 2019; Jena *et al*., 2017; Rijsbergen *et al*., 2016; Lampach & Morawetz, 2016; Chiputwa *et al*., 2015; Rueda & Lambin, 2013; Ruben & Zuniga, 2011; Ruben & Fort, 2012). Second, in term of behavioural intention, most studies examined actual perspective of behavioural adoption. Only very few studies covered the cognitive perspective of the intention to adopt (Borges *et al*., 2014; Hansson *et al*., 2012) and accommodated a set of complex contributing factors on intention to adopt the scheme (Tey *et al*., 2014). Third, concerning impact evaluation of GIs scheme, most studies covered partially the overall sustainability pillars. For example, some studies relied on economic impact (Neilson *et al*., 2018; Neilson & Hartatri, 2014), whereas others addressed institutional impact (Barjolle *et al*., 2017; Galtier, 2013; Durand & Fournier, 2017). Other studies focused only on two aspects of the assessment, such as economic and social impacts (Neilson *et al*., 2018; Neilson & Hartatri, 2014), or social and institutional impacts (Wijaya *et al*., 2017). Only few studies comprehensively implemented three pillars of sustainability impact assessment (Bowen & Zapata, 2009; Barjolle *et al*., 2009). Fourth, studies on ethical commitment in maintaining sustainable farming practice mainly focused on traders' point of view (Cadby *et al*., 2021; Sun *et al*., 2017; Mboga, 2017). Fifth, the dynamics of farmers' moral development and psychological attachment in commitment hardly received attention (Meijboom & Stafleu, 2016; Cardoso & James, 2011).

4. RESEARCH OBJECTIVES AND APPROACH

The aim of this dissertation generally is to analyse the adoption behaviour and sustainability impacts of KBAC scheme, particularly the experience of Balinese smallholder farmers. Accordingly, three empirical examinations are incorporated in this dissertation to address comprehensively the following objectives:

i. **To analyse the determinant factors of behavioural intention to adopt KBAC scheme**. This examination aims to provide a better understanding of farmers' determination and expectation in implementing KBAC scheme in the future. It is crucial to scrutinize the behavioural intention to adopt KBAC scheme especially considering that there were limited studies on GIs scheme specifically on behavioural

intention. We employed the integrated model of theory of interpersonal behaviour (TIB) and diffusion on innovation (DOI) to fill the gap of theoretical foundation and to accommodate a complex human behaviour setup. Partial Least Square Structured Equation Modelling (PLS-SEM) technique was applied to estimate and solve a comprehensive conceptual framework.

ii. **To evaluate the sustainability impact of farmers' participation in KBAC scheme**. This examination focuses on sustainability welfare indicators (i.e. economic, social and environmental) that were conceptualized by applying theory of change (ToC). Propensity Scoring Matching (PSM) was chosen as main method of analysis to avoid the counterfactual issue arising from farmers' participation state in KBAC scheme. Additionally, a set of sustainability impact indexes was developed as comprehensive evaluation measures of KBAC participation.

iii. **To analyse the ethical commitment of farmers' participation in implementation of sustainable farming practises of KBAC scheme**. This examination focuses on understanding how farmers' moral development and psychological attachments contribute to farmers' ethical commitment to sustainable farming practices in KBAC scheme. We developed an integrated model of Investment Model Scale (IMS) and interactionist model to achieve the objective.

To establish these objectives, a household survey was conducted between March and April 2019 in Bangli regency, Bali province. The survey collected data of 300 smallholder farmers and consisted of KBAC members and non-members based on the membership data documented in book Code of Practice (CoP) of KBAC (MPIG, 2011) and other KBAC documentation obtained from local government. Farmers were interviewed using a structured questionnaire. The first part of the questionnaire covered farm and farmers' characteristics, including age, gender, family size, education, plantation altitude, farm size, details of coffee and other crops production. The second part covered farming practices and farmers' economic activities. Followed by the third part, which covered multiple aspects of the KBAC scheme, including institutional (e.g. leadership and membership) and marketing information. Then, the fourth part covered external factors (including access to credit and information) and cognitive factors (including intention, attitude, social value, emotion, habit, commitment, satisfaction, quality alternative, and investment).

5. OUTLINE

The dissertation is structured as follows. Chapter I presents a general introduction of this dissertation, including motivation of studies and overview of KBAC scheme. Chapter II presents the first manuscript titled "*Integrated Model of Interpersonal Behaviour and Diffusion of Innovation on the Intention to Adopt Kintamani Bali Arabica Coffee Scheme*". Chapter III presents the second manuscript titled "*Sustainability Impact Assessment of Participation in Geographical Indication Scheme: The Case of Kintamani Bali Arabica Coffee*". The manuscript titled "*Moral Development and Psychological Attachment in Ethical Commitment to Sustainable Farming Practice: The Case of Arabica Bali Kintamani*" is presented in Chapter IV. Chapter V discusses general conclusions, policy implications, and suggestions for further studies. The questionnaire of the survey is presented in the appendix.

CHAPTER II

INTEGRATED MODEL OF INTERPERSONAL BEHAVIOUR AND DIFFUSION OF INNOVATION ON THE INTENTION TO ADOPT KINTAMANI BALI ARABICA COFFEE SCHEME

Abstract

The behavioural intention to adopt coffee certification is an important foundation for sustainable coffee schemes implementation. However, this might be a problem as farmers' participation in some cases of sustainable coffee schemes has remained low and the intention to adopt sustainable coffee scheme might still be a puzzle. Empirical studies on the intention to adopt sustainability schemes were frequently based on either the theory of interpersonal behaviour or infrequently diffusion of innovation theory. Few studies have been able to establish the integration of those foundations, in which the case of GIs coffee scheme has not yet been covered. The development of Kintamani Bali Arabica Coffee scheme has also been narrowly studied despite its important contribution to the development of GIs scheme in Indonesia. Therefore, this study aims to fill those gaps by examining the behavioural intention to adopt Kintamani Bali Arabica Coffee scheme based on an integrated model of interpersonal behaviour and diffusion of innovation. In order to achieve this objective, the model was estimated using Partial Least Squares Structural Equation Modelling using primary data collected from 300 arabica coffee farmers in Bangli regency, Bali. The results show that there are significant contributions of perceived relative advantage, habit, evaluation of outcome, norm, self-concept, and perceived trialability on the intention to adopt Kintamani Bali Arabica Coffee scheme. Further analysis also shows that perceived relative advantage has the highest positive direct and indirect effect toward the intention to adopt KBAC scheme. However, in regard to interpersonal behaviour, habit has the highest direct effect on the intention to adopt KBAC scheme. The result also shows that selected facilitating conditions supporting interpersonal behaviour and perceived attributes contribute to the intention to adopt KBAC scheme. There are some policy implications for the improvement of the scheme, including the importance of supporting and promoting productivity and market reputation enhancement, validation of cost and benefits of participation, maintaining Subak Abians religious cultural values, and improving the accessibility of knowledge and financial capacity of farmers.

Keywords: arabica coffee, geographical indication, interpersonal behaviour, diffusion of innovation, PLS-SEM modelling.

2.1. INTRODUCTION

There are a growing number of consumers with particular interest in sustainable coffee products around the world in the past few years. Renowned as *connoisseur* consumers, they have particular interest not only in the quality, but also in the geographical indication, cultural values and sustainability of the coffee products (Quintão *et al*., 2017; Vanharanta *et al*., 2015; Purnomo *et al*., 2019). This phenomenon is part of the third and fourth coffee wave movements, which consider single origin, high quality, and sustainable production in the new coffee supply chains development. In response to this trend, several sustainable coffee schemes competing in the world coffee market have emerged, including those based on external standard such as Fair Trade International, Common Code for the Coffee Community (4C), Organic, Rain Forest Alliance, Coffee and Farmer Equity (CAFÉ), Starbuck, and UTZ Kapeh. Alternatively, there are also several coffee schemes based on internal practices, such as geographical indication of origin (GIs) schemes.

GIs schemes developed are based on *Trade Related Aspects of Intellectual Property Rights* (TRIPS) of World Trade Agreement 1994[4]. Since then, these schemes have been established as trademarks and collective property to represent quality, production method, and reputation of a product toward specific region or locality. In this regard, GIs coffee schemes play an important role to protect the originality and quality reputation of the coffee production as well as its traditional cultural communities and knowledge (Samper *et al*., 2017; Schüβler, 2009; Vellema *et al*., 2015). GIs coffee schemes are also argued to have an important role in creating alternative markets for sustainable coffee in the global market (Neilson *et al*., 2018; Samper *et al*., 2017; Mawardi, 2009a; Teuber, 2010). Aside important roles to the product and its market, GIs coffee schemes are also argued to play important roles to coffee farmers, including improving accessibility to sustainable farming practises (Wijaya *et al*., 2017; Samper *et al*., 2017) and generating premium income opportunity (Teuber, 2010; Barjolle *et al*., 2017).

In a broader perspective, GIs are argued to contribute to *Sustainable Development Goals* (SDGs). Bager & Lambin (2020) suggest that a third of all companies in the global coffee supply chain play important roles in adoption of sustainability practices which are consistent with the SDGs. In a more detailed approach, Kimura & Rigolot (2021)

[4] Article 22.1 of TRIPS defines geographical indication as:
"*Indication, which identify a good as originating in the territory of a member, or a region or locality in that territory, where the given quality, reputation or other characteristics of the good is essentially attributable to its geographical origin*".

suggested that GIs contribute to at least nine goals within production stages, including no poverty (goal 1), good health and well-being (goal 3), quality education (goal 4), gender equality (goal 5), affordable and clean energy (goal 7), decent work and economics growth (goal 8), responsible consumption and production (goal 12), biodiversity (goal 15), and partnership (goal 17). Furthermore, Barrera (2020) comprehensively discussed the potential contribution of GIs value chain in accelerating the achievement of all goals of SDGs. Considering overall roles; it is clear that GIs coffee schemes should widely be adopted not only in developed countries but also in developing countries.

Accordingly, Indonesian government initiated several GIs coffee products originating from specific regions within Indonesian archipelago. Kintamani Bali Arabica Coffee (KBAC) is the first GIs agricultural product of Indonesia. The developed scheme has an interesting framework with a combination of local wisdom and sustainable farming practices based on the religious and cultural philosophy in the life of Balinese people[5]. Furthermore, KBAC scheme focuses on empowering farmers and local agriculture institutions through partnership activity and capacity building for producing high quality coffee. In this regard, the scheme not only represents local geography identity as the origin of the product, but also farmers' intention and effort in implementing a sustainable agriculture practice in the coffee production (Wahyudi & Jati, 2010).

Farmers' behavioural intention to adopt is a critical aspect for the successful implementation of a sustainable coffee scheme. Understanding farmers' behavioural intention to adopt is important for designing appropriate schemes (Dietz *et al*., 2019; Bray & Neilson, 2017), developing more internalized and effective schemes (Ibnu *et al*., 2015; Luhman *et al*., 2016), and identifying strategies to improve farmers' livelihoods (Bray & Neilson, 2017; Neilson *et al*., 2018). It is also important in terms of institutional development, particularly in developing organization structure and certification schemes, and appropriate partnership models towards improving farmers' welfare (Wijaya *et al*., 2017; Astuti *et al*., 2015a; Ibnu *et al*., 2018; Chiputwa *et al*., 2015). In overall, it is crucial to scrutinize farmers' behavioural intention to adopt KBAC scheme, not only for the evaluation of its development, but also to other GIs coffee and agricultural products around

[5] The philosophy derives from Balinese beliefs, known as '*Tri Hita Karana'*, which literally describes the three reasons for prosperity, therefore harmony among fellow human beings, harmony with environment and nature, and harmony toward God. Traditional farmer groups referred to as '*Subak Abian'* were established based on those beliefs and became the most common establishment of farmers' community in Bali.

the world. However, there were only a limited number of studies on coffee GIs schemes particularly KBAC scheme since initiated in 2001.

In addition to a lack of empirical studies, there are also theoretical-wise research gaps in term of behavioural intention to adopt GIs coffee schemes, KBAC scheme in particular. Since studies regarding behavioural intention to adopt GIs scheme are limited, we seek theoretical foundation on a broader term, which is behaviour adoption of agriculture practices. Several meta-analysis studies on the behavioural adoption in agriculture practices showed that they are most likely based on utility maximisation model (UM), theory of reasoned action (TRA) and theory of planned behaviour (TPB) (Rajendran *et al*., 2016; McDonald, 2014; Borges *et al*., 2019b). However, each of these theoretical foundations used to highlight parts of the more complex important factors of intention to adopt. For example, UM models focus on defining the influence of socio-economic factors on adoption behaviour (Ansah, 2016), while TRA and TPB focus on cognitive factors of adoption behaviour (Borges *et al*., 2019b). Additionally, most of the studies using UM, TRA or TPB as theoretical foundations examined the actual perspective behavioural adoption, only a few covered the cognitive perspective of the behavioural adoption itself, particularly behavioural intention to adopt (Borges *et al*., 2014; Hansson *et al*., 2012). Henceforth, it is imperative to have a theoretical foundation to accommodate a set of complex factors that determine behavioural intention to adopt KBAC scheme.

Corresponding to those aforementioned research gaps, the objective of this study is to analyse the determinant factors of behavioural intention to adopt KBAC scheme from the coffee farmers' perspective. From this analysis, we expectantly are able to examine the implication of farmers' behavioural intention to adopt KBAC scheme for the evaluation of KBAC and other GIs scheme development around the world. An integrated model of theory of interpersonal behaviour (TIB) and diffusion of innovation (DOI) is developed to fill the gap of theoretical foundation that accommodates a set of complex contributing factors. TIB is selected as theoretical foundation as it not only accommodates cognitive and social factors of behavioural intention to adopt (Rajendran *et al*., 2016; Tey *et al*., 2014), but also habits and facilitating conditions (Moody, 2013; Tey *et al*., 2014; Taherdoost, 2018). DOI was selected as theoretical foundation as it accommodates diffusion of innovation in individual behaviour intention to adopt (Tey *et al*., 2014; Reimer *et al*., 2012; Roger, 2003). The integration of TIB and DOI itself bounded by cognitive rationality, social and economic factors that make it more robust and consistent to

accommodate the complexity in determining behavioural intention to adopt (Jackson, 2004; Tey *et al*., 2014). In addition, the perceived attributes are defined as an individual self-convincing mental in persuasion of concerning characteristics. Therefore, the perceived attributes help to explain the rate of adoption of an innovation (Tanye, 2016).

The Partial Least Square Structural Equation Modelling (PLS-SEM) is used as empirical method on a set of primary data collected from 300 coffee farmers in Bangli regency of Bali province to examine farmers' behavioural intention to adopt KBAC scheme based on developed TIB and DOI integrated model. Detailed material and method are provided in the following section. While results and discussion are presented in section three, conclusions and implications are presented in section four.

2.2. MATERIALS AND METHODS

2.2.1. Conceptual Framework

Our variable of interest in this study is farmers' behavioural intention to adopt KBAC scheme. Triandis (1979) defined intention as an expression of self-instruction and a conscious plan to conduct behaviour to adopt. Furthermore, it explains the motivation of individuals in conducting their behaviour to adopt (Ajzen, 2002). Following these concepts, intention to adopt in this study is defined as the determination and expectation to use and apply KBAC method to produce coffee in the future (intention to adopt, hereafter). While in selected studies, intention to adopt is discussed as simply the adoption or participation behaviour (Tey, *et al*., 2014; Reimer *et al*., 2012). Corresponding to the objectives of this study, an integrated model of Theory of Interpersonal Behaviour (TIB) and Diffusion of Innovation (DOI) was developed in order to accommodate a set of complex contributing factors influencing intention to adopt KBAC scheme. TIB emphasizes that human beings are neither fully autonomous nor entirely social, which is consistent with theory of reasoned action (TRA) and theory of planned behaviour (TPB) (Salonen & Helne, 2012). Thus, interpersonal behaviour is influenced by neither individual nor contextual factors only (Triandis, 1977b; Taherdoost, 2017). Accordingly, TRA and TPB define that interpersonal behaviour is influenced by central cognitive rationality factors (including attitudes and emotions) and social factors (social values). Taking TRA and TPB into account, TIB adds two additional factors that influence interpersonal behaviour, including habit and facilitating conditions. Hence, TIB postulates that an

individual has a stronger intention when attitudes, emotions, social values, habits and facilitating conditions are favourable (Triandis, 1977a).

Based on TIB, attitude is defined as a combination of beliefs and evaluation of outcomes (Triandis, 1977b). In terms of evaluation of outcomes, attitude explains the degree of evaluation toward the behaviour (Ajzen, 1991). Accordingly, intention depends on rational consideration on individual belief and evaluation of outcomes toward an individual's behaviour, while emotions are defined as the responses which arise from the subconscious mind. It refers to both positive and negative feelings and instinct toward an individual's behaviour, such as being happy, frustrated, or disappointed (Triandis, 1977b). Furthermore, social value is defined as an individual's internalisation of specific interpersonal agreements (that are made under a specific social situation) to facilitate reference groups of subjective culture (Triandis, 1979). In this regard, social value represents the concept of societal contribution on behaviour development (Rogers, 2003). Considered as the central factor of interpersonal behaviour, habit is defined as frequently repeated behaviour that influences an individual's present behaviour (Triandis, 1977a, 1979). Similarly, Engman & Cranford (2016) defined habit as the self-validation of repetitive behaviour with minimal conscious energies.

The results of empirical exercises on the influences of the above-mentioned factors in an individual's behaviour based on TIB are diverged. Some studies supported influences of limited factors, whereas others supported influences of more intensive factors of individual's behaviour. For example, in case of potato famers in Colombia, attitude is the important factor defining intention to adopt the protective equipment in pesticide application (Feola & Binder, 2010). Other studies such as Boazar *et al*., (2019) emphasized that social value and habit are important factors to influence intention to adopt the rice cultivation technique in Iran. More comprehensive study results emphasized the positive influences of attitudes, emotions, social values and habits on intention to adopt the sustainable agriculture practises in Malaysia (Tey, *et al*., 2014). According to the above-mentioned theoretical and empirical literatures of TIB, we hypothetically proposed that attitudes, emotion, social values and habit have positive effects on intention to adopt KBAC scheme, detailed as follow:

I. Attitudes effects on intention to adopt KBAC scheme.

H1. Farmers' belief about outcome regarding the implementation of KBAC has positive effect on their intention to adopt KBAC scheme.

H2. Farmers' evaluation of outcome regarding the implementation of KBAC has positive effect on their intention to adopt KBAC scheme.

II. Emotion effect on intention to adopt KBAC scheme.

H3. Farmers' emotion has positive effect on their intention to adopt KBAC scheme.

III. Social values effects on intention to adopt KBAC scheme.

H4. Farmers' norm has positive effect on their intention to adopt KBAC scheme.

H5. Farmers' role has positive effect on their intention to adopt KBAC scheme.

H6. Farmers' self-concept has positive effect on their intention to adopt KBAC scheme.

IV. Habit effects on intention to adopt KBAC scheme.

H7. Farmers' habit has positive effect on their intention to adopt KBAC scheme.

The second theoretical foundation in this study is the diffusion of innovation theory (DOI). DOI postulates the process on the innovation continuously diffuses or communicates to people to develop mutual understanding using particular channels in the social system (Rogers, 2003). It is argued that an innovation needs to be widely adopted to attain a self-sustained state of diffusion or reach critical mass within the rate of adoption. Innovation itself is defined as ideas, technologies, practices, objects and products that are recognized to be new by individual adopters (Rogers, 2003). In this regards, perceived attributes help to explain the rate of adoption of an innovation (Tanye, 2016). Perceived attributes are defined as an individual self-convincing mental in persuasion of concerning characteristics. In this regards, Rogers (2003) discusses five different forms of attributes, including perceived relative advantage, compatibility, complexity, trialability, and observability.

Although innovation should not be limited to introduction of technology only, most of the empirical exercises on DOI are converged to that representation. Only a limited number of empirical studies used DOI and defined innovation as practices, particularly agricultural practices. Defining innovation as technology for example, Elmustapha *et al*., (2018) studied the adoption of solar energy technology for power heating in Lebanon. They emphasized that perceived relative advantage and observability have positive correlations whereas perceived complexity has negative correlation to the adoption of solar energy technology. While defining innovation as practices, Tey *et al*., (2014) suggested that farmers' perceived relative advantage, compatibility and complexity significantly determined farmers' adoption of sustainable agricultural practices (SAPs) in Malaysia. Similarly, Reimer *et al*., (2012) suggested that farmers' perceived relative advantage,

compatibility and observability are significant in explaining the participation behaviour in agricultural Best Management Practices (BMP) in USA.

According to theoretical and empirical literature in applying DOI on the intention to adopt above, we defined innovation as the adoption of the KBAC scheme and hypothetically proposed that relative advantage, compatibility, complexity, trialability and observability have positive effects on the intention to adopt KBAC scheme.

V. Perceived attributes effects on intention to adopt KBAC scheme.

H8. Farmers' perceived relative advantage of KBAC scheme has positive effect on their intention to adopt KBAC scheme.

H9. Farmers' perceived compatibility of KBAC scheme has positive effect on their intention to adopt KBAC scheme.

H10. Farmers' perceived complexity of KBAC scheme has positive effect on their intention to adopt KBAC scheme.

H11. Farmers' perceived trialability of KBAC scheme has positive effect on their intention to adopt KBAC scheme.

H12. Farmers' perceived observability of KBAC scheme has positive effect on their intention to adopt KBAC scheme.

Following conceptualization of both TIB and DOI in regards of attention to adopt KBAC schemes, we proposed an integrative strategy toward both theoretical foundations used in this study. The strategy is based on an argument that TIB and DOI are connected through cognitive relationships (Tey *et al*., 2014; Reimer *et al*., 2012). In this regard, we proposed two cognitive relationships. The first integrating relationship is through the relationship between perceived attributes and attitudes. Pannell *et al*., (2006) argued that perceived attributes would inform adopters' attitudes through cognitive contents about outcomes in the form of expectation on innovation. Hence, aside contribution to the intention to adopt, it is also argued that perceived attributes contribute to attitudes and resulting rationality in individuals' decision-making processes. Based on this argument, we proposed that perceived attributes have positive effects on attitudes.

VI. Perceived attributes toward KBAC effects on attitudes toward KBAC scheme.

H13a1. Farmers' perceived relative advantage of KBAC scheme has positive effect on their belief about outcomes of KBAC scheme.

H13b1. Farmers' perceived relative advantage of KBAC scheme has positive effect on their evaluation about outcomes of KBAC scheme.

H13a2. Farmers' perceived compatibility of KBAC scheme has positive effect on their belief about outcomes of KBAC scheme.

H13b2. Farmers' perceived compatibility of KBAC scheme has positive effect on their evaluation about outcomes of KBAC scheme.

H13a3. Farmers' perceived complexity of KBAC scheme has positive effect on their belief about outcomes of KBAC scheme.

H13b3. Farmers' perceived complexity of KBAC scheme has positive effect on their evaluation about outcomes of KBAC scheme.

H13a4. Farmers' perceived trialability of KBAC scheme has positive effect on their belief about outcomes of KBAC scheme.

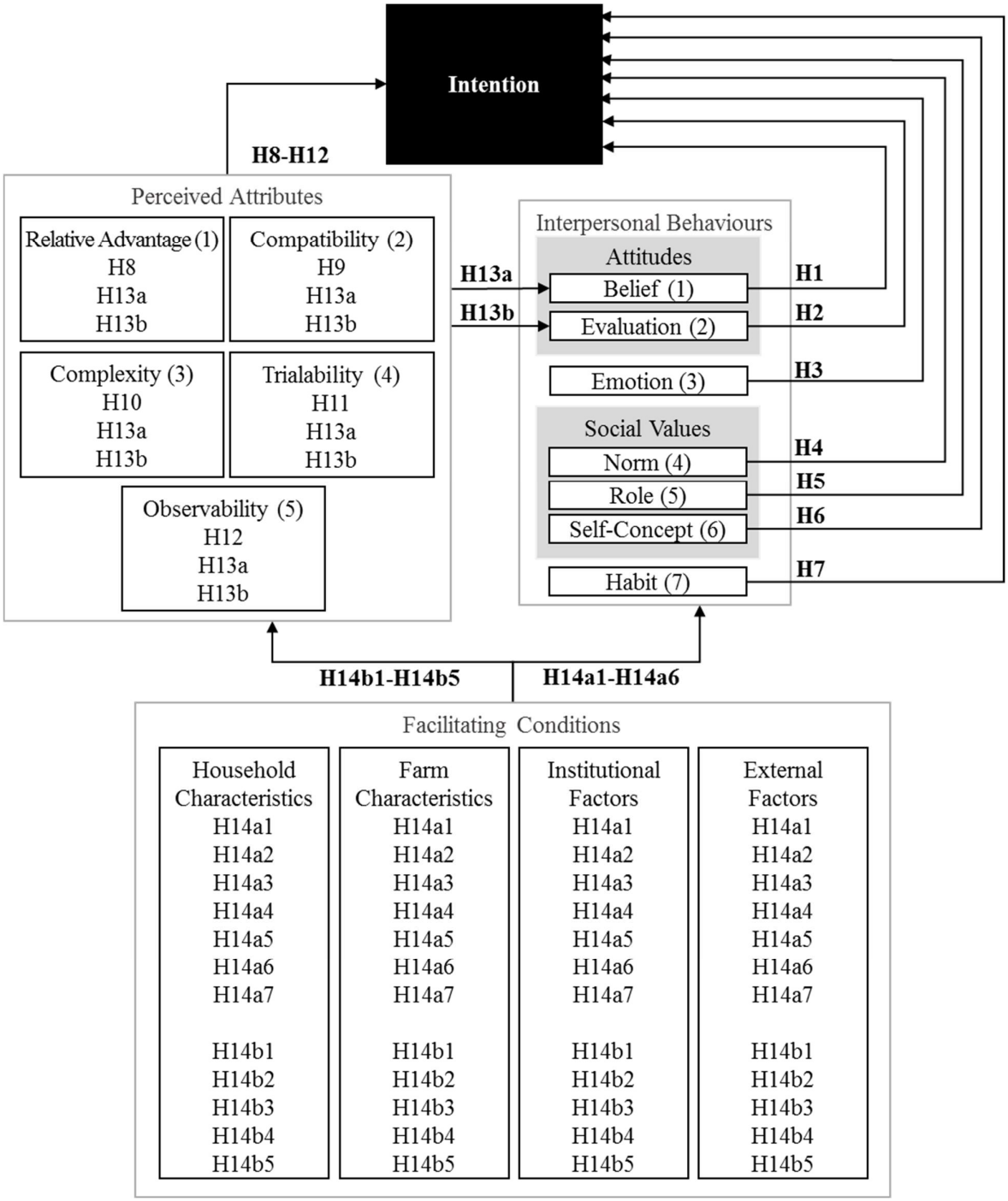
H13b4. Farmers' perceived trialability of KBAC scheme has positive effect on their evaluation about outcomes of KBAC scheme.

H13a5. Farmers' perceived observability of KBAC scheme has positive effect on their belief about outcomes of KBAC scheme.

H13b5. Farmers' perceived observability of KBAC scheme has positive effect on their evaluation about outcomes of KBAC scheme.

Less straightforward than the first, the second integrating relationship is through the overlapping factors between TIB and DOI, namely facilitating conditions. Facilitating conditions are defined as conditions that facilitate behavioural performance (Triandis, 1977b). Additionally, it is defined as those variables obtained from an individual that enable them to facilitate their behavioural performance (Osbourne & Clarke, 2006). In this integrative strategy, facilitating conditions indirectly influence intention to adopt in two ways. First, as TIB is the extension concepts of TPB, facilitating conditions contribute to the intention to adopt indirectly via interpersonal behaviour, including attitudes, emotion, social values, and habit. Considering those literatures, the following factors such as household characteristics, farm characteristics, institutional factors and external factors were used to represent facilitating conditions.

Figure 2.1. Conceptual framework of integrated TIB and DOI model



Source: author's own conceptual framework

VII. Facilitating conditions have positive effects on interpersonal behaviours toward KBAC scheme.

H14a1. Farmers' facilitating conditions have positive effects on their belief about outcomes of KBAC scheme.

H14a2. Farmers' facilitating conditions have positive effects on their evaluation of outcomes of KBAC scheme.

H14a3. Farmers' facilitating conditions have positive effects on their emotion related to KBAC scheme.

H14a4. Farmers' facilitating conditions have positive effects on their norm related to KBAC scheme.

H14a5. Farmers' facilitating conditions have positive effects on their role related to KBAC scheme.

H14a6. Farmers' facilitating conditions have positive effects on their self-concept related to KBAC scheme.

H14a7. Farmers' facilitating conditions have positive effects on KBAC's habit related to KBAC scheme.

Second, facilitating conditions contribute to intention to adopt indirectly via perceived attributes. This hypothesis is based on DOI, which postulates that perceived attributes are subjective perceptions on the innovation influenced by adopter's characteristics, including socioeconomics, agro-ecological, institutional and information condition (Rogers, 2003). While facilitation conditions also refer to the degree of organisation and infrastructure of an individual in supporting the use of an innovation (Venkatesh *et al*., 2003). Considering these two concepts, we proposed that facilitating conditions also contribute to perceived attributes.

VIII. Facilitating conditions have positive effects on perceived attributes toward KBAC scheme

H14b1. Farmers' facilitating conditions have positive effects on their perceived relative advantage of KBAC scheme.

H14b2. Farmers' facilitating conditions have positive effects on their perceived compatibility of KBAC scheme.

H14b3. Farmers' facilitating conditions have positive effects on their perceived complexity of KBAC scheme.

H14b4. Farmers' facilitating conditions have positive effects on their perceived trialability of KBAC scheme.

H14b5. Farmers' facilitating conditions have positive effects on their perceived observability of KBAC scheme.

Generally, the overall integrated model of intention to adopt KBAC scheme features three types of relationships, including the direct effects of interpersonal behaviours and perceived attributes on intention, the indirect effects of perceived attributes on intention through attitudes, and the indirect effect of facilitating condition on intention through interpersonal behaviours and perceived attributes. In those indirect effect, interpersonal behaviours and perceived attributes play an intermediating role of other factors in relation to the intention to adopt. The complete conceptual framework of intention to adopt KBAC scheme used in this study is presented in Figure 2.1.

2.2.2. Study Design

In order to pursue the objectives of this study, a set of primary data were collected through face to face survey with coffee farmers on the area of KBAC scheme implementation. The survey was conducted between March and April 2019 in the Bangli Regency. Bangli was selected as our survey location because it has the largest coffee production based on secondary data from Directorate General of Estate Crops (2019) and Statistics Indonesia (2019). It is the region where the Kintamani mountain is located. Five villages within Bangli regency were randomly selected as the base of farmer households for the survey, considering similar access to market condition and agro-ecological zone. To determine minimum sample size for our analyses, the sampling size was calculated by applying gamma-exponential distribution, according to Kock & Hadaya (2018). With the minimum sample size of 181 to 200 respondents as computed using the selected method, this study started with a total of 300 respondents obtained from statistical calculation using Arabica farmers' population data for the reason of providing more robust estimation results.

Prior to the household survey, in-depth interviews were conducted with selected stakeholders, including Indonesian Coffee and Cocoa Research Institute (ICCRI), Head of Community of Geographical Indication Protection (CGIP)[6], local government and statistics agencies representatives to have a general overview of research subject particularly regarding the development of KBAC scheme. Additionally, secondary data was also obtained from these interviews, including data on coffee productions, cropping methods, coffee yield, number of coffee farmers, and spatial distribution of the KBAC members.

[6] KBAC Farmer Association

These secondary data complement the primary data in term of initial references to determine collection of primary data and secure the representativeness of sampled data to actual population of farmers of Arabica coffee Kintamani, Bali.

The survey was implemented using a structured questionnaire that was transformed into a computer-assisted personal interviewing (CAPI) program and has successfully completed a pre-test step prior to data collection in the selected field. A pre-test with an improvement was implemented with 10 farmers for identifying the questions that turned out to be not understandable to minimise biased answers. The household survey aimed to collect all essential data from coffee farmers based on the need of empirical application and the integrated model of behavioural intention. Furthermore, the questionnaires were supplemented with socio-demographic information (e.g. age, gender, and family size), farm characteristics (e.g. plantation attitude, size, and production), institutional (e.g. leadership and membership) and external factors (e.g. access to credit and access to information). This demographic information was collected in regards to exercise variable of facilitating conditions used in the model (H14a1-H14a7 and H14b1-H14b5).

In order to operationalize cognitive factors within the integrated model of TIB and DOI as presented in figure 1, farmers' attitudes were distinguished between belief about outcome (H1) and evaluation of outcome (H2); emotion (H3); social values were distinguished between norm (H4), role (H5) and self-concept (H6); habit (H7) and perceived attributes were distinguished between relative advantage (H8), compatibility (H9), complexity (H10), trialability (H11) and complexity (H12). This variable of interest and all its contributing factors were measured as farmers' responses and statements on five-point Likert-scale options corresponding to particular given questions. These measurements were particularly used because they were reliable and easily understood and could easily be applied by interviewers and respondents (Netemeyer *et al.*, 2003). Following Fishbein & Ajzen (2010) and Tey et al. (2014), the conceptualisation of the complex integrated model of behavioural intention to adopt KBAC schemes had been defined into structured questionnaire of the survey.

2.3. RESULTS

2.3.1. Descriptive Statistics

The sample consists of 300 arabica farmers, who were mainly above 35 year of age (90.3%), and were considered to be within the range of prime and mature working age, as presented in Table 2.1. They were mainly primary school graduates (35.7%), followed by junior and senior high school graduates (16.7% and 21.7%). In addition, the household heads were mainly male (98%), that has an important role in the decision making of coffee production. Two to three family members of the farmers' households were working as family labour in the coffee plantation with the average size of 0.94 hectare per farmers and an annual coffee production of 1,400 kilogram.

Table 2.1. Farmer characteristics

No.	Descriptions	Proportion (%)	No.	Descriptions	Proportion (%)
1.	**Age**	**100**	**3.**	**Education**	**100**
	- 15-24	0.33		- Never go to school	4.30
	- 25-34	9.33		- Did not pass primary school	17.00
	- 35-44	29.67		- Primary School/Equal	35.70
	- 45-54	26.00		- Junior High School/equal	16.70
	- 54 <	34.67		- Senior High School/equal	21.70
2.	**Marital Status**	**100**		- D1/D2/D3 (diploma)	1.30
	- Never married	0.30		- Bachelor	3.30
	- Married	96.00	**4.**	**Gender**	**100**
	- Divorced	1.00		- Male	98.00
	- Widowed	2.70		- Female	2.00

Source: author's own calculation.

The overall arabica farmers in Bangli regency, which on average have 0.87 hectares coffee plantation and produced 330 kilograms annually, were moderately represented (Table 2.2.). In terms of land ownership, the sample shows that 88.67% of total respondents owned their land (customary rights) which is in line with overall Bangli coffee farmers' land ownership. Similarly, the sample shows that 93.70% of farmers applied polyculture method, which also in line with overall coffee farmers in Bangli regency. In this regard, the sampling shows a higher representation toward coffee farmers of Bangli regency in terms of land ownership and cropping method. In the polyculture method, coffee being the primary crop is intercropped with mainly tangerine (duo culture) or other secondary crops such as avocado, chili, banana, maize or cabbage. Furthermore, tangerine plays an important role in acting as a shade for coffee trees, preventing heat, increasing land utilization and eventually improving farmer's income.

Table 2.2. Farm characteristics

No.	Description	Mean (Sample)	Mean (Bangli)
1	Land size (Ha)	0.94	0.87
2	Production (Ton)	1.40	0.33
3	Land ownership (categorical)[a]	CRs (88.67%)	CRs
4	Cropping method (categorical)[b]	DC and PC (93.70%)	Polyculture
5	Yield (Ton/Ha)	1.49	0.38
6	Hired Workers (Person)	1.15	0.05

a. Land ownership includes customary rights (CRs), leasehold (LH), parent/free rent, and customary rights and leasehold (CRL).
b. Cropping methods include monoculture (MC) and polyculture (PC). In PC, coffee plants are intercropped with tangerine, avocado, chili, banana, maize, or cabbage.
c. Mean (sample) calculated based on the primary data, while mean (Bangli) calculated based on secondary data.

Source: author's own calculation and Statistics Indonesia, 2019.

Considering the objective of the study, Table 2.3. presents farmers' responses towards variables of interest and latent variables. The results show that 80.3% of respondents agreed that the scheme provides relative advantages in term of increasing reputation (average value: 3.96; standard deviation: 0.819) and farming productivity (average value: 3.89; standard deviation: 0.865). Furthermore, 75.67% of respondents agreed that evaluation of outcome of scheme related to high quality of harvest (average value: 3.97; standard deviation: 0.840), safety for workers (average value: 3.87; standard deviation: 0.779), price premium (average value: 4.01; standard deviation: 0.820) and environment (average value: 3.91; standard deviation: 0.765) potentially contributes to the intention to adopt KBAC scheme. Meanwhile, 75.67% of respondents agreed that scheme attribute related to compatibility, such as suitability for most aspects of farm (average value: 3.91; standard deviation: 0.832) and consistency in application is important to define farmers' intention to the scheme. Farmers' responses in other potential latent variables, such as belief of outcome, emotion, norm, role, self-concept, habit, complexity, trialability and observability are presented in Table 2.3.

Table 2.3. Farmers' responses in selected latent variables

No.	Latent Variables	Responses Proportion (%)				
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1	Intention to adopt	0.00	2.67	30.33	36.67	30.33
2	Beliefs of outcome	0.33	2.00	35.67	50.00	12.00
3	Evaluation of outcome	0.00	2.00	22.33	47.00	28.67
4	Emotions	0.00	2.00	49.67	46.33	2.00
5	Norms	0.00	1.00	29.33	55.33	14.33
6	Roles	0.00	2.00	30.00	48.67	19.33
7	Self-concepts	1.67	11.00	55.33	28.67	3.33
8	Habits	0.67	1.00	31.00	54.33	13.00
9	Relative advantage	0.00	1.67	18.00	47.67	32.67
10	Compatibility	0.00	1.67	22.67	50.67	25.00
11	Complexity	0.00	3.00	28.33	52.67	16.00
12	Trialability	0.00	3.67	28.00	54.00	14.33
13	Observability	0.00	1.67	35.67	51.33	11.33

Source: author's own calculation.

2.3.2. PLS Analysis

2.3.2.1. Measurement Model Evaluation

Partial Least Square – Structural Equation Modelling (PLS-SEM) was used in this study to evaluate the integrative model of farmers' intention to adopt KBAC scheme. Following Hair *et al.,* (2014), the conceptual framework was evaluated in two steps, namely measurement model and structural model evaluation. The measurement model describes the inter-correlation between latent variables or constructs (unobservable variables) represented by its corresponding indicators (observable variables). Latent variables refer to substantial terms based on the conceptual framework, while indicators serve as the inference in estimating it (Razie *et al*., 2016). Furthermore, detailed indicators for each corresponding latent variable in our model are presented in Table 2.4.

Measurement model evaluation was established using internal consistency, convergence validity and discriminant validity criteria. Furthermore, the internal consistency was evaluated by computing two statistics, namely Cronbach's Alpha (CA) and Composite Reliability (CR). They are used to evaluate internal consistency of each latent variable by applying a threshold value of 0.70 as suggested in Hair *et al*., (2014). The estimation results of the measurement model show that CA and CR statistics of most latent variables are above the threshold, except for emotion, habit, self-concept, and role in

cases of CR evaluation. Accordingly, those latent variables are subject to further evaluation of convergence validity. In term of convergent validity, the evaluation was established by computing average variance extracted (AVE) and reflective indicator loadings (RIL) of latent variables.

The threshold values of 0.500 for AVE and 0.708 for RIL were used to evaluate the convergent validity of latent variables, according to Hair *et al*., (2014). Furthermore, latent variables with AVE or RIL values below those thresholds failed to meet convergence validity and subject to inclusion reconsideration in the model. Regardless the fact that most latent variables meet the AVE threshold, there were some that did not, including emotion, habit, self-concept, and role. Similar to CR in the internal consistency, those latent variables are subject to reconsideration in RIL evaluation. In contrast to previous statistics, RIL computation established at indicators level were not at the latent variables level.

Table 2.4. Measurement model evaluation

Constructs/ Indicators	Measures	Mean	SD	IC		CV	
				CR	CA	AVE	RIL
1. Intentions							
Determination	I intend to use the KBAC method to produce coffee in the future	3.953	0.847	0.952	0.899	0.908	0.951
Expectation	I expect to apply the KBAC method to produce coffee in the future	4.017	0.854				0.954
2. Attitudes							
Beliefs about outcome							
Efficiency	If I produce KBAC, I will reduce my production costs	3.753	0.795	0.843	0.722	0.642	0.771
Income	If I produce KBAC, I will increase my farm income	3.927	0.775				0.846
Investment	If I produce KBAC, I will receive a higher level of financial support	3.523	0.961				0.784
Evaluation of outcome							
Quality	KBAC will produce a good quality harvest	3.967	0.840	0.936	0.909	0.786	0.883
Safety	KBAC will improve safety for my workers	3.870	0.779				0.847
Price	KBAC will increase my price premium	4.013	0.820				0.918
Environment	KBAC will enhance the environment surrounding my farm	3.913	0.765				0.897
3. Emotions							
Happiness	If I have the opportunity to adopt Arabica Kintamani Bali, I will be happy	4.040	0.765	0.927	0.883	0.810	0.893
Satisfaction	I think that strictly following KBAC is good	3.970	0.802				0.889
Curiosity	I feel that practicing KBAC is interesting	3.997	0.759				0.917
4. Social values							
Norms							
Family support	My family would expect me to adopt KBAC scheme for my farming practice	3.883	0.772	0.937	0.915	0.747	0.827
Friend support	My friends outside my work would support me to adopt KBAC into my farming practice	3.880	0.808				0.864
Co-workers support	My co-workers would expect that I adopt KBAC for farming practices	3.807	0.768				0.869
Farmers support	Most farmers in Subak Abian would support me in adopting KBAC for farming practice	3.863	0.795				0.880
Villagers motivation	My village community always motivates me to adopt KBAC into my farming practice	3.790	0.748				0.881
Roles							
Individual role	For me, as a coffee farmer in Bali, it is appropriate to practice KBAC	3.893	0.801	0.941	0.906	0.841	0.921
Partnership role	Adopting KBAC for farming is suitable for me as a coffee farmer of Subak Abian	3.860	0.766				0.931
Community role	Due to my role in my village community, it is appropriate to use KBAC	3.780	0.791				0.899
Self-concepts							
Principles	Adopting KBAC on my farm would support my principles	3.077	0.908	1.000	1.000	1.000	1.000
5. Habits							
Active	I practice sustainable farming practice regularly	3.770	0.794	0.941	0.922	0.763	0.861
Natural	Adopting sustainable farming practice is natural for me	3.810	0.825				0.874

Constructs/ Indicators	Measures	Mean	SD	IC		CV	
				CR	CA	AVE	RIL
Acceptable	Adopting sustainable farming practice is socially acceptable	3.803	0.769				0.860
Comfort	I am comfortable with sustainable farming practice	3.697	0.893				0.895
Persistence	I have been practising sustainable farming for a long time	3.803	0.823				0.876
6. Perceived attributes							
Relative advantage							
Reputation	Using KBAC will increase farmer reputation in market	3.890	0.819	0.922	0.830	0.855	0.923
Enhancement	Using KBAC will enhance farming productivity	3.963	0.865				0.926
Compatibility							
Suitability	KBAC method will compatible with most aspect of farming practice	3.913	0.832	0.909	0.801	0.834	0.922
Consistency	The name “KBAC” will make me want to apply the program	3.703	0.805				0.904
Complexity							
Clarity	I will have no difficulty finding the information about KBAC that I want	3.703	0.797	0.934	0.858	0.876	0.932
Understandable	I will have no difficulty understanding how KBAC technically work	3.697	0.823				0.939
Trialability							
Importance	Being able to try out KBAC is important to my decision to use it	3.710	0.774	0.911	0.806	0.837	0.924
Complimentary	I really will not lose much by trying KBAC, even if I do not like it	3.613	0.819				0.906
Observability							
Followers	I will adopt KBAC, when other farmers also adopt it	3.620	0.810	0.884	0.740	0.792	0.914
Notability	I will have no difficulties in telling friends what KBAC is like	3.573	0.760				0.865
7. Facilitating conditions							
Farmer characteristics							
Gender role	gender of head household	0.980	0.140	1.000	1.000	1.000	1.000
Innate ability	age of head of household	49.047	12.156	1.000	1.000	1.000	1.000
Family size	number of family member	2.857	1.041	1.000	1.000	1.000	1.000
Farm characteristics							
Farm capacity	coffee plantation area (Ha)	0.737	0.748	1.000	1.000	1.000	1.000
Farm endowment	farm altitude (masl)	1,264.287	87.147	1.000	1.000	1.000	1.000
Institutional factors							
Leadership	leadership position in organisation	4.767	0.761	1.000	1.000	1.000	1.000
External factors							
Financial capacity	access to credit	0.440	0.496	1.000	1.000	1.000	1.000
Knowledge	access to information	0.750	0.433	1.000	1.000	1.000	1.000

SD (Standard Deviation), IC (Internal Consistency), CA (Cronbach's Alpha), CV (Convergence Validity), RIL (reflective indicator loadings). All constructs (except facilitating conditions) measured by statements based on five-point Likert-scale options (1= do not agree at all, to 5= completely agree).
Source: author’s own calculation.

The advantage of computing RIL in measurement model evaluation was that it not only served as a reference to evaluate convergence validity but also as a reference to reconsider the inclusion of latent variables in the model, which previously failed to meet CR and AVE thresholds (Hair *et al*., 2014). Therefore, from RIL evaluation it was possible to produce a reduced measurement model that meets all the evaluation criteria. The estimation results show that some indicators of particular corresponding latent variables had RIL values below the selected threshold, particularly within emotion, habit, self-concept, and role. Therefore, those indicators in the following measurement model evaluation were excluded. As a result, re-estimating and re-evaluating the reduced measurement model shows that all latent variables meet the internal consistency and evaluation threshold of convergence validity (Table 2.4.) and are reliable for further analysis.

This was similar to the discriminant validity evaluated using two statistics, including Heterotrait-Monotrait Ratio of Correlations (HTMT ratio) and Variance Inflation Factor (VIF). Hair *et al.,* (2019) suggest that bootstrap confidence intervals should be used for testing when HTMT ratios are significantly different to the corresponding thresholds (i.e. 0.85, 0.90 and 1.00) within 95% confidence intervals. Table 2.5. presents the significancy test of HTMT ratio of selected latent variables that meet evaluation threshold of discriminant validity. The next step was performing collinearity test among latent variables. Strong collinearity in structural model is unfavourable since it could produce non-robust estimated parameters of the predictors in the model, causing misleading interpretations of the estimation result. While VIF was used as the statistics measure of the collinearity and value below 5.00 was used as noncollinearity critical threshold according to Hair *et al.,* (2019). VIF of all latent variables meet the critical threshold with the maximum value of 3.47, except for continuity to implement KBAC. Therefore, the indicator was excluded in further analysis. Reduced composition of initial structure prior to measurement evaluation is reliable and valid to utilize the following analysis of structural model evaluation (Table 2.6.).

Table 2.5. Heterotrait-Monotrait Ratio (HTMT) of latent variables correlations

No	Latent variables	OS	SM	Bias	2.5%	97.5%	No	Latent variables	OS	SM	Bias	2.5%	97.5%
1	Belief - Intention	0.824	0.823	-0.001	0.737	0.900	40	Complexity - Emotion	0.742	0.738	-0.004	0.652	0.814
2	Evaluation - Intention	0.782	0.782	0.000	0.717	0.831	41	Trialability - Emotion	0.712	0.709	-0.002	0.615	0.801
3	Emotion - Intention	0.719	0.717	-0.001	0.638	0.784	42	Observability - Emotion	0.658	0.656	-0.002	0.566	0.748
4	Norm - Intention	0.798	0.799	0.001	0.738	0.841	43	Role - Norm	0.920	0.920	0.000	0.870	0.953
5	Role - Intention	0.758	0.758	0.000	0.691	0.819	44	Self-concept - Norm	0.176	0.177	0.000	0.088	0.285
6	Self-concept - Intention	0.315	0.312	-0.003	0.202	0.427	45	Habit - Norm	0.777	0.780	0.003	0.682	0.847
7	Habit - Intention	0.837	0.837	0.001	0.787	0.879	46	Relative advantage - Norm	0.820	0.820	0.001	0.746	0.884
8	Relative advantage - Intention	0.888	0.888	0.000	0.831	0.944	47	Compatibility - Norm	0.806	0.806	-0.001	0.730	0.869
9	Compatibility - Intention	0.857	0.856	-0.001	0.792	0.906	48	Complexity - Norm	0.748	0.749	0.001	0.669	0.823
10	Complexity - Intention	0.732	0.734	0.001	0.637	0.806	49	Trialability - Norm	0.733	0.735	0.002	0.630	0.810
11	Trialability - Intention	0.807	0.807	0.000	0.720	0.868	50	Observability - Norm	0.724	0.726	0.002	0.626	0.802
12	Observability - Intention	0.749	0.751	0.002	0.663	0.816	51	Self-concept - Role	0.158	0.157	-0.001	0.043	0.272
13	Relative advantage - Belief	0.849	0.846	-0.003	0.762	0.926	52	Habit - Role	0.762	0.764	0.002	0.663	0.826
14	Compatibility - Belief	0.846	0.844	-0.002	0.751	0.936	53	Relative advantage - Role	0.814	0.812	-0.002	0.747	0.868
15	Complexity - Belief	0.823	0.822	-0.001	0.717	0.916	54	Compatibility - Role	0.779	0.777	-0.002	0.713	0.844
16	Trialability - Belief	0.819	0.818	0.000	0.692	0.917	55	Complexity - Role	0.730	0.730	0.000	0.652	0.803
17	Observability - Belief	0.798	0.800	0.002	0.670	0.890	56	Trialability - Role	0.746	0.747	0.001	0.634	0.830
18	Evaluation - Belief	0.915	0.916	-0.002	0.885	0.920	57	Observability - Role	0.699	0.699	0.000	0.608	0.783
19	Emotion - Belief	0.782	0.778	-0.004	0.691	0.871	58	Observability - Self-concept	0.126	0.131	0.005	0.022	0.257
20	Norm - Belief	0.913	0.912	-0.001	0.842	0.975	59	Relative advantage - Self-concept	0.324	0.321	-0.002	0.204	0.426
21	Role - Belief	0.863	0.862	-0.002	0.783	0.929	60	Compatibility - Self-concept	0.297	0.294	-0.003	0.171	0.422
22	Self-concept - Belief	0.213	0.208	-0.005	0.068	0.359	61	Complexity - Self-concept	0.193	0.188	-0.004	0.066	0.312
23	Habit - Belief	0.834	0.834	0.000	0.743	0.920	62	Trialability - Self-concept	0.157	0.157	0.000	0.039	0.277
24	Relative advantage - Evaluation	0.783	0.782	-0.001	0.706	0.841	63	Habit - Self-concept	0.258	0.256	-0.002	0.114	0.380
25	Compatibility - Evaluation	0.763	0.764	0.000	0.679	0.840	64	Relative advantage - Habit	0.876	0.877	0.001	0.795	0.932
26	Complexity - Evaluation	0.691	0.691	0.000	0.582	0.787	65	Compatibility - Habit	0.920	0.919	0.000	0.856	0.965
27	Trialability - Evaluation	0.681	0.682	0.001	0.560	0.776	66	Complexity - Habit	0.837	0.837	0.001	0.759	0.899
28	Observability - Evaluation	0.656	0.656	0.000	0.540	0.754	67	Trialability - Habit	0.857	0.857	0.000	0.766	0.920
29	Role - Evaluation	0.884	0.884	0.000	0.836	0.931	68	Observability - Habit	0.798	0.800	0.002	0.708	0.865
30	Norm - Evaluation	0.909	0.908	0.000	0.857	0.947	69	Relative advantage - Compatibility	0.908	0.909	0.001	0.902	0.933
31	Self-concept - Evaluation	0.217	0.216	-0.001	0.113	0.329	70	Complexity - Compatibility	0.902	0.903	0.001	0.837	0.959
32	Habit - Evaluation	0.719	0.721	0.002	0.616	0.802	71	Trialability - Compatibility	0.891	0.891	-0.001	0.792	0.968
33	Emotion - Evaluation	0.724	0.723	-0.002	0.640	0.787	72	Observability - Compatibility	0.836	0.838	0.002	0.737	0.912
34	Norm - Emotion	0.785	0.782	-0.002	0.696	0.835	73	Relative advantage - Complexity	0.839	0.840	0.002	0.762	0.911
35	Role - Emotion	0.760	0.757	-0.003	0.674	0.816	74	Trialability - Complexity	0.864	0.866	0.003	0.751	0.935
36	Self-concept - Emotion	0.113	0.116	0.003	0.044	0.216	75	Observability - Complexity	0.844	0.848	0.004	0.758	0.929
37	Habit - Emotion	0.809	0.808	-0.001	0.755	0.862	76	Trialability - Observability	0.904	0.906	0.005	0.871	0.945
38	Relative advantage - Emotion	0.765	0.762	-0.003	0.688	0.832	77	Relative advantage - Observability	0.769	0.771	0.001	0.679	0.855
39	Compatibility - Emotion	0.766	0.762	-0.003	0.687	0.835	78	Trialability - Relative advantage	0.800	0.799	-0.001	0.706	0.891

OS (Original Sample), SM (Sample Mean), Bias (Bias corrected)

Source: author's own calculation.

Table 2.6. Variance Inflation Factor (VIF) of selected indicators

Latent Variables	Indicators	VIF	Latent Variables	Indicators	VIF
1. Intention	Determination	2.997	8. Habit	Common	2.795
	Expectation	2.997		Acceptable	2.551
2. Belief about outcome	Efficiency	1.401		Comfort	3.475
	Income	1.476		Persistence	3.169
	Investment	1.388	9. Relative advantage	Reputation	2.011
3. Evaluation of outcome	Quality	2.691		Enhancement	2.011
	Safety	2.188	10. Compatibility	Suitability	1.805
	Price	3.711		Consistency	1.805
	Environment	3.091	11. Complexity	Clarity	2.299
4. Emotion	Happiness	2.302		Understandable	2.299
	Satisfaction	2.464	12. Trialability	Importance	1.837
	Curiosity	2.805		Complimentary	1.837
5. Norm	Family support	2.092	13. Observability	Followers	1.525
	Friend support	2.698		Notability	1.525
	Co-workers support	2.752	14. Facilitating Conditions	Gender role	1.000
	Farmers support	2.893		Innate ability	1.000
	Villagers' motivation	2.903		Family size	1.000
6. Role	Individual role	3.155		Farm capacity	1.000
	Partnership role	3.441		Farm endowment	1.000
	Community role	2.545		leadership	1.000
7. Self-concept	Principles	1.000		Financial capacity	1.000
8. Habit	Active	2.530		Knowledge	1.000

Source: author's own calculation.

2.3.2.2. Structural Model Evaluation

The structural model evaluation was established in three part, namely predictive accuracy, predictive relevance and path analysis. R-squared (R^2), Q-squared (Q^2), and path coefficients were used for these analyses respectively (Hair *et al.,* 2014). Furthermore, all those statistics were estimated based on the relationships specified in the structural model. The first part of the structural model evaluation was to evaluate predictive relevance and accuracy for all endogenous latent variables. R-squared (R^2) was used to evaluate predictive accuracy of all endogenous latent variables in our structural model. Furthermore, predictive accuracy indicates the degree of explained variation of particular endogenous latent variable. 0.25, 0.50 and 0.75 were used as thresholds of estimated R^2, which differentiate into three degrees of predictive accuracy, namely weak, moderate and substantial respectively (Hair *et al*., 2014). According to figure 2.2., our estimation results show that intentions to adopt KBAC (R^2=0.721), beliefs about outcome (R^2=0.564) and evaluation of outcome (R^2=0.549) have a moderate predictive accuracy of the model variance, while other endogenous latent variables, including emotion (R^2=0.149), norm (R^2=0.243), role (R^2=0.254), self-concept (R^2=0.079), habit (R^2=0.235), relative advantage

(R^2=0.218), compatibility (R^2=0.208), complexity (R^2=0.195), trialability (R^2=0.138) and observability (R^2=0.185) show weak predictive accuracy.

Table 2.7. Predictive accuracy and predictive relevance evaluation

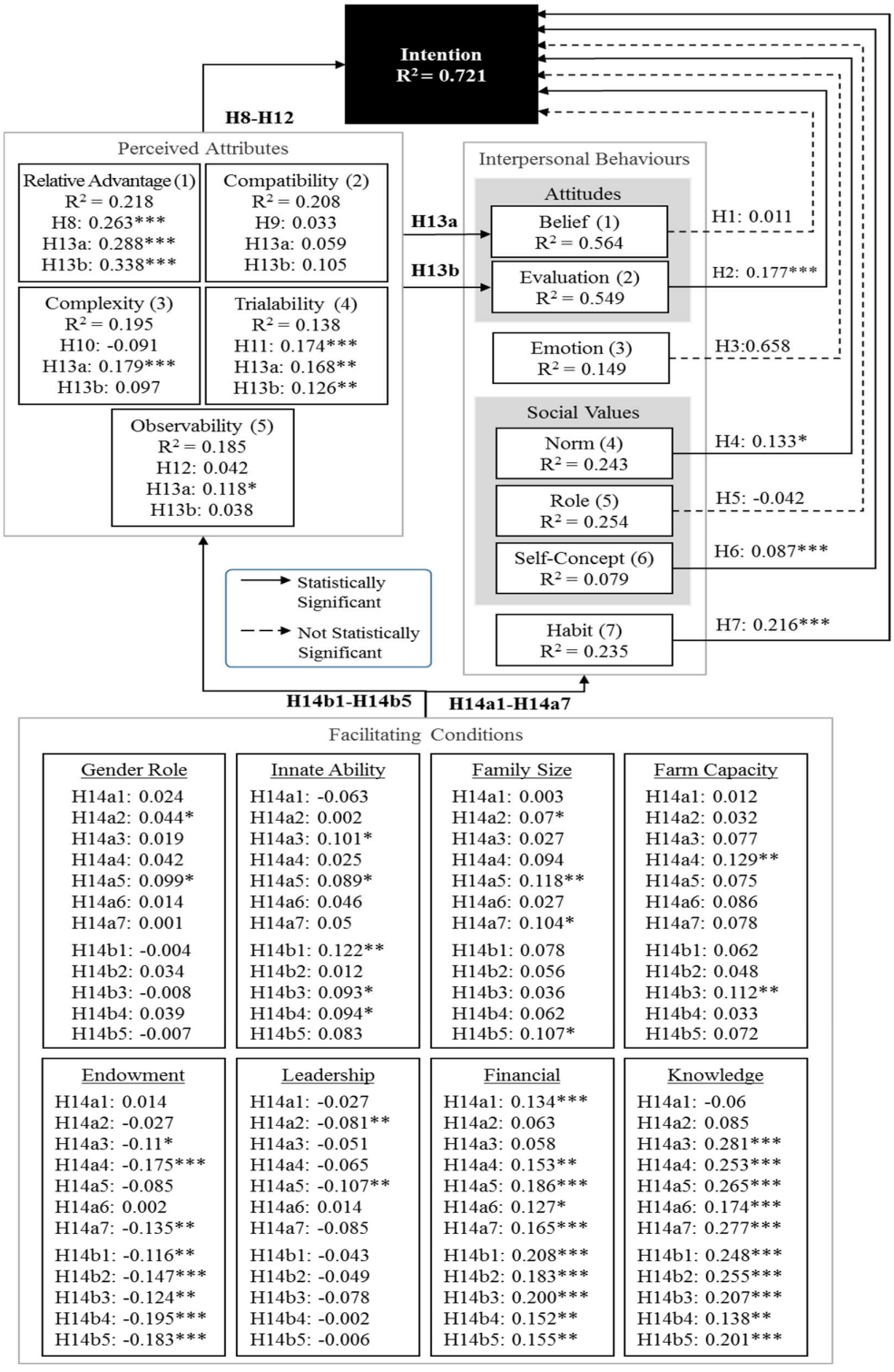
No.	Latent Variables	R^2	Adj. R^2	Result	Q^2 (=1-SSE/SSO)	Result
1.	Intention	0.721	0.709	moderate	0.610	predictive relevance
2.	Beliefs about outcome	0.564	0.544	moderate	0.319	predictive relevance
3.	Evaluations of outcome	0.549	0.528	moderate	0.397	predictive relevance
4.	Emotion	0.149	0.126	weak	0.107	predictive relevance
5.	Norm	0.243	0.223	weak	0.164	predictive relevance
6.	Role	0.254	0.223	weak	0.169	predictive relevance
7.	Self-concept	0.079	0.053	very weak	0.028	predictive relevance
8.	Habit	0.235	0.214	weak	0.163	predictive relevance
9.	Relative advantage	0.218	0.196	weak	0.165	predictive relevance
10.	Compatibility	0.208	0.186	weak	0.143	predictive relevance
11.	Complexity	0.195	0.173	weak	0.145	predictive relevance
12.	Trialability	0.138	0.115	weak	0.084	predictive relevance
13.	Observability	0.185	0.163	weak	0.115	predictive relevance

Source: author's own calculation.

Furthermore, Stone-Geisser's Q-squared value (Q^2) was used as a criterion for predictive relevance valuation (Stone, 1974; Geisser, 1974). The Q^2 values of all structural models were computed using blindfolding procedure, which is a sampling reutilization technique established by systematically removing data points and providing a prognosis of their original values. Zero was used as the threshold to evaluate predictive relevancy of endogenous variables following Hair *et al.,* (2019). The results prove that Q^2 values for all latent variables are higher than zero, implying that all endogenous latent variables in our integrated model of behavioural intention meet the predictive relevance criterion.

Subsequently, in order to evaluate the structural model, path analysis was applied, which was developed based on theoretical and empirical literatures derived hypotheses. Therefore, this evaluation was established to justify whether those hypotheses were developed as a conceptual framework in the integrated model of behavioural intention and were supported with selected empirical case and the intention to adopt KBAC scheme. The higher of path coefficient, the higher effect of a latent variable on another latent variable accordingly to the relationship in the structural model. In this regards, path coefficients are considered as a direct effect of a latent variables on other corresponding ones. Our estimation results that 6 out of 12 selected latent variables are statistically significant in having a direct positive effect toward the intention to adopt KBAC scheme: evaluation of outcome (0.177***; H2), norm (0.133*; H4), self-concept (0.087***, H6), as well as habit (0.216***; H7), relative advantage (0.263***; H8), and trialability (0.174***; H11).

Figure 2.2. Path model of farmers' intention to adopt KBAC scheme



* significant at 10%; ** significant at 5%; ***significant at 1%

Source: author's own calculation.

The first part of the integration model of interpersonal behaviour and diffusion of innovation is showed by the direct effects of perceived attributes toward attitude. Our estimation proves that in case of the belief about outcome, the highest statistically significant effect is contributed by relative advantage (0.288***, H13a1) followed by complexity (0.179***, H13a3), trialability (0.168**, H13a4), and observability (0.118*, H13a5). In case of the evaluation of outcome, the highest statistically significant effect is contributed by relative advantage' (0.338***, H13b1), followed by trialability (0.126**, H13b4). In this part of integration of behavioural and diffusion of innovation, evaluation of outcome is considered as the partial mediating variables towards the intention to adopt. This is because it significantly and positively intervenes the relative advantage contribution and the intention to adopt. While relative advantage has a significant and positive direct effect towards the intention to adopt.

The second part of the integration model is proved by the direct effect of facilitating conditions on both interpersonal behaviours and perceived attributes. Furthermore, study results empirically proved the argument. The estimated path coefficient shows that selections of latent variables of facilitating conditions have statistically significant effects on corresponding latent variables of interpersonal behaviour and perceived attributes. First, gender role (0.044*, H14a2), family size (0.070*, H14a2) and leadership (-0.081**, H14a2) significantly contribute to the evaluation of the outcome. In regards to social values, farm capacity (0.129**, H14a4) and endowment (-0.175***, H14a4), financial capacity (0.153**, H14a4), and information (0.253***, H14a4) have positive effects on norm. Furthermore, self-concept is influenced by knowledge (0.174***, H14a6) and financial capacity (0.127*, H14a6). While farm endowment (-0.135**, H14a7), financial capacity (0.165***, H14a7) and knowledge (0.277***, H14a7) also show significant effects towards habit. Then relative advantage is considerably influenced by innate ability (0.122**, H14b1), farm endowment (-0.166**, H14b1), financial capacity (0.208***, H14b1) and knowledge (0.248***, H14b1). Lastly, innate ability (0.094*, H14b4), farm endowment (-0.195***, H14b4), financial capacity (0.152**, H14b4) and knowledge (0.138**, H14b4) are also found to have significant effects on trialability. In addition, the structural model evaluation including tested hypotheses, corresponding paths, path coefficients, decisions on the test and other relevant statistics are presented in Figure 2.2.

2.3.3. Discussion

Our initial analysis based on descriptive statistics show that farmers' intention to adopt KBAC scheme are high (67.00%), indicated by rate of farmers' agreement (agree and strongly agree) to determination and expectation to adopt KBAC scheme method to produce coffee in the future. While farmers' responses in most of other latent variables, whether derived from interpersonal behaviour or diffusion of innovation model, are also mostly high. This indicates the high rates of farmers' agreement to corresponding statement related to the adoption of KBAC scheme. In interpersonal behaviour part, the rates of farmers' agreement are mostly high, including in term of belief of outcome of KBAC scheme (62.00%), evaluation about outcome of KBAC scheme (75.67%), norms (69.66%), roles (68.00%) and habits (67.33%) related to KBAC scheme. While farmers' responses in term of emotions (48.33%) and self-concept (32.00%) related to KBAC scheme are relatively moderate. In diffusion of innovation part, the rate of farmers' agreements are overall high, including in term of perceived relative advantage (80.34%), perceived comparability (75.67%), perceived complexity (68.67%), perceived trialability (68.33%) and perceived observability (62.66%) of the adoption of KBAC scheme.

However, this initial analysis not necessarily implies the magnitudes of relationships between intention to adopt KBAC scheme to each of the corresponding latent variables in interpersonal behaviour and diffusion of innovation. Accordingly, PLS-SEM analysis was conducted to scrutinize the magnitudes of relationships between intention to adopt KBAC scheme to each of corresponding latent variable in interpersonal behaviour and diffusion of innovation. The PLS-SEM findings are discussed henceforth to highlight some interesting results. First, the results show that evaluation of outcomes effect the intention to adopt KBAC scheme. This significantly and positively affects the intention to adopt KBAC scheme, however, its partially mediating relative advantage, trialability and facilitating conditions. Therefore, hypothesis 2, partially hypotheses H13b1 and H13b4, and partially hypotheses H14a1 to H14a7 are empirically proven. Evaluation of outcome represents farmers' economic consideration on the intention to adopt KBAC scheme. This result implies that farmers are more likely to calculate cost and benefits prudently prior to adopting KBAC scheme.

It is in line with the previous studies by Tey *et al.,* (2014) suggested that evaluation of outcome has a positive influence toward farmers' intention to adopt sustainable farming practices in Malaysia. To some extent, these findings might also indicate that KBAC

actually has delivered some benefits to member farmers, e.g. in terms of higher productivity, premium price, worker safety and environmental improvement. Although beliefs about outcomes also represent attitude, it has not shown an equal statistical significance as evaluation of outcomes in affecting the intention to adopt KBAC scheme. These results indicate that farmers are more dependable to prudently calculated cost and benefits than salient information about outcomes of adopting KBAC scheme. Furthermore, it is deviated from previous empirical studies which argue that belief or perception about the innovation significantly affects adoption (Feola & Binder, 2010; Boazar *et al*., 2019).

Second, norm, self-concept and habit affect the intention to adopt KBAC scheme. Furthermore, the results show that these variables have positive effect on the intention to adopt KBAC scheme. Consequently, these results confirm hypotheses 4, 6, and 7. Despite the fact that each corresponding indicator might contribute to each side of intention to adopt KBAC scheme, norm, self-concept and habit are most likely rooted to the same religious and cultural system, the *Subak Abians*. In this regard, the integration of the *Tri Hita Karana* (i.e. the harmony relation with gods, society and environment) in the *Subak Abians* and the sustainable farming practise within the KBAC schemes (including social cultural environments) have been able to contribute to the development of farmers' norm, self-concept and habit.

In terms of norm, it appears that the intention to adopt KBAC practise comes from the influence groups (i.e. family, friends, co-workers, other farmers, villagers and community), that most likely also hold those religious values. Similarly, for self-concept that already developed based on those environment and religious values, in which choices are formed from subjective values and the decision made through dynamic integration process. These results support the evidences that norm and self-concept positively affect the intention to adopt various environmental practices (Feola & Binder, 2010; Tey *et al.,* 2014; Adnan *et al*., 2020). In term of habit, the implementation of organic farming and environmental conservation practise, where it connects local actors and cultural activities, has become a habit to the farmers even prior to the intention to KBAC scheme. As has resulted from the study by Tey *et al.,* (2014), positive habit is an important determinant of the intention to adopt sustainable farming practices. Generally, this finding successfully supports the concept of GIs product which aims to maintain the traditional knowledge in processing the products (e.g. UNCTAD, 2015; WIPO, 2018; Coordinating Ministry of Human Development and Culture Republic of Indonesia, 2015).

Third, the result shows that relative advantage has a significant and greatest effect directly and indirectly toward the intention to adopt KBAC scheme, within not only perceived attributes but also compared to other variables in interpersonal behaviour. Therefore, these result supports hypothesis 8 and partially hypothesis 13b1. In this regards, relative advantage is considered as the major determinant of the intention to adopt the KBAC scheme. Relative advantage perceived to provide extra benefits (e.g. technically and economically) compared to the existing practices rather than an idea attempted to change the traditional farming practise alone. This result is consistent with the empirical literature suggesting that relative advantage has a positive and strongly contributes to the intention to adopt sustainable practise in Malaysia (Tey *et al*., 2014). It also confirms Reimer *et al.,* (2012) argument that relative advantage is the main motivation for farmers to adopt all conservation practises in Indiana. Furthermore, the effect of relative advantage on belief and evaluation of outcome (hypothesis 13b) supports the evidence that perception on the innovation attribute contributes to the attitude toward environmental practices (Tey *et al*., 2014; Reimer *et al*., 2012).

Fourth, the result shows that trialability significantly and positively affects the intention to adopt KBAC scheme which corresponds to hypothesis 11. This finding indicates that providing on-farm trial for farmers for implementing the KBAC practice has positive influence on the intention to adopt the scheme. According to World Coffee Research (2020), on-farm trials on specific innovations in coffee farming may provide high productivity and profits for farmers. This result corresponds with the study of Reimer *et al*., (2012) which states that trialability is one of the important motivating factor for adopting conservation practises (i.e. conservation tillage and cover crop) in Indiana watersheds.

Fifth, household and farm characteristics and institutions have indirect effects on the intention to adopt KBAC scheme through relative advantage, evaluation, habit, norm, self-concept and trialability. The results show that innate ability, financial capacity and knowledge positively influence relative advantage and trialability. Meanwhile, farm endowment negatively affects the intention to adopt KBAC. These results confirm hypotheses H14b4 and H14b1 and are in line with Reimer *et al*., (2012) which proved that farmer and farm characteristics contribute to changing personal perceptions about innovation characteristics. These perceptions affect the attitude to the final decision regarding conservation practice adoption.

In addition, evaluation of outcome is positively affected by gender role and family size, but negatively affected by leadership. Therefore, this result partially confirms hypothesis H14a2. Norm otherwise, are attributable to the positive effects of farm capacity, financial capacity and knowledge. These results partially confirm hypothesis H14a4. Financial capacity and knowledge positively contribute to self-concept. Thus, it partially supports hypothesis H14a6. Similarly, Feola & Binder (2010) argued that farmers' characteristics, such as identities and household head are important in supporting positive self-concept toward the intention to adopt personal protective equipment. Additionally, according to Adnan *et al*., (2020), positive attitude that leads to the intention to adopt green fertilizer adoption in Malaysia, was affected by human capital factors, financial assets and physical resources.

Finally, habit is positively attributable to family size, financial capacity and knowledge, but negatively attributable to farm endowment. The results therefore partially confirm hypothesis H14a7. Environmental condition and individual capacities support personal habit, as emphasized in Engman & Cranford (2016). Therefore, the result implies that financial capacity and knowledge are the important factors in influencing the reference groups to affect farmers to the intention to adopt KBAC scheme, whereas family size is important in preliminary consideration (e.g. labour, financial or information supports) which eventually affects an individual's decision through the diffusion process of innovation and becomes a pattern of social change. In general, the results suggest that decision-making process does not only rely on individual principles, but also the rational considerations in terms of facilitating conditions.

2.4. CONCLUSIONS

The aim of this study is to examine behavioural intention to adopt KBAC scheme by applying an integrated model of TIB and DOI. Initial analysis shows that most of farmers (67.00%) have the intention to adopt KBAC scheme. Farmers' responses in most of latent variables, whether derived from model of interpersonal behaviour or diffusion of innovation, are also mostly high. Most farmers (80.34%) agree in perceived advantage of using KBAC method, including increasing market reputation and enhancing farming productivity. Most farmers also agree with regard to perceived compatibility (75.67%) and evaluation of outcome (75.67%) of KBAC scheme. Similarly, most farmers also have high respond in norms (69.66%), perceived complexity (68.67%), perceived trialability

(68.33%), roles (68.00%), and habits (67.33%) correspond to the adoption of KBAC scheme. In contrast, it is also shown that a smaller portion of farmers (48.33%) agree to the emotions related to the opportunity to adopt, practice and comply with KBAC scheme. Similarly, fewer farmers (32.00%) agree that adopting KBAC scheme is in accordance to their principles (self-concept).

Applying measurement model evaluation as the first step of PLS-SEM analysis proved that the integrative behavioural intention was reliable and valid for this study. While, based on the structural model evaluation, the study results show that the intention on KBAC scheme is significantly attributable toward relative advantage, habit, evaluation of outcome, norm, self-concept, and trialability. The PLS analysis further emphasized that in terms of perceived attributes, relative advantage has the highest positive direct and indirect effect towards the intention to adopt KBAC scheme. However, in regard to interpersonal behaviour, habit has the highest direct effect on the intention to adopt KBAC scheme. In addition, financial capacity and knowledge mostly facilitate the latent variables of perceived attributes (i.e. relative advantage and trialability) and interpersonal behaviour (i.e. evaluation of outcome, norm, self-concept and habit) and contribute to the intention to adopt KBAC scheme.

There are several implications corresponding to aforementioned findings. First, the results indicate that farmers perceive relative advantage positively which highly affects the intention to adopt KBAC scheme. In contrast, other study showed that KBAC scheme might not be able to provide sufficient market recognition in retail market, causing inability of the CGIP to compensate a high farm gate price (Neilson *et al*., 2018). They argued that it is because of CGIP's poor delivery in famers' benefits regarding quality control management through labelling system and marketing function. Similarly, in broader cases, current studies on various GIs products showed that agricultural modernisation through GIs schemes might not necessarily resulting cost of production efficiency (Török *et al*., 2020). Therefore, as a prerequisite condition for promoting perceived benefit of KBAC scheme, it is important to revitalize KBAC institution/CGIP to a good institutional arrangement. In this regard, stakeholders (i.e. government in each regional hierarchy, society and traders) need to continue and promote KBAC scheme, particularly regarding the enhancement of farming productivity and improvement of farmer reputation in the market in the future.

Second, farmers' habit towards sustainable farming practice has significant effect on the intention to adopt KBAC scheme. It indicates that all stakeholders need to support the implementation the traditional farming practices, such as organic farming, environmental conservation in relation to the *Subak Abian* as religious and cultural system in KBAC scheme implementation. In this regard, GIs aim to institutionalize the resources of places (Giovanucci *et al*., 2011), which preserves the local resources based on the unique combination of cultural expression (Traditional Culture Expression-TCE), biological diversity, soil characeteristics and climate conditions. Thus, it is able to preserve the traditional technique in achieving the sustainable coffee production (FAO & European Bank, 2018; WIPO, 2018).

Third, the results also indicate that evaluation of the outcome affects the intention to adopt KBAC scheme, however, from the other end it is supported by perceived relative advantages and trialability. These findings imply that policy makers and other stakeholders need to transform the scheme into a more accountable and reliable arrangement by providing certainty of cost and benefits of participating in KBAC scheme through the program extension targeted for good quality harvest, worker safety, increased price premium and enhanced environment surrounding the farm. However, previous studies in KBAC scheme indicated that the implementation of the program extension might not necessarily work as planned due to local political reasons between district and provincial government (Neilson *et al*., 2018; Wijaya *et al*., 2017b). Therefore, partnership arrangement for developing the GIs scheme should be improved, for example with public private arrangement and introducing neutral institution (e.g. Central Bank of Indonesia) in the GIs partnership as it is also implemented in the case of Ijen Raung Arabica coffee GIs of Bondowoso regency, East Java.

Fourth, the farmers' perceived trialability positively and significantly affects the intention to adopt KBAC scheme. To improve farmers' accessibility to essential information to understand the technicality of the KBAC scheme, stakeholders need to improve the intensity and deliverability of those supports and promotions. Fifth, the results show that farmers' norm and self-concept significantly affect the intention to adopt KBAC scheme. In this regards, policy makers need to optimize the role of each KBAC actor including farmers' referents (i.e. family, friend, co-worker and villager motivators) to contribute to marketing partnership of KBAC. Finally, financial capacity and knowledge highly facilitate perceived attributes and interpersonal behaviours to affect the intention to

adopt KBAC scheme. These findings imply that stakeholders need to improve farmers' financial capacity (e.g. access to credit) and knowledge (e.g. access to information) to support evaluation of outcome, norm, self-concept, habit, relative advantage and trialability towards the improvement of the intention to adopt KBAC scheme.

There are several theoretical and methodological recommendations in regards of development of further studies. Concerning model development in behavioural adoption on sustainable scheme, other studies need to explore the conceptual setup beyond the integration of TIB and DOI, particularly exploring other possible relationships of selected latent variables. For example; on how the habits regarding the implementation of the scheme could be formed and be changed. From methodological perspective, in the process of transferring the selected model statements in the questionnaire, it is important to consider relevant guideline for developing questionnaire. Fishbein & Ajzen (2010) served a basic direction administer the questionnaire. In addition, other studies also need to explore data measurement selections to discover possibility of contribution of others factors. Lastly, extending sample size and/or exercising sustainable scheme of other agricultural products are also advisable in further studies.

CHAPTER III

SUSTAINABILITY IMPACT ASSESSMENT OF PARTICIPATION IN GEOGRAPHICAL INDICATION SCHEME: THE CASE OF KINTAMANI BALI ARABICA COFFEE

Abstract

Kintamani Bali Arabica Coffee (KBAC) is the first geographical indication scheme implemented in Indonesia, and is considered a specialty coffee scheme complying with sustainable farming practices. However, empirical studies on GIs evaluation are bound to sometimes fail in reflecting sustainability impact. Furthermore, studies on sustainability assessment are mainly on international sustainability schemes and partially expose the sustainability pillars. This study therefore aims to evaluate the (KBAC) scheme's sustainability impact on farming households' economic, social and environmental measures, in a bid to address these gaps. A propensity score matching was conducted to analyse the scheme's sustainability impacts, using primary data collected from 300 farming households. According to the results, the scheme led to a sustainable higher economic impact, including higher coffee yield and cost efficiency, contributing to a higher profit and income. In terms of social impact, participating in the scheme also contributes to improved capacity building and standard of living, including record keeping, access to electricity and information, as well as gender participation. Meanwhile, with regard to environmental impact, the scheme also contributes to maintain sustainable coffee practices, improve biodiversity and ecosystem in the coffee farm and surrounding areas. However, the results indicate weak sustainability impacts for these three pillars, leaving spaces for evaluating development for KBAC scheme, comprehensively causal framework within input, activities and output and the scheme's institutional setting.

Keywords: arabica coffee, geographical indication, sustainability impact assessment, propensity score matching.

3.1. INTRODUCTION

Recently, there has been a rapid rise in consumers' demand for sustainable coffee products around the world. This necessitates higher motivation for more farmers to participate in the overall supply chain, including the introduction of new sustainability standards and certifications. Therefore, Fairtrade International, Bird Friendly, Rainforest Alliance, and other schemes have been introduced as a response to these demands in developed markets (Arifin, 2010; Glasbergen, 2013). The international development community regards these schemes as efforts to achieve sustainability goals by addressing integrated long-term economic, social and environmental goals, considering prosperity, for the future generations (Giovannucci & Koekoek, 2003). Thus, the sustainability term reflects in the interconnection of three pillars, economic, social and environment, in each standard and certification's overall scheme.

In Indonesia, Rainforest and Fairtrade International were the first international sustainability coffee schemes, implemented in the 1990s. Subsequently, other international coffee schemes (including Organic, Rainforest Alliance) were implemented. However, several sustainability-related issues are currently being faced, even after over 30 years of implementing these schemes. According to several studies, the challenges that farmers face include implementation and certification costs, workload as well as inadequate information on price determination (Neilson, 2008; Arifin, 2010; Astuti *et al*., 2015a). In addition, farmers' economic benefit is currently not optimized, as roaster industries received more benefits from the schemes (Astuti *et al*., 2015b; Ibnu *et al*., 2015). Other studies also highlighted the issue of low commitment in the schemes participation. Also, farmers tend to move to alternative market channels, including uncertified channel and intermediaries, as limited information about certification implementation creates uncertainty (Astuti *et al*., 2015b; Ibnu *et al*., 2015).

The Geographical Indication of Origins (GIs) scheme was introduced as an alternative to international sustainability coffee scheme standards. GIs coffee is considered as the specialty coffee strand with specific attributes of quality and reputation to a single country, region, and/or farm, as well as implementing particular quality improvement based on good agricultural practices, for complying with sustainability principles (Mawardi, 2009b; Wijaya *et al*., 2017). Thus, GIs coffee scheme is a considerable sustainability scheme, with these additional geographical indication attributes. The

scheme's implementation is empirically argued to present several benefits. These include contributing to domestic and international market differentiation (Kampf, 2003; Teuber, 2010; Neilson, 2008), improving products reputation as a prestigious global commodity (Neilson, *et al*., 2018), preventing intellectual property right conflicts within the market (Mawardi, 2009a), and maintaining the environment and cultural heritage (Gangjee, 2012; Jena & Grote, 2015). In some case, the scheme also supports access to the financial service (Neilson & Hartatri, 2014), famers' income improvement (Neilson & Hartatri, 2014; Barjolle *et al*., 2009, Tregear *et al*., 2016), and value-added development (Mawardi, 2009a).

However, all these advantages do not always necessarily reflect sustainability impact at some point. With regard to evaluating a sustainability scheme, a comprehensive impact assessment need to consider the impacts on the three sustainability pillars, including economic, social, and environment. However, most related studies, particularly GIs schemes, cover one or two of these pillars partially. Several studies focus on economic (for instance, Neilson *et al*., 2018; Neilson & Hartatri, 2014) and institutional impacts (Barjolle *et al*., 2017; Galtier, 2013; Durand & Fournier, 2017), while others focus on two aspects of the assessment, economic and social impacts (Neilson *et al*., 2018; Neilson & Hartatri, 2014); as well as social and institutional impacts (Wijaya *et al*., 2017). Only a few evaluate comprehensively sustainability impact with respect to the three pillars. Bray & Neilson (2017) particularly applied Sustainability Impact Assessment (SIA) and systematic review to analyse the impact of international coffee certifications. Meanwhile, in the case of another GIs product, only a few studies implemented SIA (Bowen & Zapata, 2009; Barjolle *et al*., 2009).

Therefore, a more formal evidenced-based evaluation procedure is required to properly evaluate this sustainability scheme's achievements. This kind of evaluation is not only important for planning the scheme's implementation, but for formulating effective policies to support the development as well. However, most studies focus on international sustainability schemes including Fairtrade International, Organic, UTZ, Café and Rainforest Alliance (for instance, Dietz *et al*., 2019; Jena *et al*., 2017; Rijsbergen *et al*., 2016; Lampach & Morawetz, 2016; Chiputwa *et al*., 2015; Rueda & Lambin, 2013; Ruben & Zuniga, 2011; Ruben & Fort, 2012), and only a few particularly evaluate GIs schemes' counterpart.

This study therefore evaluates the KBAC scheme's sustainability impact on coffee farmers in Kintamani, Bali, in a bid to fill these gaps, using theory of change as groundwork to develop the SIA framework and deduce the final estimation results. As an alternative to 'before and after' evaluation, an SIA was established using counterfactual approach by comparing economic, social and environment impacts of coffee based KBAC scheme participation. Subsequently, with the aid of primary data collected from 300 Kintamani coffee farmers Bangli Regency, Propensity Score Matching (PSM) was used to eliminate the counterfactual problem arising from KBAC scheme based on participation. An index was then developed to comprehensively evaluate the scheme's sustainability impact in the study area.

The establishment of coffee GIs scheme in Indonesia was motivated by the *Trade-Related aspects of Intellectual Property Rights* (TRIPs) agreement in 1994, and present an interesting case corresponding to gaps in the studies mentioned above. In Indonesia, GIs was implemented under the Law No. 15/2001 regarding Trademark, and the Government regulation No 51/2007 regarding GIs. Based on these agreements, laws and regulations, the scheme is clearly not a commercial trading scheme, but a law of protection on regional assets (Mawardi 2009b; Wijaya et al., 2017). Thus, the local producers are able to define the scheme rule with code of practice (CoP). The Kintamani Bali Arabica Coffee (KBAC), initiated in 2001, is the first agricultural product GIs scheme implemented in Indonesia, and serves as the pilot project for developing other GIs schemes within the country. Based on the Directorate General of Intellectual Property (2015), GIs coffee is one of the most traded products in global market among 54 Indonesian GIs products, including agriculture, food and handicraft products. However, studies comprehensively evaluating the scheme's sustainability impact are quite rare. In this study, section two describes the research material as well as methods; section three provides an estimation analysis, while sections 4 and 5 present the discussion and conclusion.

3.2. MATERIALS AND METHODS

3.2.1. Conceptual Framework

The concept of sustainability impact assessment (SIA) for KBAC was developed based on theory of change (ToC), in a bid to achieve the study's objective. According to OECD (2010), SIA integrates three sustainable development pillars (economic, social and

environmental), into the assessment, with regard to short- and long-term impacts. A study by Harrington (2016) showed the sustainability concept relates to long-term capacity and condition of improvements, while sustainable development relates to human development (WCED, 1987) and focuses on human wellbeing, ecological services as well as biodiversity (Waas *et al*., 2011). Thus, redefining sustainability concept with respect to sustainable development; results in an integration of human needs in terms of economic, social and environmental conditions, over the long-term.

Impact evaluation therefore aims to evaluate the effectiveness and the accountability of interventions (including policies, programs, schemes), and stimulate the improvement of quantity, quality, coverage, policy or any other anticipated objectives (Gertler *et al*., 2016; White, 2010). This evaluation is conducted based on evidence-based policy-making, through monitoring and evaluation (Gertler, *et al*., 2016). Monitoring refers to the process of continuously tracking inputs, activities, outputs of a scheme for instance, in order to accumulate information regarding managerial activity. Meanwhile, evaluation is a periodical assessment on a planned, ongoing or established scheme. With reference to the impact evaluation concept, SIA includes the close-loop cycle method, and these are monitoring, adaptation and evaluation. This method is therefore approached from the causal or logical chain; however, feedback loop application is suggested (White, 2010; OECD, 2010).

The theory of change (ToC) is considered as an important underpinning concept for impact evaluation, and operates under theory-based approach, commonly used for explaining an intervention or a program's method of producing empirical evidence as well as systematic development (UNDAF, 2017; Laing & Todd, 2015). Thus, ToC utilizes a chain of logical changes, also known as causal effect framework, to assess a program or a project's capacity to achieve the desired results and is therefore intended to structure a fundamental reason as well as provide a framework of logical changes (Gertler *et al*., 2016; Roger, 2014; UNDAF, 2017). In terms of sustainability scheme, ToC helps to understand the scheme's impact creation process towards farmers' livelihood, by taking the scheme's organisation characteristics and goal criteria into account. ToC also serves as a guide to break down these characteristics and criteria a particular chain element, for instance, inputs, activities, outputs, outcomes and impacts. The goal criteria determine the impacts' components (the pillars), while the organisation characteristics determine the interrelationship (pathways) between these elements and the impact.

Several empirical studies have utilized ToC as groundwork for establishing sustainability schemes' impacts. Bray & Neilson (2017) adopted the theory of change to assess the impact of participation in international coffee schemes, including Fair Trade, UTZ, Organic and Rain Forest. The study identified four main impact pathways for improving producer welfare, including impact for human, social, physical and natural capitals, by applying a systematic review for scheme adoption in various countries. Meanwhile, Neilson *et al*., (2018) adopted ToC to analyse two sustainability pillars, the economic and social impacts, for two GIs coffee schemes in Indonesia, KBAC and Arabica Flores Bajawa Arabica Coffee (FBAC). After applying descriptive analysis and mean comparison for member and non-member groups of these schemes, the study discovered participating in GIs coffee does not necessarily guarantee farmers' economic and social benefits. In addition, the study reported involvement in GIs management reduces social inclusiveness, local values, culture as well as income, and shows the schemes' implementation's negative impact, due to the local institution's inefficiency in integrating GIs implementation toward producers and other coffee actors.

OECD (2010) integrates three sustainable development pillars into the evaluation of a sustainable program's short- and long-term impacts, recognized as the Sustainability Impact Assessment (SIA). Meanwhile, theory of change (ToC) is considered as an important underpinning concept for impact evaluation, and is commonly used to explain an intervention or program's process for producing empirical evidence and systematic development (UNDAF, 2017; Laing & Todd, 2015). Therefore, a conceptual framework for KBAC sustainability evaluation was developed by identifying and assigning KBAC organizational attributes based on three pillars (economic, social and environmental) as well as particular chain of changes (inputs, activities, outputs, outcomes, and impacts) corresponding to SIA and GIs literatures. These organizational attributes include goals, needs, and barriers to progress documented in KBAC's Code of Practice (CoP). Relevant empirical literature and suggestions from relevant KBAC stakeholders were also taken into consideration, during the conceptual framework's development.

Figure 3.1. shows the conceptual framework, with the following structure. The first section are inputs, defined as all resources and stakeholder modalities, for instance, land, crops, labour, financial capital, and knowledge, on the farmers' side. In this chain, KBAC member and non-member farmers' inputs are not necessarily diverged, as the basic coffee farming inputs are considered. The second are activities, comprising all activities within

KBAC scheme utilizing corresponding inputs. In this chain, activities are defined by each party in the scheme, including farmers, Community of Geographical Indication Protection (CGIP) and stakeholders. Furthermore, the third are outputs, defined as all output results from activities and inputs utilization, while the fourth are outcomes, representing details of the short- and medium-term effects, as well as likely changes in performance to be achieved within the chain. Meanwhile, the fifth are impacts, defined in terms of the three SIA pillars as economic, social and environmental. Each impact representation is attributable to particular pathways, these are economic, social as well as environmental pathways, and these hypothetically explain the creation of outcomes within the chain changes' systematic interconnections.

This study's main features comprehensively evaluate these three pillar impacts. Subsequently, the KBAC scheme sustainability goals were selected and set into economic, social as well as environment impacts. The goals were determined based on CoP and applicable goals of empirical GIs studies. Economic impact is represents by six outcomes, including higher coffee yield, lower production cost (pre-harvest, harvest and post-harvest), premium prices, improved farmers' income (on- and off-farm), higher re-investment (on land, crop, labour), and financial independence. Meanwhile, social impact is represented by nine outcomes, ranging from improved farming skills to maintaining the traditional farming practises and cultural value. In addition, environmental impact is represent by sustainable agricultural practices, extensive farming, maintaining natural resources, as well as water and soil quality, consequently resulting in improved on-site biodiversity.

In the economic impact pathways, the impact is measured improved farmers' income (on and off-farm incomes and household expenditure), coffee price, productivity and farming practises (increased profit as well as coffee yields), investment (increased coffee plot size and hired worker), as well as increased financial independent (increased access to saving and credit facilities). These outcomes are increased through the pathways outlined below:

a. Increased coffee production and coffee quality decreased production cost, and improved investment through certain activities (for instance, implementing KBAC code of practice, committing for establishing and conducting standards), implementing CoP's labelling and promoting the products.

b. Increased financial independence through strategies including, building marketing cooperative and access to financial services.

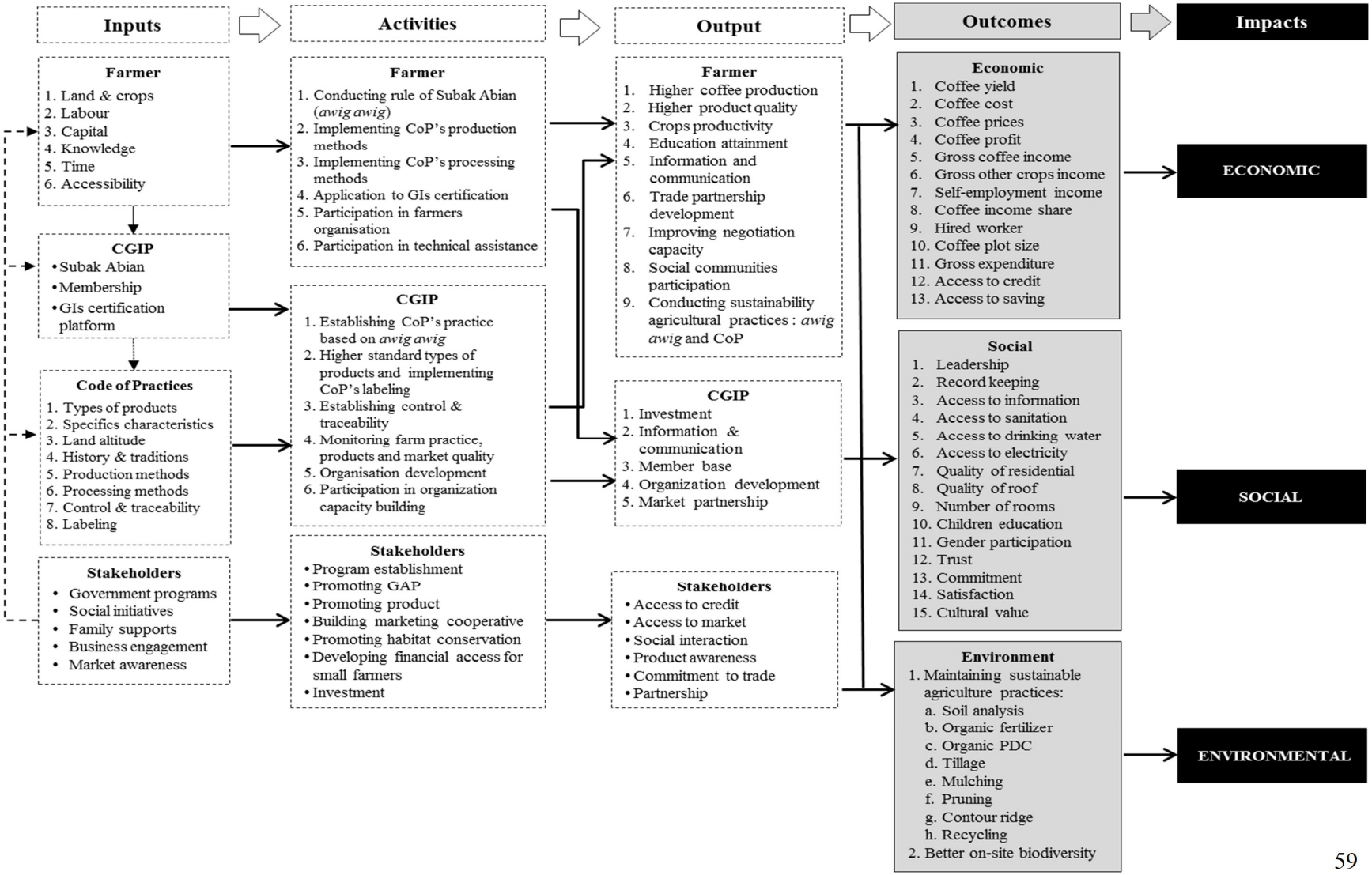
The social impact pathways are measured by the improvement of household infrastructure (for instance, quality of access to sanitation, water sources, access to electricity; building materials, as well as roof and room types), human capital (for instance, children education level), skills (for instance, leadership and record keeping), gender participation (for instance, woman negotiation), trust, commitment, and cultural value awareness. These social outcomes are expected to increase through the conditions below:

a. The investment made by stakeholders (government, NGOs and buyers) into physical facilities and equipment for farmers through *Subak Abians* CGIP.
b. Strengthening farmer institutions through organisation capacity building.
c. Enhancing social capital and improving networking opportunities.
d. Facilitating trainings for women managerial capacities.

Furthermore, the environment impact pathways are measured by biodiversity (number of shading trees and birds species on coffee plot), as well as the behaviour for applying agriculture farming practices (organic fertilizers, pruning, tillage, mulching, contour ridge, recycling method, pest and disease control as well as soil analysis) by farmers. These outcomes are achievable through the strategies below:

a. Implementing CoP with regards to production, processing method and implementing organic farming.
b. Monitoring and mandating good agricultural practices by CGIP and stakeholders.
c. Promoting environment issues in coffee production by stakeholders.

Figure 3.1. Conceptual framework of sustainability impact evaluation



3.2.2. Study Design

The main data was collected through a face to face or household survey implemented between March and April 2019, in Bangli regency, selected as the survey locus, out of two regencies in the KBAC administrative zone, due to possessing the largest coffee production (Directorate General of Estate Crops, 2019; Statistics Bangli, 2018). Based on the final Cochran's (1963) formula for determining sampling size, the researchers decided to interview 300 farmer households in randomly selected five villages within Kintamani district, including Catur, Belantih, Gunung Bau, Ulian, and Serahi, locate in the same agro ecological zone, and with similar access to market condition. A tested and structured questionnaire application was used in the computer-assisted personal interviewing (CAPI) program to collect all essential data, including farmers' profiles, demographic composition, farming practices, economic activities, details of coffee and other crops production, as well as marketing information related to KBAC scheme.

Balinese farmers commonly participate in traditional farmer groups referred to as *Subak Abian*. In addition, a complete list of these groups provided by Bali Provincial office and CGIP office was utilized to determine selected farmer households. Subsequently, two *Subak Abian*s in each village were selected. Non-*Subak Abian* farmers are not allowed to be KBAC members (MPIG, 2011), however, not all *Subak Abian* farmers are CGIP members. Therefore, in this study, KBAC members are defined as CGIP *Subak Abian* farmers documented in CoP, and administratively possessing a KBAC membership card.

This study was conducted over a decade after KBAC implementation; therefore, comprehensive farmers' household data prior to this implementation are hardly available. Thus, an ex-post evaluation was established using counterfactual approach, and accordingly, the survey targeted at two farmer groups. These are KBAC members and non-members, regarded as the treatment and control groups, respectively. In this setup, any divergent impacts between these two groups correspond to the scheme's effectiveness in achieving sustainability goals. Subsequently, a stratified random sampling was applied to select sample farmers from each group.

Table 3.1. Selected outcome variables

No	Outcome variables	Descriptions	Measurements
		I. Economic outcomes	
1	Coffee yield	Harvested coffee to total area of cultivation	ton/hectare
2	Coffee cost	On-farm and off-farm cost of coffee production	million IDR/hectare
3	Coffee prices	Coffee prices received	IDR/kg
4	Coffee profit	Coffee net income	million IDR/hectare
5	Coffee income	Income from coffee in the last 12 months per hectares	million IDR/hectare
6	Other-crops income	Income from other crops in the last 12 months	million IDR/hectare
7	Off-farm income	Income from other work than farming owned land	million IDR
8	Coffee income share	Share of coffee income to total income	ratio
9	Hired worker	Number of workers outside household	person
10	Coffee plot size	Total area of coffee owned plot	hectare
11	Household expenditure	Total household expenditure in the last 12 months	million IDR
12	Access to credit	Household has access to credit	1= yes, 0 = no
13	Access to saving	Household has bank account	1= yes, 0 = no
		II. Social outcomes	
1	Leadership	Type of leadership position of household head	1= yes, 0 = no
2	Record keeping	Records the farm activity	1= yes, 0 = no
3	Access to information	Access to information about agriculture activity	1= yes, 0 = no
4	Access to sanitation	Household has access to owned sanitation	1= yes, 0 = no
5	Access to drinking water	Household has access to owned drinking water source	1= yes, 0 = no
6	Access to electricity	Household has access to electricity	1= yes, 0 = no
7	Quality of residential	Farmer's household built in brick material	1= yes, 0 = no
8	Quality of roof	Farmer's household roof built in tiles material	1= yes, 0 = no
9	Number of rooms	Number of rooms in farmer's household	rooms
10	Children education	Education of the children in the household	1 = yes, 0 = no
11	Gender participation	Household member participated in organisation	1= yes, 0 = no
12	Trust	"Do you trust in the KBAC scheme?"	1= yes, 0 = no
13	Commitment	"Will you commit to the KBAC scheme?"	1= yes, 0 = no
14	Satisfaction	"Are you satisfied with the KBAC scheme?"	1= yes, 0 = no
15	Cultural value	"Are KBAC scheme represent cultural value?"	1= yes, 0 = no
		III. Environmental outcomes	
1	Soil analysis	Frequency of soil analysis	1= yes, 0 = no
2	Organic fertilizers	Applies organic fertilizer	1= yes, 0 = no
3	Organic PDC	Applies organic pest and disease control (PDC)	1= yes, 0 = no
4	Pruning	Frequency of pruning coffee tress	times/season
5	Tillage	Frequency to tillage the soil	times/season
6	Mulching	Frequency of mulching	times/season
7	Contour ridge	Applies contour ridges or trenches	1= yes, 0 = no
8	Recycling	Applies recycling method	1= yes, 0 = no
9	Shading trees	Number of shading trees	trees/hectare
10	Birds species	Number of birds species on the coffee plot	species/hectare

*IDR: Indonesia Rupiah.

Based on the estimated data of KBAC scheme participation rate provided by the Bali Provincial Plantation Service as well as Indonesia Coffee and Cocoa Institute (ICCRI), a 40-60 proportion of KBAC member and non-member farmers was selected. Subsequently, 114 member and 186 non-member farmers were randomly selected, in

consistency with the previously calculated sampling size of 300, using aggregate coffee farmer from secondary data (Statistics Bangli, 2018) as population reference. Table 3.1. shows the selected outcome variables exercised, corresponding to outcomes and impacts of three sustainability assessment pillars described within conceptual framework in the previous section. These selected outcome variables were then sorted into economic, social and environmental.

3.2.3. Estimation Strategy

This study aims to evaluate the KBAC scheme's sustainability using counterfactual approach, for particular reasons. These are the unavailability of a comprehensive baseline data on coffee farmer's household prior to the scheme's implementation, and the conducting of this study over a decade after this implementation. Therefore, an ex-post evaluation was selected to answer the study objectives and was established by retrospectively evaluating differences in outcomes between selected member (treatment group or beneficiaries) and non-member (control group or non-beneficiaries) KBAC farmers. However, evaluating differences in outcomes between these particular groups tends to cause a selectivity bias (Heckman *et al*., 1998), as participation in the scheme does not always meet randomization criteria completely. Thus, following similar studies (for instance, Caliendo & Kopeinig, 2008; Rosenbaum & Rubin, 1983; Rubin & Thomas, 1996), Propensity Score Matching (PSM) analysis was selected to solve the problem of selectivity bias.

A five steps procedure described in Caliando & Kopeinig (2008) and Lampach & Morawetz (2016) was used to produce a robust PSM estimation. The propensity scores were first developed based on probit estimators, and the equation below was used to obtain each observation's propensity scores, to estimate the KBAC scheme's participation probability.

$$\mathrm{P(X)} = \mathrm{Pr(T = 1|X)} \qquad (3.1.)$$

Furthermore, the estimated score's value (P(X)) lies between 0 and 1, indicating the propensity to participate. A value closer to one implies a higher likeliness to participate in the scheme. Meanwhile, Rosenbaum & Rubin (1983) balancing score procedure was applied to avoid the curse of dimensionality resulting from using direct comparison on nonrandomized observations with different unit measurement. The equation below shows

the balancing score procedure, a function of relevant and observable characteristics providing a meaningful comparison between the member and non-member groups.

$$\acute{P}(X|T = 1) = \acute{P}(X|T = 0) \quad (3.2.)$$

Subsequently, the scores are stratified based on balanced covariates across treatment and comparison groups. According to Rosenbaum & Rubin (1983), five blocks are a good number of balanced covariates for stratifying the propensity score.

The observable farmers' household characteristic variables (X), both member and non-member, selected based on the KBAC scheme's documents and attributes, as well as economic theories, and relevant empirical studies. Therefore, household and farm characteristics, as well as market accessibilities were exercised in the probit estimation of the propensity to participate in the KBAC scheme. The household characteristics were age of household head, education, family size, gender, marriage, and experience. Also, the squared of age and experience, were included to consider the variables' diminishing return. Meanwhile, to consider the farm characteristics' contribution in KBAC scheme participation, off farm activity, past land size, land ownership, tree age and tree age square values were also included. In addition, market accessibility variables (time to input as well as output markets) were exercised to consider the contribution of access to public goods and infrastructure in the scheme's participation. The spearman' correlation test was applied to assure no strong multicollinearity among (X), leading to biased estimation results, for instance.

Secondly, three different matching methods were exercised to evaluate robustness of the selected models, Kernel, nearest neighbour and Caliper matching. Kernel matching is a nonparametric matching method applying a weighted average of non-member to formulate a counterfactual match for matching each member (Caliando & Kopeinig, 2008; Khandker *et al*., 2010). The nearest neighbour matching is the most commonly applied and straightforward robustness method, where each member individual is matched with an individual from comparison group to the nearest propensity score (Khandker *et al*., 2010; Caliando & Kopeinig, 2008). Furthermore, the nearest neighbour matching was applied without replacement, to match the groups. Meanwhile, the calliper matching aims to solve poor matching due to nearest neighbour matching, by applying the threshold for maximum propensity range (Khandker *et al*., 2010). Thus, this method is suitable for matching with replacement, considering certain range among propensity score. Subsequently, Jacovidis

(2017) was followed to apply 0.2 standard deviation calliper threshold of the propensity score. These exercised matching methods were then evaluated by the ability to balance the distribution of related variables in both member and non-member group (Caliando & Kopeinig, 2008). In addition, absolute standardized difference the propensity score's mean linear index value in the treatment groups (Rubin's B) is applied using suggested threshold below 25 (Rubin, 2001), to obtain balanced indicators after matching and resulting a good matching quality. Alternatively, the ratio of member group to the propensity score's non-member variance (Rubin's R) matched with is also used to evaluate the matching method, using a suggested threshold between 0.5 and 2.

Third, the common support area's was determined by two approaches, direct visual assessment on the distribution density of both group's propensity scores, and alternatively, by applying propensity score minima-maxima rule of both group's propensity scores. This was executed after reducing the non-member observations with a smaller p-score value, compared to the member group's counterpart; and by eliminating member group observations with higher p-score value, compared to non-member counterpart (Caliando & Kopeinig, 2008).

Holding conditional independence assumption (CIA) and sizeable common support area (Rosenbaum & Rubin, 1983), the mean difference outcome variables (Y) was then specified over the common support or average treatment effect on treated (ATT) as [7].

$$\tau_{\mathrm{ATT}}^{\mathrm{PSM}} = \mathrm{E}_{\mathrm{P(X)}\,|\mathrm{T}=1}\{\mathrm{E}\,[\mathrm{Y}(1)\,|\mathrm{T}=1,\mathrm{P}\,(\mathrm{X})] - \mathrm{E}\,[\mathrm{Y}=(0)|\,\mathrm{T}\;=\;0,\mathrm{P}\,(\mathrm{X})]\} \qquad (3.3.)$$

Where, τATT represents the expected average effect of binary treatment variables, meaning KBAC scheme members (T=1) compared to non-members (T=0).

Fourth, matching quality and treatment effects estimation are evaluated. This step is essentially the analysis' main part, corresponding to the study's objective. Prior to evaluating the treatment effects estimation, the matching quality's accuracy was examined by comparing the propensity scores, before and after matching (Caliando & Kopeinig, 2008). This examination is based on the scores' standardized bias (Rosenbaum & Rubin, 1983) and absolute standardized bias (Rubin, 2001). The standardized bias' aggregate value prior to and after matching ought to be below 20-25 points, to produce balanced matching (Caliando & Kopeinig, 2008; Rosenbaum & Rubin, 1983; Rubin, 2001).

[7] CIA refers to the assumptions that observable characteristics variables (X) are not affected by treatment effects and potential outcomes variables (Y) are independent of treatment assignment.

Meanwhile, matching accuracy is evaluated based on 5 percentage differences in standardized marginal distribution bias of observable characteristic variables, after matching (Rosenbaum & Rubin, 1983; Caliando & Kopeinig, 2008). Alternatively, the arithmetic mean's significance is also used to evaluate matching accuracy. In correspondence with the study objective, standardized mean difference p-value of outcome variables on average treatment effect is then used to evaluate the KBAC scheme's sustainability impact.

Meanwhile, the fifth and final stage is post estimation test, by robustness analysis of selected outcomes variables. This analysis is required to verify the treatment effect's robustness. CIA assumption is used in treatment effect estimation with score matching; however, there is a likelihood of simultaneous unobserved variables effects on characteristic and outcome variables. Thus, leaving likelihood of simultaneous unobserved variables effects unidentified, might lead to a hidden bias in the treatment effect estimation. Therefore, Rosenbaum bounds for nominal data (Rosenbaum, 2002) and Mantel-Haensz bounds for binary data (Caliando & Kopeinig, 2008; DiPrete & Gangl, 2004) are applied to address the hidden bias likelihood.

The Rosenbaum bounds statistic (rbounds) calculates the confidence intervals of treatment effect by applying matching estimation for each gamma (Γ) value. Γ explains log odds of differential unobserved factors, calculated using significance level of Wilcoxon sign test for significant outcome variables. Similarly, Mantel-Haensz bounds statistics (mhbounds) aims to check whether the probability of receiving the treatment and qualitative covariate outcomes are influenced by qualitative unobserved variables for each Γ value. In this case, Γ refers to differential unobserved factors' log odds calculating a p-_mh+ significance level, for significant outcome variables. Therefore, no treatment effect hypotheses are evaluated to indicate unobserved variables' effect on the decision to participate in KBAC scheme possibly correlated with the outcome variables.

Subsequently, a comprehensive measurement of each sustainability pillar and overall sustainability was established, the Human Development Index method introduced by the United National Development Program (UNDP, 1990), to conclude the evaluation of sustainability impact of KBAC scheme. Accordingly, from each statistically significant sustainability outcome variable obtained from PSM analysis, ($Y_{i,j}^{*}$) was computed as a standardized outcome indicator (j) of each farmer (i), as shown below.

$$Y_{i,j}^{*} = \frac{Y_{i,j} - Min_j}{Max_j - Min_j} \quad (3.4.)$$

All selected indicators must be evaluated toward the same direction, otherwise outcome indicators must be standardized reversely. Similarly, indexing categorical of interval outcomes indicators need to be adjusted accordingly, prior to composite index computation.

For each sustainability impact pillar (p), meaning, economic, social and environmental, each farmer's composite index, an index of economic/ social/ environmental impacts ($ESEI_{i,p}$) was computed based on these statistically significant sustainability outcome variables from PSM analysis. Using the same formula, each farmer's (i) overall sustainability index (SI_i) was also computed, using the equation below.

$$ESEI_{i,p}, SI_i = \frac{Y_{i,j1} + Y_{i,j2} + \cdots + Y_{i,jn}}{n} \quad (3.5.)$$

3.3. RESULTS

3.3.1. Descriptive Statistics

Based on the mean value before matching, both member and non-member farmer groups have similar characteristics. All selected famers are smallholders, and are mostly elementary school graduates, with average age of 49 years and average coffee plantation experience of 18 years. In addition, Bali coffee is planted in the highland of Kintamani, on the slope of an active volcano, Mount Batur, above 900 meter high. Coffee trees also have an average productive age of 8 years and total productive tree per hectare of 400. The annual coffee production for members and non-members is about 2.3 and 0.84 tons, respectively.

Table 3.2. Descriptive Statistics

No.	Description	Mean (Sample)			Mean (Bangli)
		Members	Non-Members	Overall	
1.	Land size (Ha)	0.86	0.66	0.94	0.87
2.	Production (Ton)	2.30	0.84	1.40	0.33
3.	Land ownerships [a]	CRs (84.21%)	CRs (91.40%)	CRs (88.67%)	CRs
4.	Cropping methods [b]	PC (89.70%)	PC (96.70%)	PC (93.70%)	PC
5.	Yield (Ton/Ha)	2.67	1.27	1.49	0.38
6.	Hired Workers (Person)	1.61	0.88	1.15	0.05

a. Land ownership include, customary rights (CRs), leasehold (LH), parent/free rent, and customary rights and leasehold (CRL).
b. Cropping methods include monoculture (MC), and polyculture (PC). In PC, coffee plants are intercropped with tangerine, avocado, chili, banana, maize, or cabbage.

Source: authors own calculation and Statistics Bangli, 2018.

On average, farmers' household contain 3 family members also working as labour in the family coffee plantation, with an average land area of 0.94 hectares per household. Approximately 93.70% of farmers intercrop coffee with other crops, for instance, tangerines, avocados, and banana to provide shading trees and for particular economic reason. In terms of plantation size, farming method and land ownership, the sample representativeness corresponds to the coffee farmer population in the selected region, Bangli regency, Bali province. These farmers own an average of 0.87 hectares coffee plantation, apply intercropping and practice customary rights land ownerships (Statistics Bangli, 2018).

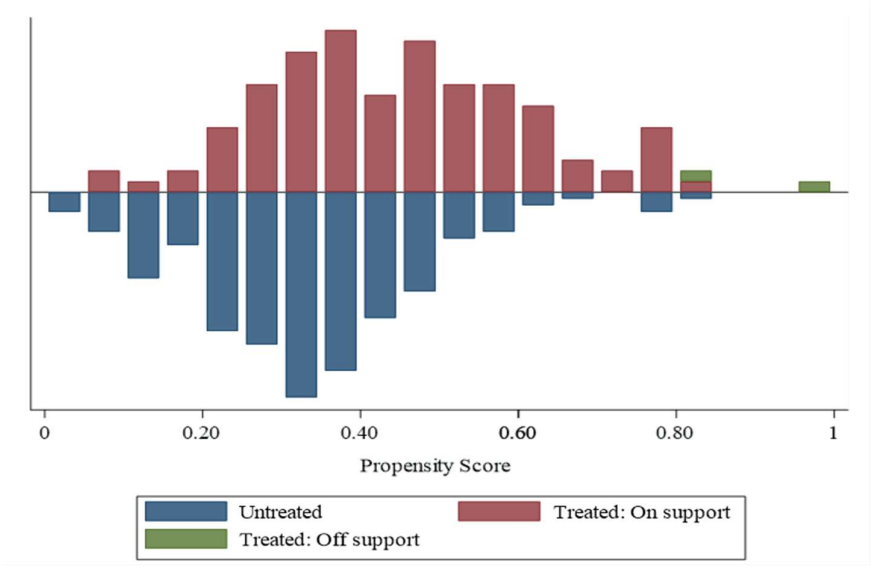
3.3.2. Sustainability Impact Propensity Score Matching

Initially, statistically significant standardized mean differences are found in characteristic variables between member and non-member KBAC farmer groups (Columns 2, 3, and 4 in Table 3.3.). Based on the p-value, both groups show statistically significant differences in past land size (5 years prior survey), coffee land ownership types and access to public facilities. Most of the other characteristic variables show no significant indifferences, however, the findings indicate directly evaluation of farmers' composition in each groups prior to matching often leads to selectivity bias. Thus, to produce a robust counterfactual analysis, a propensity score matching was required to re-evaluate the credibility each of those 300 selected samples from both member and non-member groups. Columns 8, 9 and 10 of Table 3.3. show the probit estimation results of propensity to

participate in KBAC scheme, where age, age squared, experience, experience squared, past land size and access to output market have a statistically significant influence on the scheme's participation propensity. A correlation examination between these selected characteristic variables was conducted previously to minimize multi-collinearity issues in the probit estimation. The results show no high correlation between these variables, meaning no correlation above 0.08 thresholds.

Therefore, the KBAC scheme participation's propensity score for each sample farmer, member and non-member, were estimated, considering the statistically significant characteristic variables' distribution. Subsequently, three matching algorithms were exercised to determine matching member and non-member farmers, to be included in the impact evaluation; meaning, Nearest neighbour, Kernel and Caliper matching. Based on the matching quality tests, Kernel matching algorithm provides most robust results, indicated by the Rubin's (B) and Rubin's (R) values of 28.50 and 0.90, respectively. Furthermore, a common support area was determined to evaluate the credibility of each initial 300 observations, based on Kernel matching algorithm. The estimation showed the common support area for our outcome analysis is between propensity score of 0.07 to 0.97. Thus, any observation with a score outside this area is excluded in further analysis. Figure 3.2. shows the satisfaction distribution common support area of farmers propensity scores for KBAC members and non-members, based on Kernel matching algorithm, with the suggested five blocks balanced propensity score stratification.

Figure 3.2. Propensity score distribution within common support area



Source: author's own calculation.

The estimation results suggest there two observations of member group (treated: off support), not qualified to be included in further analysis, thus, 298 total observations are left. Meanwhile, Columns 5, 6, and 7 of Table 3.3. show the comparison of standardized mean characteristics between member and non-member KBAC farmers after propensity score matching. According to the results, there are no significant differences in farmers' characteristics between member and non-members of the scheme, suggesting both groups are credible for outcome variable evaluation. In correspondence with the study objectives, the KBAC scheme was evaluated by examining differences in Average Treatment Effect on Treated (ATT) for each outcome variable, within each sustainability pillar impact between members and non-members. Table 3.4. shows the list of outcome variables exercised as particular pillar impact indicators (column 2), each group's detailed ATT estimation (columns 3 and 4), differences (column 5) and statistical significance of these differences (column 7), as well as the selected outcome variables' robustness (column 8).

In terms of economic impact, the ATT estimation shows statistically significant differences in eight selected economic outcome variables (out of 13) between KBAC scheme members and non-members. These differences include higher coffee yield (1.80 ton/ha), lower coffee cost (4.28 million IDR/ha) and prices (348 IDR/kg), higher coffee profit (26.72 million IDR/ha), and income (26.72 million IDR/ha), lower other-crops income (6.25 million IDR/ha), higher coffee income share (0.14), and improved access to saving facilities (0.13), for members. Meanwhile, in term of social impact, ATT estimation shows three social outcome variables (out of 15) are statistically significant different between KBAC members and non-members. These differences include improved application of record keeping (0.04), access to information (0.13), and gender participation (0.37). Furthermore, in terms of environmental impacts, the ATT estimation shows statistically significant differences in five environmental outcome variables (out of 11) between KBAC members and non-members. These include improved organic pest and disease control (0.12), pruning (0.12), and tillage (0.27) application, as well as lower number of shading trees (-155), and bird species (0.56).

Column 8 of Table 3.4. shows the post estimation tests, where rbounds and mhbounds statistics of most selected outcome variables meet the robustness criteria. In term of economic and environmental impacts, the rbounds and mhbounds statistics of all selected outcome variables are statistically significant, implying the economic and environmental impacts are due to KBAC participation treatment effects, and are not

affected by unobserved factors. Similarly, the social impact counterpart shows all outcome variables are due to treatment effect and are not influenced by unobserved factors.

Table 3.3. Propensity score matching estimation

Characteristic variables	Mean before PS matching			Mean after PS matching			Probit estimation of participation		
	Member	Non-member	P-value	Member	Non-member	P-value	Coefficient	S.E.	Marginal Effect
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Household characteristics									
Age HH (years)	48.83	49.17	0.820	48.79	48.50	0.840	0.140**	0.060	0.050**
Age HH, squared (years)	2,493	2,589	0.520	2,490	2,548	0.820	-0.001***	0.000	-0.001***
Family size	2.92	2.82	0.400	2.89	2.99	0.490	-0.030	0.080	-0.010
Education HH [a]	2.82	2.82	0.970	2.83	2.83	0.990	0.000	0.060	0.000
Gender HH (dummy)	0.99	0.97	0.280	0.99	0.99	0.980	0.340	0.760	0.130
Marital Status HH [b]	1.05	1.15	0.150	1.05	1.08	0.630	-0.150	0.170	-0.060
Experience (years)	19.31	18.21	0.410	19.16	19.99	0.560	0.070**	0.030	0.030**
Experience, squared (years)	478	470	0.900	473	517	0.510	-0.001**	0.000	-0.001**
Farm characteristics									
Off farm activity (dummy)	0.33	0.37	0.510	0.34	0.34	0.970	-0.080	0.170	-0.030
Past land size (Hectare)	1.17	0.85	0.000	1.16	1.23	0.670	0.130*	0.070	0.050*
Coffee land ownership [c]	2.72	2.13	0.070	2.24	2.38	0.240	0.010	0.030	0.004
Tree age (years)	8.71	8.56	0.450	8.70	8.54	0.470	-0.270	0.290	-0.100
Tree age, squared (years)	79.14	75.72	0.350	79.04	75.63	0.430	0.010	0.020	0.010
Accessibility									
Time to input market (minutes)	16.41	15.89	0.770	16.57	17.47	0.690	-0.010	0.010	-0.002
Time to output market (minutes)	25.00	18.09	0.000	24.12	22.71	0.590	0.020***	0.010	0.010***
Number of observations	114	186		112	186			298	
Log likelihood								-180.080	
LR chi2 (15)								38.270	
Prob. > chi-squared								0.001	
Pseudo R-squared								0.090	

a. Education of household head: 1: Did not pass elementary school, 2: Elementary School/Equal, 3: Primary School/MTs, 4: Junior high school/MA, 5: D1/D2/D3 (Diploma), 6: Bachelor, 7: Never go to school.

b. Marital status: 1: Married, 2: Divorced, 3:Widowed, 4:Single

c. Land ownership: 1: Freehold, 2: Customary rights, 3: Leasehold

P-values are based on t-test of standardized mean differences in selected variables between member and non-member group.

* Significant at 10%; ** significant at 5%; and ***significant at 1%.

Source: author's own calculation.

Table 3.4. Average treatment effect on treated estimation

No.	Outcome variables	Average Treatment Effect on Treated (ATT)					rbounds / mhbounds
		Member	Non-member	Difference	SE	T-stat	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Economic outcomes						
1	Coffee yield (ton/ha)	3.67	1.87	1.80	0.65	2.77***	1.00 > ***
2	Coffee cost (million IDR/ha)	5.82	10.10	-4.28	1.90	-2.25**	1.00 > ***
3	Coffee prices (IDR/kg)	7,205	7,554	-348	179.00	-1.94*	1.00 > ***
4	Coffee profit (million IDR/ha)	36.68	5.67	31.00	16.08	1.93*	1.00 > ***
5	Coffee income (million IDR/ha)	42.50	15.78	26.72	16.16	1.65*	1.00 > ***
6	Other-crops income (million IDR/ha)	8.96	15.21	-6.25	1.98	-3.14***	1.00 > ***
7	Off-farm income (million IDR)	8.35	13.72	-5.37	3.30	-1.63	1.00 > ***
8	Coffee income share (ratio)	0.34	0.20	0.14	0.04	3.90***	1.00 > ***
9	Hired worker (person)	1.58	1.33	0.25	0.36	0.71	1.00 > ***
10	Coffee plot size (hectare)	0.85	0.91	-0.07	0.10	-0.65	1.00 > ***
11	HH expenditure (million IDR)	56.72	54.29	2.42	5.75	0.42	1.00 > ***
12	Access to credit (dummy)	0.46	0.44	0.03	0.07	0.43	2.20 > ***
13	Access to saving (dummy)	0.37	0.24	0.13	0.06	2.13**	1.00 - 1.20 ***
	Social outcomes						
1	Leadership (dummy)	0.13	0.09	0.05	0.04	1.09	1.00 - 1.05 *
2	Record keeping (dummy)	0.04	0.01	0.04	0.02	1.67*	1.00 - 1.10 *
3	Access to information (dummy)	0.83	0.69	0.13	0.06	2.24**	1.00 ***
4	Access to sanitation (dummy)	0.88	0.82	0.06	0.05	1.06	1.00 - 1.10*
5	Access to drinking water (dummy)	0.61	0.61	0.00	0.07	0.03	1.45 > ***
6	Access to electricity (dummy)	0.92	0.68	0.23	0.05	4.37***	1.00 > ***
7	Quality of resident (dummy)	0.86	0.93	-0.07	0.04	-1.56	1.55 > ***
8	Quality of roof (dummy)	0.32	0.30	0.02	0.06	0.27	1.50***
9	Number of rooms (rooms)	3.79	3.71	0.07	0.17	0.43	1.00***
10	Children education (dummy)	0.52	0.50	0.01	0.07	0.20	1.45*
11	Gender participation (dummy)	0.53	0.15	0.37	0.06	5.94***	1.00 > ***
12	Trust (dummy)	0.88	0.86	0.02	0.05	0.39	2.35 > *
13	Commitment (dummy)	0.73	0.70	0.03	0.06	0.44	2.40 > ***
14	Satisfaction (dummy)	0.63	0.54	0.09	0.07	1.31	2.40 > ***
15	Cultural value (dummy)	0.78	0.79	-0.01	0.06	-0.20	2.05 > *
	Environmental outcomes						
1	Soil analysis (dummy)	0.29	0.38	-0.08	0.07	-1.27	1.35 > ***
2	Organic fertilizers (dummy)	0.95	0.97	-0.02	0.03	-0.78	1.70 > *
3	Organic PDC (dummy)	0.58	0.46	0.12	0.07	1.72*	2.50 > ***
4	Pruning (times/season)	1.19	1.07	0.12	0.07	1.68*	1.00 > ***
5	Tillage (times/season)	1.23	0.97	0.27	0.10	2.55***	1.00 > ***
6	Mulching (times/season)	0.53	0.47	0.06	0.07	0.87	1.80 > ***
7	Contour ridge (dummy)	0.57	0.49	0.08	0.07	1.15	1.00 - 1.05 **
8	Recycling (dummy)	0.76	0.73	0.03	0.06	0.47	2.25 > ***
9	Shading trees (trees/ha)	438	593	-155	81.17	-1.92*	1.00 > ***
10	Birds species (species/ha)	3.65	3.08	0.56	0.23	2.51**	1.00 > ***

* Significant at 10%; ** significant at 5%; and ***significant at 1%.

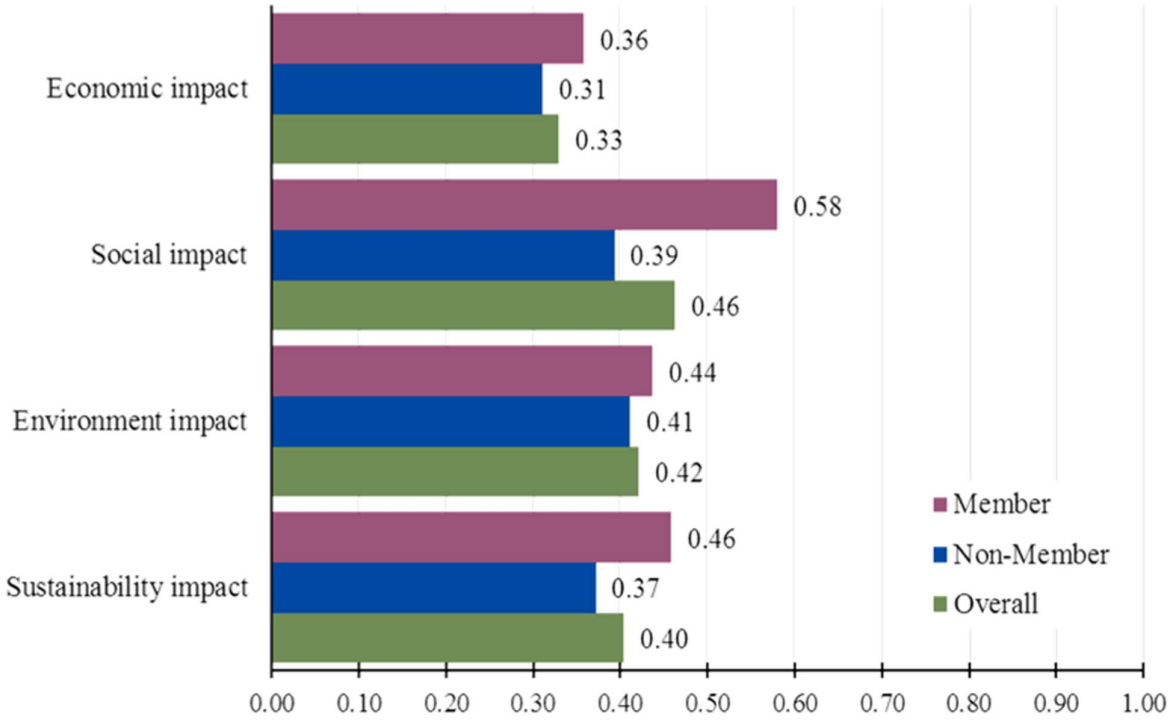
Source: author's own calculation.

3.3.3. Indexes of Sustainability Impact

The sustainability impact indexes were developed to evaluate the KBAC scheme's sustainability impacts, composite of these sustainability outcome variables with statistically significant ATT differences between members and non-members. Based on the

results, KBAC member farmers experience higher economic and environmental impact (0.36 and 0.44, respectively), compared to non-member counterparts (0.31 and 0.42, respectively). Similarly, KBAC member farmers experience higher social impact (0.49), compared to non-member counterparts (0.30). Subsequently, each coffee farming weak and strong sustainability impact was evaluated, using 0.5 index values as a threshold. To some extent, the KBAC scheme contributed to higher economic, social, and environmental sustainability indexes for member farmers. However, the estimation results indicate weak sustainability impact in all three pillars.

Figure 3.3. Indexes of sustainability impact of KBAC scheme



* t-test on all index differences between member and non-member are significant at 1%.

Source: author's own calculation.

3.3.4. Discussion

3.3.4.1. The Economic Impact Assessment

The ATT estimation results indicates some economic impact of the KBAC scheme on member farmers, including advancement in farming practise, leading to higher coffee yield and cost efficiency. To some extent, the results also confirm this advancement in farming practise leads to higher profit and coffee farming income, in the long run. The economic impacts of increased farm productivity and efficient cost are considered more

tangible, compare to other economic impact, as these are mostly determines by pre-harvest input and activities. Therefore, the KBAC scheme's economic impact driven within the post-harvest periods are probably not as favourable, compared to pre-harvest periods. Based on the results, member farmers received lower coffee prices in the market. These findings underpinned previous studies by Neilson *et al*., (2018) and Jaya, *et al*., (2014), emphasizing GIs coffee farmers received lower price for products. However, the findings are in contrast to several previous studies, for instance, Tregear *et al*., (2016) and Teuber *et al*., (2010) emphasizing the membership of GIs schemes ought to lead to economic security, and not only managed to lower production costs, but also ensured premium prices, compared to non-member farmers. Therefore, benefits throughout the economic impact pathways, as expected in the conceptual framework, particularly through post-harvest relevant activities, have probably been established as institutionalized, within the KBAC scheme. In this regard, this is attributable to the trade partnership developed by member farmers, marketing cooperative establishment by the CGIP, or initiation of commitment to trades activities.

In addition, the findings also indicate the existence of alternative marketing channels to the KBAC's. The members most likely experienced a diminishing economic impact, as MOTRAMED and the partnership within KBAC ended in 2008[8]. Therefore, numerous farmers sold coffee individually, or collectively, through an alternative chain under the scheme, or even through non-certified market. Further investigation during the survey showed about 63% of farmers, both members and non-members, currently sell cherry beans to local collector, while 23% sell to middlemen, 8% sell directly to local exporters and only 11% sell to CGIP Subak Abian, the certified chain. Thus, non-certified chains offered more favourable economic advantages, for instance, premium prices and higher market opportunity, and consequently, attracted farmers. Through these alternative chains, farmers also have the opportunity to receive credit facilities as well as advance payments, and these are probably not available through the certified chain. Wijaya *et al*., (2017) described these facts as a conflict of interest among actors within KBAC supply chain, eventually causing sub optimal economic impact of participation in the scheme.

[8] MOTRAMED is a collaborative partnership program between the Indonesian Coffee and Cocoa Research Institute (ICCRI) and the International Cooperation Centre on Agrarian Research for Development (CIRAD), supported by other stakeholders including local and provincial government, coffee exporters, local roasters, and the French Embassy, to develop a sustainable agriculture of the Arabica coffee of Kintamani scheme.

Furthermore, Wijaya *et al*., (2017) underlines conflict of interest also causing inefficiency in production and quality control, as well as marketing under the KBAC scheme. Similarly, *Jena et al*., (2012) and Weber (2011) stated the conflict of interest in non-sustainable coffee schemes, where premium price is often earned at cooperative level and only actively participating member farmers are able to receive these benefits (Jena *et al*., 2012; Weber, 2011).

In addition to these findings, the ATT estimation also showed member farmers received lower income from other crops and higher coffee income share. This indicates member farmers more specialized at coffee farming not only compare to other on-farm income (e.g. secondary crops like tangerine, avocado, or vegetables) but also to off-farm income, aggregately. About the KBAC scheme, as results of the specialization, the coffee farming practise has been conducted efficiently, as indicated by higher coffee yield and lower cost. However, the specialization also indicates member farmers' dependency on income pathways (input, activities, and outputs) within pre- as well as post-harvest periods, where uncertainty in coffee bean prices within the market tend to expose member farmers to higher risk of losses. Conversely, non-member farmers are less dependent on coffee, and therefore have an alternative on-farm source of income, for instance, tangerine farming. An in-depth discussion with respondents disclosed substantial decline in the coffee's prices compensated with increases in the tangerine's prices occurred in 2000 and 2012. Consequently, numerous farmers eventually shifted to tangerine farming.

Furthermore, the KBAC scheme is also expected to contribute to the member farmers' improvement, in term of access to finance, based on two outcome variables exercised accordingly, access to credit as well as saving facilities. According to previous empirical studies (Ruben & Fort, 2012; Ruben & Zuniga, 2011; Rijbergen *et al*., 2016), participating in coffee schemes is argued to lead to a rise in source of finances (represented by access to credit facilities) and increase in financial literacy (represented by access to saving facilities). However, ATT estimation results show member and non-member KBAC farmers only differ statistically significantly in terms of access to saving. This implies KBAC membership probably provides members with improved financial literacy of member farmers but not necessarily with improved source of finance.

3.3.4.2. The Social Impact Assessment

Following the economic impacts, the scheme is also expected to deliver social impacts generally through improved farmers' capacity building, living standards, and contribution to KBAC organizational development. In terms of capacity building, the results show statistically significant ATT difference between member and non-member farmers in record keeping activities. This finding is in line with previous studies, arguing capacity buildings are associated with the coffee scheme, meaning record keeping activity, agronomic and managerial skill (Vellema *et al*., 2015; Bose *et al*., 2016). However, the ATT results also indicate only a small portion of farmers, both KBAC member and non-member, actually implement record keeping activities. These facts also possibly explained the reasons for both farmer groups' relatively low access to credit facilities. Generally, capacity buildings are directly and indirectly improved by participating in coffee schemes. Institutions within the scheme (for instance, cooperatives and roasted companies) often provide direct capacity buildings to farmers, both before and after accessing scheme, in order to maintain commitment in the scheme (Jena *et al*., 2012). Meanwhile, agronomist NGO or government usually conducts indirect capacity buildings independently to support farmers struggling with the coffee scheme (Valkila 2014; Jurjonas *et al*., 2016).

In terms of standard of living improvement, the result shows member farmers have better access to electricity, compared to non-members. This indicates KBAC scheme participation leads to attitudinal changes in willingness to invest in access to electricity. Thus, improved access to electricity is not always directly provided to KBAC members, but through inputs or activities aimed at strengthening member farmer's capacity and networking opportunities. The availability of sufficient and stable electricity supply in coffee production is crucial for ensuring post-harvest activities, including coffee storage, handling and processing activity.

Furthermore, as another social impact related to living standard, the results show statistically significant ATT difference in access to information between member and non-members. This implies compliance with the KBAC scheme is able to help farmers obtain better understanding on coffee processing, with the capacity to improve coffee productivity. Farmers also received market information and technical skills to develop the businesses. The survey also disclosed *Subak Abians*, other farmers and family, are other important sources of information for farmers. This shows *Subak Abians'* significant role within the community, in distributing knowledge for coffee business development. The

finding is in line with Jena *et al.* (2012) emphasizing capacity building through participation in sustainable schemes leads to improved information and trust in cooperatives. Additionally, social capital and farmer networks generated through education and information sharing are believed to solve the scheme complexity effectively (Vellema *et al*., 2015; Jena *et al*., 2012; Pinto *et al*., 2014).

Meanwhile, non-statistically significant differences show among other outcomes related to member farmers' living standard. These are sanitation, drinking water, quality of residence, and quality of roof or number of rooms in the household. This implies the KBAC scheme does not necessarily provide improved internal capitalization from the coffee production, and this result is partially in contrast with previous findings, stating compliance to sustainability scheme leads to an upgrade in farmers' physical assets, including house investment, improved latrine, piped water, farm processing and equipment units (Ruben & Zuniga, 2009; Ruben & Fort, 2012, Rijbergen *et al*., 2016). As previously showed in the economic impact, member farmers have a better impact in terms of profit making, but not necessarily in access to credit facilities. Member farmers are more specialized on coffee production; therefore, profit is most likely reinvested to maintain coffee farms, pre-harvest and post-harvest, rather than to improve physical assets.

Meanwhile, in terms of non-physical improvement, the results show statistically significant ATT difference between member and non-member farmers, in terms of equal gender participation. This indicates KBAC scheme membership offers higher opportunities for women in the coffee business activity. Further discussion with respondents during the survey disclosed member farmers allow female family members (wives and daughters), to negotiate coffee price with traders. However, Suacana (2016), based on village rules, known as the *awig-awig pakraman*, argues probably have limited role in farming decision-making. In wider perspective, these findings are actually in line with previous empirical studies on international coffee schemes, stating sustainability schemes increase women's role by allowing business control over coffee revenues (Chiputwa & Qaim, 2016; Elder *et al*., 2012; Meekem & Qaim, 2018).

3.3.4.3. The Environmental Impact Assessment

Measuring the KBAC scheme's impact on the broader area (for instance, surrounding forest) was quite challenging, therefore farmers' experience within coffee plot was considered to minimise estimation bias. The results of ATT estimation show

significant differences in several environmental outcome variables. These include the use of organic pest and disease control (PDC), tree pruning and soil tillage practise, as well as number of shading trees and bird species. Two later variables are based on the coffee plot and surrounding area's condition, while the others are more likely related to sustainable agricultural practices within the KBAC participation in KBAC, continually applied by member farmers.

Sustainable agriculture practises developed within the KBAC scheme, are a mixture of local traditional farming practises and several advancements based on the scheme's CoP. Tree pruning and soil tillage are important crop management techniques aimed at coffee productivity optimization. Thus, these findings have twofold implications, and in the first, KBAC scheme participation improves farmer's knowledge as well as experience in sustainable agriculture practises. Similarly, Durand & Fournier, (2017) acknowledge GIs schemes are able to modernise and renew traditional farming practises. However, in the second, pruning and soil tillage tend to endanger the biodiversity and ecosystem. Pruning refers to reducing shades, with the aim to increase yield at the short-term production process. This process, to some extent, causes degradation in the coffee plot and surrounding forest's canopy, with a contribution to biodiversity. Bird species are more diverse in member farmer's plots; therefore, tree pruning has most likely been implemented properly. It complemented with other environment friendly agriculture practises, for instance, implementing organic fertilizer and organic PDC.

Similarly, to some extent, soil tillage has the capacity to threaten earthworms, springtails and insects, considered important for soil structure and decomposition improvement (Moos *et al*., 2017; Sheibani & Ahangar, 2013). These empirical studies also reported tillage reduction tends to increase the population of crucial microorganisms for biomass performance, as well as organic matter. Soil tillage also aims to improve productivity; however, the practise is also traditionally established as part of the KBAC scheme, in less excessive measures. Conversely, Bowen & Zapata (2009) stated GIs scheme in Mexico lead to industrialized agriculture practises and even increased the use of chemical inputs. Thus, considering these two agricultural practices, tree pruning and soil tillage ought to be conducted cautiously in the long run, to avoid the risk of excessive practice, leading to endangered biodiversity and ecosystem. Other environmental outcome showing statistically significant difference between KBAC member and non-members is the use of organic PDC. As described in the previous section, KBAC member farmers are

less likely to implement intercropping, for instance, cultivating tangerine as secondary crop. Further investigation during the survey showed the use of chemical pesticide, is more common for intercropping farms, due to cost efficiency reason. Thus, maintaining organic pesticide use promotes more environmental impact in coffee farming practise.

In addition to these agricultural practices, the results also show a significant impact on the coffee plot and surrounding area. The first variable is number of shading trees within the coffee plot, and in this case, in favour of non-member farmers. Meanwhile, the second variable is number of bird species in the coffee plot and surrounding area, and this is in favour of KBAC scheme members. This is a bit contradictive, but shading and coffee trees actually serve similar roles in terms of providing sanctuary for the bird and other wildlife habitats. Based on the previous section, member farmers are more specialized and more intense in coffee production, and therefore probably have more coffee than 'non-coffee shading trees'. Forbes (2018) and Weintraub (2018) argued coffee plantation, particularly Arabica plantation, attract more bird species into the surrounding environment. Thus, number of shading trees alone is probably unable to represent the KBAC scheme's overall environmental impact. In this regard, the results are in line with Rueda & Lambin (2013), stating sustainable coffee scheme members in Colombia are far more expected to apply environmental practises in terms of shade tree diversity and reforestation, compared to than non-members. Generally, the sustainability indexes show the KBAC scheme has positive impacts on economic, social and environmental aspects of farmers' household, to some extent. All indexes show member farmers enjoy more benefits, compared to non-members. However, closely examining the values of these indexes and respective components shows KBAC schemes are less likely to achieve strong sustainability impacts. As previously elaborated, there is currently more room for development, to provide improved economic, social and environmental impacts.

3.4. CONCLUSIONS

In developing countries, GIs scheme have been widely implemented as an emerging value chain and tools for community development. However, the impacts on farmers' livelihood remain trivial. KBAC is the first Indonesian GIs scheme and the pilot project of other GIs coffee schemes. Thus, the scheme's implementation offers an interesting setup related to global sustainable standard trends, particularly GIs scheme

implementation, giving rise to the study objectives. Therefore, chains of logical changes were developed and sustainability impact assessment was established, based on three pillars, economic, social and environmental, to evaluate comprehensively the KBAC scheme implementation's impact and this assessment highlighted some interesting results.

In terms of economic impact, the results show advancement in farming practices throughout the scheme has led to higher economic impact, including improved coffee yield as well as cost efficiency, and consequently, higher profit and coffee income. However, the economic impact driven within the post-harvest periods are not always as favourable, compared to pre-harvest periods. The results indicate member farmers received lower coffee prices in the market, while other positive impacts show these farmers are more specialized in coffee production. In this regard, KBAC members are also more dependable on the coffee market's dynamics. Furthermore, the results show KBAC participation has a positive impact on access to saving facilities and imply several important facts. First, economic impact of participation in the scheme remains trivial, because participating seems beneficial during pre-harvest periods (for instance, production cost minimization and higher coffee yield) but detrimental in post-harvest periods (for instance, not receiving premium price). Inadequate institutional support, particularly to control and organize post-harvest periods, including managing partnership within the scheme's supply chain, is most probably the cause of these circumstances (Wijaya *et al.,* 2017; Neilson *et al*., 2018; Durand & Fournier, 2017; Belletti *et al*., 2017). Secondly, participation in the scheme; contributes to farmer's access to finance, but only implicates financial literacy and less likely involves financing resources for member farmers. Similar to the post-harvest disadvantages, KBAC members' access to credits has diminished significantly, as MOTRAMED's role as institutional support for the scheme, ended in 2012 (Wijaya *et al.,* 2017).

Meanwhile, in terms of social impact, the results show KBAC participation provides significant impacts on capacity building, access to electricity and information, as well as gender participation, and imply several significant facts. First, participating in KBAC scheme contributes to member farmers' capacity building. However, the rate of implementing these capacity building remains low among member and non-member farmers. Furthermore, the researchers expect to confirm a significant improvement in member farmer's physical assets, for instance, improved residency quality. However, due to inadequate access to credits or other economic reasons, profit and income from coffee

production are most probably reinvested to maintain coffee farms, rather than improve physical assets. The scheme also contributes to a non-physical standard of living, meaning access to information, as well as gender participation, as KBAC membership offers higher opportunities for women in coffee business.

In terms of environmental impact, the result indicated significant differences between KBAC members and non-members, particularly in maintaining sustainable agriculture practices (organic PDC, tree pruning, and soil tillage) as well as the coffee plot and surrounding area's biodiversity as well as ecosystem, and these findings also imply several interesting facts. First, pruning and soil tillage practices convey risks of endangering the biodiversity and ecosystem. However, the practices are also empirically proven to have a positive impact on the environment, with proportional and proper implementation. In addition, impacts in term of shading trees are in favour of non-members. However, member farmers are more specialized in coffee trees, meaning KBAC members have equal or even more shading functionality, compared to non-member counterparts.

Generally, this study highlights several significant impact of KBAC participation on all three SIA's pillars. Thus, the findings mentioned above have multiple policy implications, and there is room for improvements in the scheme's economic, social, as well as environmental impacts. However, whether the findings represent developing or diminishing states is to be resolved through institutional arrangement eventually. Thus, two alternative development strategies exist to strengthen the scheme's sustainability impact. The first comprises revitalizing the CGIP and partnership in order to administer the CoP, considering terroir rule, reinstating market-based needs, and KBAC scheme certified value chain as recommended by CGIP and partnership revitalization is considerably a crucial foundation for implementing the quality control mechanism in KBAC labelling system (Neilson *et al*., 2018; Durand & Fournier, 2017). The second alternative is to develop a new institutional arrangement, in public and private partnership for instance: to optimise each actor's role in the KBAC chain, through the spirit of marketing partnership (Wijaya *et al.,* 2017); in a bid to avoid problems of coordination and functional inefficiency in the supply chain (Durand & Fournier, 2017; Belletti *et al*., 2017), and consequently; aim to optimising product pricing and market recognition for the scheme (Neilson *et al*., 2018; Torok et al., 2020). The collaborative partnership in case of KBAC scheme through MOTRAMED successfully introduced and implemented sustainable farming methods for

coffee. However, the program is probably less successful in marketing arrangement, particularly with the single door market implementation (monopolistic chain), through a single exporter (Neilson *et al*., 2018). Similar issues also emerged in the case of CGIP cooperatives. To select the most suitable development strategy, all stakeholders (governments especially district government, private institutions, coffee actors) are therefore expected to promote the scheme by emphasizing KBAC's three sustainability impact pillars.

Several important lessons were also learned from this study. First, developing an empirical chain of changes framework based on the ToC is quite challenging. Therefore, rules, goals, agreements and all supporting information within any sustainable scheme need to be carefully defined and structured, according to a chain of logical framework, including inputs, activities, outputs, outcome and impacts. Furthermore, additional empirical literature and in-depth interviews during data collection is bound to facilitate the defining and structuring chain of changes step. Therefore, the reliable variables used for propensity score estimation and robust estimation results in the matching activity, are easily obtained. Therefore, considering the difficulties in measuring environmental impacts, further studies are suggested to consider long-term monitoring variables, in order to measure changes in sustainability outcomes.

CHAPTER IV

MORAL DEVELOPMENT AND PSYCHOLOGICAL ATTACHMENT
IN ETHICAL COMMITMENT TO SUSTAINABLE FARMING PRACTICES:
THE CASE OF ARABICA BALI KINTAMANI

Abstract

In the global coffee industry, ethical sourcing consideration has motivated the development of sustainability coffee schemes. Therefore, farmers' ethical commitment to sustainable farming practices plays an important role for this development. However, ethical commitment-related studies are mainly focused on traders and consumers' point of views. Thus, there is a challenge to incorporate moral development and physiological attachment, in the attribute of ethical commitment. The Kintamani Bali Arabica Coffee (KBAC) scheme offers an empirical case to fill these gaps. This study therefore aims to analyse the contribution of KBAC participation, moral development and physiological attachment, in farmers' ethical commitment to sustainable farming practices. Using Partial Least Squares Structural Equation Modelling, the estimation was conducted based on primary data from farmers' household survey involving over 300 respondents in Bangli Regency, Bali, and several interesting findings were discovered. According to the study results, investment size, expected relationship, self-identity, satisfaction, locus control and quality alternative, significantly influence ethical commitment in implementing farming practices. However, simply participating in the KBAC scheme does not necessarily imply a significant effect on farmer's ethical commitment. The overall findings suggest several policy implications, including the scheme's network's significance in supporting farmers to initiate substantial investment, redeveloping KBAC institutional arrangement, and maintaining market channels, to assure the benefit of sustainable farming practices.

Keywords: ethical commitment, sustainable farming, interactionist model, investment model scale partial least squares.

4.1. INTRODUCTION

In the coffee industry, global ethical sourcing consideration has been a crucial issue over decades (Marx *et al*., 2015; Dietz *et al*., 2019; UNFSS, 2018). The term "ethical sourcing" refers to the business activities covering economic, social and environmental sourcing responsibility (Wieland *et al*., 2016; Kim *et al*., 2016; Blowfield, 2004). Thus, ethical sourcing in coffee industry is imbedded within each value chain, from farming, harvesting, to marketing activities, and eventually, in each ready-to-serve cup of coffee. Therefore, each party within each value chain ought to take responsibility for ethical processes in the corresponding activity. According to Giovannucci & Ponte (2005), the consideration on ethical sourcing was initiated by northern countries and has been implemented globally through a new regulatory instrument, sustainability schemes.

These schemes aim to assure global sustainable coffee production and consumption, by targeting economic, social and environmental goals (Giovannucci *et al*., 2013; Negi & Perez-Pineda, 2020). Examples of prominent international sustainable coffee schemes include Fairtrade International, Global Coffee Platform (4C), Rainforest Alliance and Organic (Dietz *et al*., 2019). In addition, the issues of ethical consideration have also been adopted by other specialty coffee scheme, for instance, Geographical Indication of Origins (GIs)[9]. Generally, these sustainability schemes are intended to provide support, guidance and assurance farmers on how to meet their ethical responsibility in implementing and maintaining sustainable farming practices, during production. Thus, farmers' ethical commitment in implementing and maintaining sustainable farming practices, is an important key in sustainability scheme development.

However, empirical studies on farmers' ethical commitment particularly in implementing and maintaining sustainable farming practices are sparse. Furthermore, studies on ethical commitment mostly focus on ethical sourcing's traceability aspect, most likely from traders' point of view, as this party interacts directly with consumers (for instance, Cadby *et al*., 2021; Sun, et al., 2017; Mboga, 2017). Meanwhile, other studies focus on sustainable farming, with regards of livestock (Buller *et al*., 2018; Tookes *et al*., 2018; Liem *et al*., 2018). From a theoretical perspective, farmers' ethical commitment to

[9] GIs are defined as the strand of work for specialty coffee. This specifies the specialty coffee's origin to a single country, region, and/or farm, where the quality and reputation are attributable to the region (Article 22.1 of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs) of World Trade Organization)

sustainable farming practices, are hypothetically related to the dynamics of farmers' moral development and psychological attachment. However, only a few studies consider farmers' moral development in sustainable farming practice development (Meijboom & Stafleu, 2016; Cardoso & James, 2011), and this is mainly exercised in agricultural practice studies with utility maximization and planned behaviour as the theoretical foundation (Rajedran *et al*., 2016; Borges *et al*., 2019b). Meanwhile, despite the infrequent occurrence in agricultural studies, psychological attachment is mainly included in studies focusing on business organisation as the theoretical foundation (for instance, Greenbaum *et al*., 2014; Agnihotri & Krush, 2014; Zhang *et al*., 2009) and interpersonal relationships (for instance, Etcheverry *et al*., 2013; Abbasi, 2018; Lemay, 2016; Amirsardari & Khademi, 2019; Carpenter & Tong, 2017).

Kintamani Bali Arabica Coffee (KBAC) offers an interesting case to exercise the research gaps mentioned above. In addition to being the world's fourth largest coffee producer, Indonesia is also home to various specialty coffees. KBAC is the first specialty coffee certified as GIs product in the country. This scheme was developed based on a sociocultural religious philosophy within Balinese society, known as Tri Hita Karana. It means the three reasons for prosperity, which symbolizes the integration of prosperity of human beings and the environment, as well as prosperity toward Gods. KBAC GI's embraces this philosophy as the foundation of the scheme's conduct rules, known as Code of Procedure (CoP). This serves as a code of conduct for the overall value chain, including a set of sustainable coffee farming practices. Thus, farmers' ethical commitment in KBAC scheme is raised in 2 (two) possible forms and these are specifically toward CoP, as well as generally toward sustainable farming practices.

However, farmers' participation rate in KBAC scheme is low and diminishing (Bali Provincial Plantation Service, Indonesia Coffee and Cocoa Institute, 2019). This is because the scheme does not always successfully provide economic and social benefits for farmers (Neilson & Aklimawati, 2018). Furthermore, farmers eventually lose commitment to sustainable farming practice as regulated in CoP, after receiving technology and knowledge (Wijaya *et al*., 2017; Durand & Fournier, 2017). Durand & Fournier (2017) also showed GIs farming has been developed based on a possibly different expert practice, compared to traditional farming practice.

In terms of the KBAC scheme's empirical evaluations, inadequate understanding on ethical factors for explaining farmers' commitment probably corresponds to low and

diminishing participation. Also, no previous particular studies on farmers' ethical commitment to sustainable farming practices exist; therefore, this study aims to fill these gaps, in order to achieve the following objectives below.

(1) Understand KBAC participation's contribution to farmers' ethical commitment to sustainable farming practices.
(2) Discover farmers' moral development and psychological attachment's contributions to farmers' ethical commitment to sustainable farming practices.
(3) Gain knowledge on the policy implication of farmers' ethical commitment to KBAC scheme development.

Based on these objectives, a comprehensive model of Investment Model Scale (IMS) of Rusbult (1980) and interactionist model of Trevino (1986), was developed in this study. Rooted from the Thibaut & Kelley (1959) interdependence theory, IMS places the commitment as a central process of decision-making, including persistent and psychological attachment in the relationship (Rusbult *et al*., 1998). The interactionist model offers an explanation of how moral development (ethical orientation and self-identity), locus control, situational factors as well as individual characteristics explain behaviours in considering appropriateness (right and wrong) position as well as a certain ethical dilemma (Trevino, 1986). In this study, section two elaborates the research material and methods, while sections three and four present the estimation results and the discussion of results, respectively. Meanwhile, section 5 presents the conclusion and policy recommendations.

4.2. MATERIALS AND METHODS

4.2.1. Conceptual Framework

Figure 4.1. shows the overall hypothetical relationships described below, denoting the study's conceptual framework. In this study, the variable of interest is farmers' ethical commitment to implement and to maintain sustainable farming practices (referred to as commitment to sustainable farming practices, henceforth). Based on the CoP, these practices include manure and organic pesticide use, relying on bean quality, implementing wet processing, applying pruning, as well as crop covering (Mawardi, 2009a; MPIG, 2011), and have also been implemented by non-members of KBAC coffee scheme. This is because the practices in KBAC CoP were adopted from local farmer communities'

sociocultural religious philosophy (member and non-member of KBAC), known as the *Subak Abian*. In addition, an integrative ethical commitment model was developed based on the theories of investment model scale (IMS) as well as ethical interactionist, in correspondence with this study's objectives. IMS outlines ethical commitment based on the interdependence concept, defines people's reason to persist in a relationship (Thibaut & Kelley, 1959; Rusbult *et al*., 2011; Rusbult *et al*., 1998). In this regard, commitment explains the process of an individual's persistence and psychological attachment in the relationship (Rusbult, 1980; Rusbult, 1983).

Therefore, an increase in ethical commitment is assumed to be followed by an increase in dependency, and this corresponds to three factors. First, the satisfaction level is a degree of fulfilment in receiving outcomes, where, a rise in people satisfaction implies increased people dependency. Thus, satisfaction level rises whenever a relationship fulfils higher needs, including friendship, belonging, and security (Rusbult *et al*., 1998). Secondly, the quality of alternative is defined as a degree of potential outcomes from alternative relationship (Etcheverry *et al*., 2013; Rusbult *et al*., 1998). This explains the current relationship's extent towards an alternative, for instance, like a broader connection between friends, and a closer connection between family members. Third, investment size explains to what extent resources, access as well as desire allocated for outcomes, and these are possibly lost in cases where the relationship ends, for instance, spending time and energy for friendship, sharing resources and values, or keeping personal information related to a partner (Rusbult *et al*., 1998; Etcheverry *et al*., 2013).

Previous empirical studies offer a foundation for developing the model. Most studies applied the IMS model to a type of interpersonal relationships (for instance, Etcheverry & Agnew, 2004; Etcheverry *et al*., 2013; Durko & Petrick, 2015; Lemay, 2016), religious commitments (for instance, Wasselmann *et al*., 2015), marital commitments (for instance, Amirsardari & Khademi, 2019), as well as friendships (for instance, Carpenter & Tong, 2017; Segal & Fraley, 2016). The IMS model has also been used to obtain insights into brand loyalty (Azizi & Javidani, 2015; Chiu & Won, 2016; Menidjel *et al*., 2020), inter-organisational relationships (Nyaga *et al*., 2010; Pollack *et al*., 2013), marketing (Nusair *et al*., 2010; Nusair & Hua, 2010; Nusair *et al*., 2011) as well as environmental behaviour (Davis *et al*., 2009; Davis *et al*., 2011).

Thus, considering these three factors in the IMS, higher satisfaction and investment, as well as lower quality alternative, hypothetically lead to higher ethical

commitment. Similarly, satisfaction is defined as the capacity of certain aspects from KBAC networks, to fulfil farmers' needs. These aspects include participation in organisation, access to information, training incentives, financial access, transaction services, and market channelling. Meanwhile, quality alternative refers to any existing relationship other than within KBAC scheme, for example, access to other attractive coffee channels. The investment size is defined as the amount farmers have invested in the relationship and this is evaluated both financially and emotionally, by the cost to access, emotional involvement as well as the relationship with the other members within the KBAC scheme. Therefore, the following hypotheses were tested in this study.

H1. Farmers' satisfaction in the current network has positive effect on their ethical commitment to sustainable farming practices.

H2. Farmers' quality alternative has negative effect on their ethical commitment to sustainable farming practices.

H3. Farmers' investment size has positive effect on their ethical commitment to sustainable farming practices.

Lemay Jr. & Spongberg, (2015) argued that the expectation towards a future relationship (referred to as expected relationship, henceforth) is crucial for determining commitment, as people tend to be more motivated not only by rewards already obtained, but also by future rewards. In addition, Lemay Jr. (2016) tested an IMS model extension to predict the relationship of future satisfaction and commitment, as well as the pro-relationship with other independent variables in the model. The study showed that a rise in people's hope to be satisfied in a relationship's future implies an increasing commitment in the relationship (Lemay Jr, 2016; Baker *et al*., 2017). In this regard, the relationship's current satisfaction influenced the expected satisfaction and therefore indirectly influences ethical commitment. Thus, arguably in this study's case, farmers have higher investment size and/or lower quality alternative and are therefore bound to have higher expectation on the future relationship. Thus, the hypotheses below will be exercised in this study.

H4. Farmers' expected relationship has positive effect on their ethical commitment to sustainable farming practices.

H5. Farmers' satisfaction in current networks has positive effect their expected relationship.

H6. Farmers' quality alternative has negative effect on their expected relationship.

H7. Farmers' investment size has positive effect on their expected relationship.

Participation in the KBAC scheme or other coffee farmer networks (behavioural adoption, hereafter) arguably influences commitment to sustainable farming practices. Meanwhile, behaviour adoption also arguably influences this commitment indirectly through satisfaction, quality alternative and investment. Thus, hypothetically:

H8. Farmers' behaviour adoption has positive effect on their ethical commitment to sustainable farming practices.

H9. Farmers' behaviour adoption has positive effect on their satisfaction in current networks.

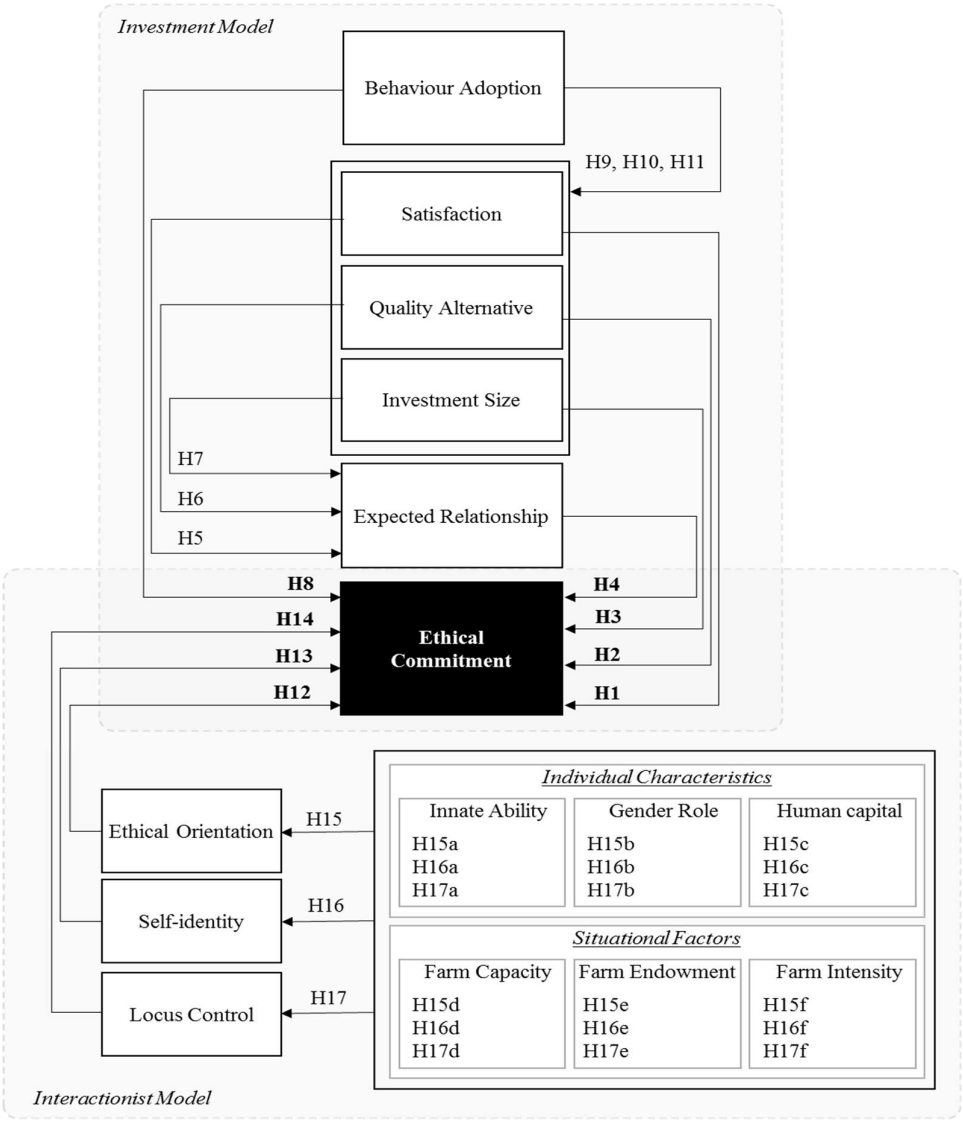
H10. Farmers' behaviour adoption has negative effect on their quality alternative.

H11. Farmers' behaviour adoption has positive effect on their investment size.

Subsequently, an interactionist model was used to explain the relationship of ethical consideration in decision-making, for commitment to sustainable farming practices. This model defines the interaction for the cognitive process of moral development, situational factors and individual variables on decision-making (Trevino, 1986). As developed from the Rest's four components analysis of the individual ethical decision process (Rest, 1986), as well as Kohlberg's model of moral decision-making (Trevino *et al*., 1986), moral development is explained through ethical orientation and self-identity (Trevino *et al*., 2006; Reynold, 2006; Cardoso & James Jr, 2011; Sulemana & James, 2014). In terms of philosophical framework for decision processing, ethical orientations are categorised into three determinations. First, utilitarianism, where ethical orientation is determined by an action's rightness and the wrongness; depending on overall social benefit and outcome-based perspective (Reynolds, 2006; Eggleston, 2012).

Meanwhile, the second is deontology or duty-based ethics, is defined based on Kant's non-consequentialism theory, as one's expected actions with respect for others' rights and consistency with reasoned duties (Stanford Encyclopaedia of Philosophy, 2016; Misselbrook, 2013). In this regards, ethical orientation is determined by an action's net benefit to society, without intruding on moral laws, rules, duties and personal rights. The third is the theory based on principles of justice, referring to fairness as well as risk and benefit's ideal distributions (Cardoso & James Jr, 2011). Thus, ethical orientation is determined by the fairness distribution of an action's benefit to society.

Figure 4.1. Conceptual framework of ethical commitment



The interactionist model has been previously applied in studies related to business organisation (for instance, Trevino *et al*., 2006; Zhang *et al*., 2009; Agnihotri & Krush, 2015; Greenbaum *et al*., 2014) as well as agriculture production (Cardoso & James Jr, 2011; Sulemana & James, 2014; James, 2005). Furthermore, limited empirical studies utilised ethical framework, especially to determine farmers' ethical decision-making in agriculture practices. Majority of the studies applying ethical framework prove farmers are considered utilitarian (Bassey *et al*., 2011; Morton & Weng, 2009; Vainio & Kauppinen, 2006; Abaidoo & Dickinson, 2002). A study by Cardoso & James (2011) showed a positive relation of farmers' decisions on a rights-based policy with chemicals used and polled, rather than horned cattle practices. In addition, industrialisation on agriculture

production resulted in farmers' behaviour change from ethical orientation on farming to the economic orientation (James, 2005; Hendrickson & James, 2005). Based-on the theoretical and empirical studies mentioned above, the hypothesis below, regarding interaction of ethical orientation to commitment, was developed.

H12. Farmers' ethical orientation has positive effect on their ethical commitment to sustainable farming practices.

The second moral development in interactionist model is self-identity. This represents a salient and self-concept reflecting an person's ability to see one's self in fulfilling a specific social role and personality (Rise *et al*., 2010; Urminsky *et al*., 2014). According to McGuire *et al*., (2012) as well as Sulemana & James (2014), self-identity among farmers consists of being a conservationist, productivist, technology oriented, traditionalist, optimist and pessimist. A conservationist farmer has particular concern over environment, while a productivist perceives economic productivity and employment as important. In terms of agricultural practice modernization, a technology-oriented farmer most probably has particular concern over innovation and technology used, whereas a traditionalist tends to preserve traditional and cultural values in agricultural practices. Meanwhile, optimist and pessimist define as farmers' perception towards sustainable farming practices.

Several studies showed that self-identity significantly influences decision making in agriculture practices. These studies mostly applied cognitive models of organisational behaviour, for example theory technology acceptance model (TAM) (Sommeren, 2019), theory of planned behaviour (Borges *et al*., 2019a; Wauters *et al*., 2014; Terano *et al*., 2015), theory of interpersonal behaviour (Moody & Siponen, 2013). Sulemana & James (2014), applying the interactionist model, argued conservationist identity has a positive influence on farmers' ethical attitude regarding environmental management practices. Meanwhile, McGuire *et al*., (2012), stated that a conservationist identity contributes to shape farmers' attitude as well as environmental behaviour. Based on these studies and empirical reviews the hypothesis below was conducted.

H13. Farmers' self-identity has positive effect on their ethical commitment to sustainable farming practices.

In line with Trevino (1986) and Rotter (1966), the locus control's influence on the commitment to sustainable farming practices was also considered. Locus control relates to

individual perceptions about the degree of control over life events, beliefs, fate and destiny. Sulamena & James (2014) showed control over life has a positive influence on farmers' environmental behaviour. Therefore, the hypothesis below was exercised.

H14. Farmers' locus control has positive effect on their ethical commitment to sustainable farming practices.

Ethical orientation, self-identity and locus control are personally developed, but are also often influenced by individual and environment. Similarly, attitude from theory of planned behaviour (Ajzen, 1991) indicates beliefs and evaluation of outcomes are associated with certain objects or characteristics. Thus, the individual characteristics and situational factors were connected with ethical orientation, self-identity as well as locus control. Individual characteristics include innate ability, gender role and human capital investment, while farm capacity, farm endowment and input intensity represent situational factors. The hypotheses below were therefore exercised.

1. Individual characteristics and situational factors influence on ethical orientation:

   H15a. Farmers' innate ability has positive effect on their ethical orientation.

   H15b. Farmers' gender role has positive effect on their ethical orientation.

   H15c. Farmers' human capital investment has positive effect on their ethical orientation.

   H15d. Farmers' farm capacity has positive effect on their ethical orientation.

   H15e. Farmers' farm endowment has positive effect on their ethical orientation.

   H15f. Farmers' farm input intensity has positive effect on their ethical orientation.

2. Individual characteristics and situational factors influence on self-identity:

   H16a. Farmers' innate ability has positive effect on their self-identity.

   H16b. Farmers' gender role has positive effect on their self-identity.

   H16c. Farmers' human capital investment has positive effect on their self-identity.

   H16d. Farmers' farm capacity has positive effect on their self-identity.

   H16e. Farmers' farm endowment has positive effect on their self-identity.

   H16f. Farmers' farm input intensity has positive effect on their self-identity.

3. Individual characteristics and situational factors influence on locus control:

   H17a. Farmers' innate ability has positive effect on their locus control.

   H17b. Farmers' gender role has positive effect on their locus control.

   H17c. Farmers' human capital investment has positive effect on their locus control.

H17d. Farmers' farm capacity has positive effect on their locus control.

H17e. Farmers' farm endowment has positive effect on their locus control.

H17f. Farmers' farm input intensity has positive effect on their locus control.

4.2.2. Study Design and Sample

In this study, data was collected from coffee farmers, through a field survey in the Kintamani arabica coffee area. The data collected includes farmers' socio-demographic characteristics (for instance, gender, age of household head, education) and farm characteristics (farm size, production as well as altitude). Based on the conceptual framework, farmers were also asked questions corresponding to all latent variables included in the conceptual framework and constructed as direct measurements based-on empirical literatures. The responses on each question measured using five likert-scale options ranging from one (for 'do not agree at all'/ 'very weak'/ 'never') to five (for 'completely agree'/ 'very strong'/ 'very often').

This survey was conducted between March and April, 2019 in Bangli Regency, Bali Province, Indonesia, using a structured questionnaire, as well as the Computer-Assisted Personal Interview (CAPI). A piloting survey was conducted, prior to the field survey, to assure the questionnaire's clarity and consistency. Bangli regency has the largest coffee production, compared to the other four regencies in Bali Province, Indonesia, and was therefore purposively selected as the survey locus (Directorate General of Estate Crops, 2018). In addition, five villages in the regency were randomly selected as the base of farmer households. Subsequently, a total of 300 farmers, both KBAC scheme members and non-members, were selected as respondents for the field survey[10], using the Cochran (1963) formulation for determining sample size with robust estimation.

4.3. RESULTS

4.3.1. Descriptive Statistics

The respondents comprised 114 member and 189 non-member farmers of KBAC scheme, and the sample distribution represents population distribution based on interviews with the key KBAC scheme stakeholders. Table 4.1 shows that farmers' household head responsible for coffee production were majorly male (98.21%), with most of them being

[10] Following Kock & Hadaya (2018), Gamma-Exponential Distribution was also used to determine the minimum sample size corresponding to PLS-SEM analysis requirement, of 200 respondents. Meanwhile, for more robust estimation results, the sample size was calculated based-on Crochcan (1993) formulation.

between 35-54 years old. They have mostly attained only primary school education (35.70%). In addition, each household comprises an average of three members, and most of these members work full time on the self-owned coffee plantation.

Table 4.1. Farmers' characteristics

No.	Descriptions	Proportion (%)		
		Member	Non-Member	Overall Sample
1.	Gender (household head)			
	- Male	99.12	97.31	98.21
	- Female	0.88	2.69	2.00
2.	Age (household head)			
	- 15-24	0.00	0.54	0.33
	- 25-34	5.26	11.83	9.33
	- 35-44	33.33	27.42	29.67
	- 45-54	30.70	23.12	26.00
	- >54	30.70	37.10	34.67
3.	Education (household head)			
	- Never went to school	0.88	6.45	4.30
	- Did not pass primary school	14.91	18.28	17.00
	- Primary school/Equal	33.33	37.10	35.70
	- Junior high school/equal	21.05	13.98	16.70
	- Senior high school/equal	22.81	20.97	21.70
	- D1/D2/D3 (diploma)	2.63	0.54	1.30
	- Bachelor	4.39	2.69	3.30
4.	Marital Status (household head)			
	- Single	0.00	0.54	0.30
	- Married	98.25	94.62	96.00
	- Divorced	0.00	1.61	1.00
	- Widowed	1.75	3.23	2.70
5.	Family members			
	- Less than 3	45.61	48.92	47.67
	- 3 and more	54.39	51.08	52.33
6.	Fulltime farm			
	- Yes	94.74	94.62	94.67
	- No	5.26	5.38	5.33

Source: author's own calculation.

Table 4.2. shows that an average coffee plantation of the sample has an area of 0.94 hectares and an annual coffee bean production of 1.4 tons. This study's sampling moderately represents Arabica coffee farmers in Bangli regency with an average plantation area and annual coffee bean production of 0.87 hectare and 0.33, respectively. In addition, the sample's land ownership status and farming method are majorly customary rights (88.67%) and polyculture cropping, respectively. In these regards, the sample provides a suitable overall representation of Kintamani arabica coffee farmers in Bangli province. These farmers majorly own land by customary rights and apply polyculture cropping method.

Table 4.2. Farm characteristics

Description	Mean Land Size (Ha)	Mean Production (Ton)	Mean Yield (Ton/Ha)	Land Ownership[a]	Cropping Method[b]
1. Member	0.86	2.3	2.67	CRs (84.21%)	PC (89.70%)
2. Non-Member	0.66	0.84	1.27	CRs (91.40%)	PC (96.70%)
3. Overall Sample	0.94	1.4	1.49	CRs (88.67%)	PC (93.70%)
4. Bangli Regency	0.87	0.33	0.38	CRs	Polyculture

a. Land ownership: customary rights (CRs), leasehold (LH), parent/free rent.
b. Cropping methods: monoculture (MC), and Polyculture (PC). In PC, coffee plants are intercropped with tangerine, avocado, chili, banana, maize, or cabbage.

Source: author's own calculation and Statistics Bangli, 2019.

Based on the study's focus, farmers were asked particular questions regarding individual commitment to sustainable farming practices. Table 4.3. presents the aggregate responses across farmers and farm characteristics. Both farmers' age groups, show strong commitment to sustainable farming practices for about 74.71 % and 74.41% of farmers in productive (15-64 years old) and elderly ages, respectively. In terms of gender, male respondents showed higher commitment (75.51%), compared to female counterparts (33.33%). Meanwhile, farmers with formal education showed stronger commitment (75.84%) compared to counterparts (70.32%). In term of farm capacity, respondents with higher farm capacity were more likely to exhibit stronger commitment (83.33%) compared to counterparts with lower capacity (71.62%). Similarly, farmers with higher farm intensity showed stronger commitment (77.67%), compared to counterparts with lower intensity (73.10%). Conversely, farmers with higher altitude plantations were more likely to exhibit weaker commitment to sustainable farming practices (57.38%), compared to counterparts with lower altitude plantations (78.08%).

Table 4.3. Farmers' responses in commitment

No.	Characteristics	Commitment Responses Proportion (%)				
		Strongly weak	Weak	Moderate	Strong	Very Strong
1.	*Age groups*					
	15-64	0.00	0.78	24.51	54.09	20.62
	> 64	0.00	0.00	25.58	60.47	13.95
2.	*Gender*					
	Male	0.00	0.68	23.81	55.44	20.07
	Female	0.00	0.00	66.67	33.33	0.00
3.	*Education*					
	School	0.00	0.85	23.31	53.81	22.03
	No school	0.00	0.00	29.69.	59.38	10.94
4.	*Farm capacity*					
	High capacity	0.00	1.28	15.38	57.69	25.64
	Low capacity	0.00	0.45	27.93	54.05	17.57
5.	*Farm altitude*					
	High	0.00	0.00	42.62	52.46	4.92
	Low	0.00	0.84	20.08	55.65	22.43
6.	*Input intensity*					
	High	0.00	0.97	21.36	57.28	20.39
	Low	0.00	0.51	26.40	53.81	19.29

Note: *farm capacity* (high > 0.95 ha, low ≤ 0.95 ha); *farm altitude* (high > 1.300msl, low ≤ 1.300msl); *input intensity* (high > 524 coffee trees, low ≤ 524 coffee trees)

Source: author's own calculation.

Table 4.4 presents the farmers' responses to selected sustainable farming practices. Most farmers showed ethical commitment to apply sustainable farming practices (agree and strongly agree), with few considerable differences between KBAC scheme members and non-members. First, member farmers exhibited slightly higher commitment to sustainable farming practices, except in terms of cherry picking practices.

Furthermore, KBAC members focus on organic fertilizer use, by applying manure as indicated by the highest responses proportion, compared to other sustainable farming practices. In this regard, non-member farmers focus on cherry picking practice in coffee bean harvesting. However, the strongest contrast in sustainable farming practices between KBAC members and non-members was observed in terms of organic or biological pest control use, followed by wet processing technique application. In addition, the lowest commitment to sustainable farming practices within both farmer groups, is seen regarding organic or biological pest control use. These four considerable differences indicate existing variation in ethical commitment to sustainable farming practices between KBAC scheme members and non-members. The following section aims to identify and further scrutinize the extent of these differences in terms of adopting KBAC schemes and other factors contributing to ethical commitment to sustainable farming practice.

Table 4.4. Responses proportion of commitment

No.	Commitment	Responses Proportion (%)				
		Strongly disagree	Disagree	Undecided	Agree	Strongly agree
	Members KBAC scheme					
1	I definitely keep applying pruning	0.00	2.63	26.32	49.12	21.93
2	I will certainly continue to be dedicated to the cherry-picking practice	0.00	3.51	23.68	37.72	35.09
3	I am committed to applying manure	0.00	0.88	22.81	37.72	38.60
4	If I have an opportunity, I will committed to the wet processing technique	0.00	1.75	29.82	40.35	28.07
5	I maintain to apply crops cover	0.00	5.26	28.95	38.60	27.19
6	I apply organic pesticides/biological control to crops	0.88	11.40	40.35	30.70	16.67
	Non-Members of KBAC scheme					
1	I definitely keep applying pruning	0.00	1.08	29.57	48.39	20.97
2	I will certainly continue to be dedicated to the cherry-picking practice	0.00	3.23	18.82	33.87	44.09
3	I am committed to applying manure	0.00	1.08	25.27	33.33	40.32
4	If I have an opportunity, I will committed to the wet processing technique	0.54	10.22	26.88	39.78	22.58
5	I maintain to apply crops cover	0.54	5.91	28.49	48.39	16.67
6	I apply organic pesticides/biological control to crops	4.84	18.28	39.25	33.33	4.30

Source: author's own calculation.

4.3.2. PLS Analysis of Farmers' Commitment

4.3.2.1. Measurement Model Evaluation

The model was estimated using the partial least squares structural equation modelling (PLS-SEM), executed through Adanco software, in order to achieve the study objective for analysing factors influencing farmers' ethical commitment to sustainable farming practice. PLS-SEM is a non-parametric multivariate and variance-based approach analysis with the capacity to maximise the endogenous latent variables' explained variance (Hair *et al*., 2014, 2017). Due to statistical robustness for exploratory research estimation,

the analysis is also appropriate for estimating a complex causal integrative model, as in this study.

Figure 4.5. shows the analysis on integrative model, established by evaluating the measurement and structural models, as described in Hair *et al*., (2014, 2017). The measurement model was developed based-on path modelling measuring the inter-correlation between latent and observed variables (indicators). In this study, all latent variables used in the conceptual framework were assumed as reflective measurements, where causality moves from latent variables to indicators. In measurement model, latent variables are evaluated using selected criteria, including internal consistency, convergence validity and discriminant validity assessment. Also, a certain threshold was used to evaluate the measurement model as described in Hair *et al*., (2014, 2017).

Each latent variable's internal consistency was analysed using Composite Reliability (CR) and Cronbach's Alpha (CA), with a 0.700 threshold value. Thus, CR and CA are required to be higher, to enable the threshold meet the internal consistency criteria. Table 4.5. shows the measurement model meets these criteria. Meanwhile, convergence validity criteria is measured by reflective indicator loadings (RIL) and average variance extracted (AVE), with threshold values of 0.708 and 0.500, respectively. Based on the estimation results, the selected latent variables and indicators in the study model meet these criteria.

Table 4.5. Measurement model evaluation

Constructs /Indicators	Measures	Mean (SD)	IC		CV	
			CR (ρC)	CA (α)	AVE	RIL
1. Ethical commitment (1= do not agree at all, 5 = completely agree)			0.90	0.87	0.61	
com1	I definitely keep applying pruning.	3.89 (0.55)				0.84
com2	I will certainly continue to be dedicated to the cherry-picking practice.	4.13 (0.73)				0.80
com3	I am committed to applying manure.	4.13 (0.66)				0.79
com4	If I have an opportunity, I will commit to the wet processing technique.	3.82 (0.81)				0.73
com5	I maintain to apply crops cover.	3.80 (0.71)				0.74
com6	I apply organic pesticides/biological control to crops.	3.70 (0.50)				0.78
2. Behaviour Adoption (1/0)						
Participate in KBAC scheme.		0.38 (0.24)	1.00		1.00	1.00
3. Expected Relationship (1= do not agree at all, 5 = completely agree)						
forsatis1	I will be happy with my relationship with this coffee channel in the future.	3.69 (0.62)	1.00		1.00	1.00
5. Satisfaction (1= do not agree at all, 5 = completely agree)			0.89	0.84	0.68	
satis1	I feel satisfied with my coffee channel because it provides me a competitive price.	3.72 (0.65)				0.79
satis2	I am satisfied with the technical training assistance.	3.58 (0.82)				0.85
satis3	I am satisfied with my financial access (credit).	3.35 (1.00)				0.74
satis4	Overall, I am satisfied with the market chain.	3.64 (0.69)				0.90
6. Quality Alternative (1= do not agree at all, 5 = completely agree)			0.86	0.76	0.67	
alter1	My alternatives channel is close to ideal.	2.56 (0.55)				0.79
alter2	If I leave my channel, I will have financial losses.	2.50 (0.65)				0.82
alter3	Market competition has influenced me to switch to an alternative program/channel.	2.46 (0.54)				0.85
7. Investment Size (1= do not agree at all, 5 = completely agree)			0.89	0.77	0.81	
invest1	I have invested time, money and energy to implement my farming practice.	3.57 (0.73)				0.88
invest3	I am emotionally invested in the coffee industry.	3.56 (0.58)				0.92

Constructs /Indicators	Measures	Mean (SD)	IC		CV	
			CR (ρC)	CA (α)	AVE	RIL
8. Self-identity (1= do not agree at all, 5 = completely agree)			0.90	0.87	0.65	
id1	For me, environmental protection is of great importance.	4.48 (0.38)				0.82
id2	Economic growth is important.	4.33 (0.45)				0.83
id3	Job creation is crucial.	4.26 (0.45)				0.83
id4	New technology is of great importance for success.	4.23 (0.48)				0.81
id6	Humanity has a promising future.	4.21 (0.46)				0.76
9. Ethical orientation (1= do not agree at all, 5 = completely agree)			0.91	0.85	0.77	
ef1	Standards should provide benefits (net of costs) for the greatest number of people.	4.43 (0.37)				0.87
ef2	Standards should provide benefits, but not at the expense of interfering with universal morals, laws, rules, duties and personal rights.	4.39 (0.43)				0.88
ef3	Standards should provide benefits in which are fairly and equally distributed in society.	4.42 (0.43)				0.88
10. Locus control (1= very weak, 5 = very strong)			0.86	0.70	0.76	
con1	How much freedom of choice do you have?	4.01 (0.75)				0.91
con2	How much freedom for beliefs/faith do you have?	4.06 (0.68)				0.83
11. Individual characteristics						
Innate ability	Age household head (years)	49 (148.27)	1.00		1.00	1.00
Gender role	Gender (dummy)	0.98 (0.02)	1.00		1.00	1.00
Human capital investment	Education (categorical)	2.82 (2.28)	1.00		1.00	1.00
12. Situational factors						
Farm capacity	Coffee area (hectares)	0.95 (0.97)	1.00		1.00	1.00
Farm endowment	Farm altitude (meters)	1264 (7619.9)	1.00		1.00	1.00
Input intensity	Number of coffee trees (nominal)	524 (619)	1.00		1.00	1.00

Note: SD (Standard Deviation), IC (Internal Consistency), CA (Cronbach's Alpha), CV (Convergence Validity), RIL (and reflective indicator loadings). All construct (except facilitating conditions) measures by statement based on five Likert-scale options (1= do not agree at all, to 5= completely agree).

Source: author's own calculation.

The Heterotrait-Monotrait Ratio (HTMT) was also calculated to assess the discriminant validity of selected latent variables used in the model. Table 4.6. shows the study results, where all selected latent variables meet discriminant validity criteria, using 0.850 as maximum evaluation threshold. Similarly, the collinearity test between latent variables, conducted using variance inflation factor (VIF), with 5.00 maximum thresholds, indicate no multicollinearity issues in the model. In summary, all selected latent variables and respective indicators meet all measurement evaluation criteria and are therefore valid as well as reliable for use in the subsequent structural evaluation analysis.

Table 4.6. Heterotrait-Monotrait Ratio of latent variables correlations

Constructs	Commitment	Expected relationship	Satisfaction	Quality alternative	Investment	Behaviour adoption	Self-identity	Ethical orientation	Locus control	Innate ability	Gender role	Human capital	Farm capacity	Farm endowment	Input intensity
Commitment	1.00														
Expected relationship	0.69	1.00													
Satisfaction	0.64	0.52	1.00												
Quality alternative	0.60	0.46	0.65	1.00											
Investment	0.84	0.68	0.68	0.62	1.00										
Behavioural adoption	0.03	0.03	0.12	0.02	0.15	1.00									
Self-identity	0.65	0.47	0.41	0.36	0.54	0.07	1.00								
Ethical orientation	0.36	0.26	0.20	0.22	0.24	0.12	0.43	1.00							
Locus control	0.66	0.55	0.36	0.40	0.63	0.04	0.58	0.52	1.00						
Innate ability	0.06	0.02	0.03	0.03	0.12	0.01	0.13	0.09	0.01	1.00					
Gender role	0.09	0.04	0.04	0.07	0.05	0.06	0.16	0.02	0.15	0.08	1.00				
Human capital	0.10	0.14	0.07	0.04	0.05	0.00	0.03	0.11	0.25	0.17	0.05	1.00			
Farm capacity	0.21	0.04	0.15	0.17	0.19	0.13	0.19	0.03	0.18	0.05	0.05	0.00	1.00		
Farm endowment	0.25	0.19	0.25	0.15	0.34	0.39	0.08	0.01	0.22	0.02	0.02	0.10	0.09	1.00	
Input intensity	0.09	0.02	0.10	0.01	0.13	0.38	0.10	0.03	0.14	0.16	0.07	0.06	0.49	0.21	1.00

Source: author's own calculation.

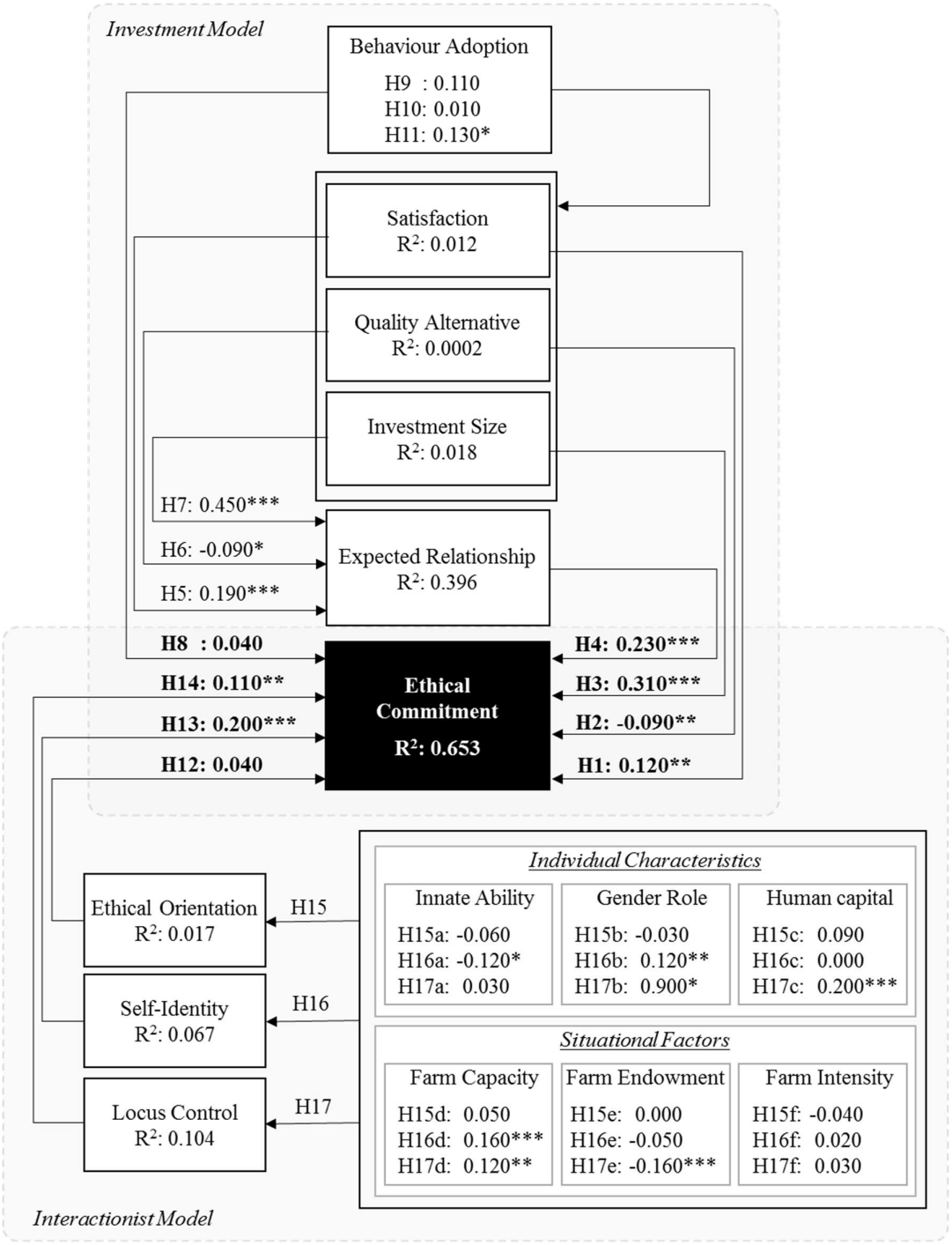
4.3.2.2. Structural Model Evaluation

In this section, the standardized root mean squared residual (SRMR), R-squared (R2), Stone-Geisser value (Q2) and path coefficient were estimated to evaluate the proposed structural model, as described in Hair *et al*., (2017). The SRMR was estimated to

evaluate the approximate fit of the study's proposed structural model. Using a 0.08 maximum SRMR threshold (Hu & Bentler, 1999; Henseler *et al*., 2014), the estimation result shows that the model has a 0.05 SRMR. This implies the proposed structural model meet the fitness criteria. In addition, the estimated R-squared (R2) was used to evaluate the predictive accuracy of all endogenous latent variables in the proposed structural model, and was evaluated in four consecutive thresholds, maximum of 0.25 (very weak), 0.50 (weak), 0.75 (moderate), as well as 1.00 (substantial). Figure 4.2. shows the estimated R-squared (R2), indicating the structural model possesses moderate predictive accuracy (R2=0.65) in estimating the variable of interest, ethical commitment to sustainable farming. The results also indicate the structural model holds weak predictive accuracy (R2=0.40) in estimating expected relationship but possesses very weak predictive accuracy in estimating other endogenous latent variables, including locus control (R2=0.10), self-identity (R2=0.07), investment size (R2=0.02), ethical orientation (R2=0.02), self-identity (R2=0.02), satisfaction (R2=0.01) and quality alternative (R2=0.00). Subsequently, the structural model's cross-validated predictive relevance was evaluated using Stone-Geisser value (Q2), and the estimation results showed all latent variables meet predictive relevance criteria.

The main analysis corresponding to the study's objectives of this study is structural model evaluation using path coefficients, to define multiple probability relationships between latent variables. Initially, this coefficient defined an independent latent variable's direct effect on a dependent variable, considering the corresponding hypothesis, which was developed based on theoretical and empirical literature in the previous section. Path coefficient also defines an independent latent variable's indirect effect on a dependent counterpart, through a mediator variable. Aggregating both effects, a relation between latent variables possibly features complementary effect, competitive effect, direct-only, indirect-only, or no effect (Hair et al., 2017). According to the estimation results, investment size (0.31***, H3) has the highest direct effect on ethical commitment to sustainable farming practices, followed by expected relationship (0.23***, H4), self-identity (0.20***, H13), satisfaction (0.12**, H1), locus control (0.11**, H14) and quality alternative (-0.09**, H2).

Figure 4.2. Path model of farmers' ethical commitment



Source: author's own calculation.

In addition, using bootstrapping procedure, the results also indicate indirect effect of investment size and satisfaction towards ethical commitment to sustainable farming practices. Thus, the results aggregately indicate complementary effects of investment size

and satisfaction towards ethical commitment to sustainable farming practices, including indirect effect through expected relationship. Conversely, the results imply that adoption behaviour aggregately has an indirect-only effect on ethical commitment to sustainable farming practices. This is because adoption behaviour is statistically significant indirectly affected through investment size. Furthermore, in the first part of integration, estimation results based on the investment model show investment size (0.45***, H7) has the highest direct effect on expected relationship, followed by satisfaction (0.19***, H5) and quality alternative (-0.09*, H6). Meanwhile, in the second part of integration, estimation results based-on the interactionist model indicates farm capacity (0.16***, H16d) has the highest effect on self-identity, followed by gender role (0.12**, H16b) and innate ability (-0.12**, H16a). The estimation results also show human capital investment (0.20***, H17c), farm capacity (0.12**, H17d), gender role (0.09*, H17b) and farm endowment (-0.16***, H17e) have a significant effect on locus control, consecutively.

4.3.3. Discussion

In this study, the PLS-SEM analysis delivers interesting evidence on the investment scale and interactionist models' the integration, in a bid to explain ethical commitment to sustainable farming practices. As part of the investment scale model, the estimation results show the investment size has a significant and the greatest direct influence toward ethical commitment, thus, confirming hypothesis 3. Investment size represents all efforts and resources allocated to achieve the expected outcome. However, in KBAC participation, farmers' investment refers to long-term period of cooperation as Subak Abian member, involving allocation of efforts through time, money and energy, for sustainable farming together with emotional attachment in the coffee industry on a broader perspective. This finding is therefore relevant to Davis *et al*., (2011), Azizi (2015) and Chiu & Won (2015), regarding investment size's positive and strong contribution toward the commitment. However, these findings deviate from the original investment model, where satisfaction is expected to have a dominant effect on commitment (Rusbult, 1980).

In some cases, individuals are more committed due to the belief of receiving happiness from the future relationship (Lemay, 2016). This is reflected in the study's finding, as the expected relationship positively and significantly influences ethical commitment to sustainable farming practices, supporting hypothesis 7. Furthermore, this finding implies farmers' higher expected rewards or happiness in the future relationship of

KBAC scheme participation leads to higher ethical commitment to sustainable farming practices. Baker *et al*., (2017) also highlighted expected satisfaction's significant influence on the decision-making process. Meanwhile, Lemay (2016) showed expected satisfaction's role in predicting commitment and behaviour within the personal relationship. Further analysis showed expected relationship is a key mediator connecting investment size and satisfaction toward commitment. Thus, the analysis suggests accepting hypotheses 7 and 5.

As part of interactionist model, self-identity is expected to have a positive effect on ethical commitment to sustainable farming practices, thus, confirming hypothesis 13. Based on the loading indicator value results, productivist identity dominantly affects the ethical commitment to sustainable farming practices. Thus, farmers' self-identity in prioritizing creation and growth within farm activities most likely influences the ethical commitment to sustainable farming practices. Conversely, farmers' self-identity is attributed positively from farm capacity as well as gender role, and negatively from innate ability. Interestingly, these results are in contrast with Sulemana & James (2014), as well as Cullen *et al*., (2020) concerning conservationist identity towards environmental practice implementation.

Furthermore, satisfaction has positive direct and indirect effect on ethical commitment to sustainable farming practices, thus, confirming hypotheses 1 and 5. The indirect effect through investment size indicates overall facilitation and benefits motivated farmers to invest more in KBAC scheme or other coffee network. This facilitation and benefits possibly include access to information, training and market, as well as transaction service provided by local government, private institutions and farmer institutions, including the local farmers' organisation, Subak Abian. Therefore, the study results largely confirmed various empirical studies applying IMS, specifically in terms of satisfaction's positive contribution toward commitment to personal relationship, marketing relationship and ecological behaviour as described in the previous section. In addition, these results disagree with earlier studies regarding satisfaction's dominant contribution toward commitment (Etcheverry *et al*., 2013; Nusair & Hua, 2010; Carpenter & Tong, 2017; Menidjel *et al*., 2020; Lemay, 2016).

Locus control's influence on the commitment clarifies control over life importantly determines ethical commitment to sustainable farming practice, thus, confirming hypothesis 14. This finding implies commitment is achievable in cases where farmers have a freedom to control choices, belief and faith. The estimation result also shows locus

control's contribution towards ethical commitment, significantly varies over human capital investment, farm capacity, gender role and farm endowment. This confirms the report by Sulemana & James (2014), as described in the previous section, regarding locus control's positive effect toward decision making process.

According to the estimation results, quality alternative has a negative effect on ethical commitment to sustainable farming practices. This variable represents another alternative network farmers participate in, including farmer groups and marketing channels with a possible influence farmers' ethical commitment to sustainable farming practices. This finding implies farmers have potential issues for not committing to implement sustainable farming practice because the alternative market for coffee provides more attractive offers, including higher price, better market opportunity and financial services, compared to the KBAC scheme. This result is mostly relevant to various IMS studies as described in the previous section (Etcheverry *et al*., 2013; Amisardari & Khademi, 2019; Azizi, 2015; Martins *et al*., 2017; Chiu & Won, 2015). A further result shows the model estimation is unable to support hypothesis 8, as behavioural adoption has no significant influence on the commitment. These findings indicate simply participating in KBAC scheme, does not necessarily determine farmers' ethical commitment to sustainable farming practices. This study results suggest participation in the KBAC scheme has a positive effect on ethical commitment to sustainable farming, only by following with substantial investment size.

4.4. CONCLUSIONS

Farmers' ethical commitment to sustainable farming practices is an crucial part for promoting ethical sourcing and sustainable development. This commitment is closely related to numerous international sustainable schemes' initiation, as these schemes provide support, as well as guidance, and assures farmers meet ethical responsibilities. Previous studies related to ethical commitment focus mainly on traders' point of view or on livestock products, and only a few focuses on farmers' side of view in crops product. Thus, in conceptual perspectives, there is an empirical challenge to incorporate moral development and psychological attachment, toward farmers' ethical commitment to sustainable farming practices.

The Kintamani Bali Arabica Coffee (KBAC) scheme offers an empirical case to fill all the gaps mentioned above. This is not only based on the scheme being the first GI's scheme to be officially legislated in Indonesia, but also on the rules of conduct being rooted in the sociocultural religious philosophy within Balinese society, also supporting sustainable farming practices. Therefore, based on the investment scale and interactionist models, an integrative model of ethical commitment to sustainable farming practices was developed, particularly incorporating moral development and psychological attachment. Subsequently, the analyses established several interesting results, using primary data from farmers' household survey involving over 300 respondents.

The study's initial analysis using descriptive statistics indicates strong farmers' ethical commitment to sustainable farming practices, particularly differentiated by respondents' demographic and farm characteristics. In this regard, productive age, formal education, higher farm capacity, higher farm intensity and lower farm altitude influence stronger ethical commitment to sustainable farming practices. Interestingly, the initial analysis also indicated that KBAC scheme member farmers show slightly higher ethical commitment to sustainable farming practices, compared to non-members. Subsequently, PLS-SEM analysis was conducted to further examine farmers' ethical commitment to sustainable farming practices, in a bid to further scrutinize the initial analysis. The measurement evaluation suggests the integrative model is valid and reliable for use in further analysis. The structural evaluation suggests ethical commitment to sustainable farming practices is significantly and positively attributable towards investment size, expected relationship, self-identity, satisfaction, as well as locus control and negatively, towards quality of alternative.

In correspondence to the initial analysis of KBAC participation's contribution, the structural evaluation shows no statistically significant difference between member and non-member farmers in the ethical commitment to sustainable farming practices. However, the structural evaluation also shows KBAC participation has an indirect effect on farmers' ethical commitment to sustainable farming practices, through investment size. These findings imply this contribution is not optimized without substantial investment allocated in the scheme's overall supply chain.

Meanwhile, in terms of farmers' moral development, the estimation result also shows investment size, satisfaction, and quality alternative, have significant influences on farmers' ethical commitment. These findings imply farmers' investment and satisfaction

with the KBAC scheme is bound to encourage farmers' ethical commitment to sustainable farming practices. Conversely, any existing of alternative network not necessarily supporting sustainable farming practices is bound to discourage this commitment. In addition to directly contributing towards farmers' ethical commitment, investment size and satisfaction also have an indirect effect through expected relationship. Thus, investment size and satisfaction form the expectation from future relationship in the KBAC scheme, and consequently, affect this commitment. In terms of psychological attachment, the estimation results show locus control and self-identity influence farmers' ethical commitment to sustainable farming practices. Locus control represents farmers' right and freedom of choice, and is related to farmers' personal belief on sociocultural religious philosophy, *Tri Hita Karana*. Meanwhile, self-identity represents farmers' productivist identity, and most likely indicates the roles of productivity and economic growth in farmer's ethical commitment to sustainable farming practices.

This study offers some policy implications corresponding to the previously mentioned findings. First, as participation in KBAC alone does not necessarily contribute to farmer's ethical commitment to sustainable farming practices, the scheme's network, ought to continue promoting sustainable farming practices as part of KBAC adoption, particularly by assuring the benefits of participation in the scheme and supporting farmers with services and subsidizes for implementing sustainable farming practices (Neilson *et al*., 2018; Durand & Fournier, 2017). The KBAC networks, as well as the Community Geographical Indication Protection (CGIP), include local government, roasters, cooperatives, and Subak Abian. Simultaneously, as the indirect effect through investment size was found to have mediated the effect of participation in the scheme, the network needs to support farmers to improve investment sizes, through selected facilitation as financial support, technical assistance, market facilitation or subsidizes, for implementing sustainable farming practices.

Secondly, investment size and satisfaction are bound to encourage farmers' ethical commitment directly and indirectly, through expectations from future relationship in the scheme. This implies the need for policy makers to support services and technical assistance for farmers, in order to facilitate the KBAC scheme participation (Wijaya et al., 2017). The support possibly includes improving access to information, financial, markets, input resources and coffee technology (Vecchio *et al*., 2020; Neilson *et al*., 2018). Conversely, any existing alternative network is bound to discourage farmers' ethical

commitment. Thus, satisfaction over KBAC participation outcomes, including economic, social and environmental impacts, must be maintained and gradually improved. Only then is any existing secondary network bound to not be perceived as an alternative to KBAC network, for providing overall outcomes and benefits.

Third, expected relationship significantly mediates investment size and satisfaction to influence ethical commitment to implement sustainable farming practices. This suggests policy makers ought to consider maintaining farmers' expected relationship, by enhancing the investment size and satisfaction, in order to increase this commitment. For instance, government and private institutions, through public-private partnerships, need to continue supporting the KBAC program's existence by redeveloping and promoting market for the KBAC institution, as well as assuring the benefits of applying sustainable farming practices (Wijaya *et al*., 2017; Török *et al*., 2020; Durand & Fournier, 2017).

Fourth, with respect to locus control, KBAC network needs to improve and maintain the sociocultural religious philosophy, *Tri Hita Karana*, within the scheme's rules of conducts, in a more communal and respectful manner. In terms of productivist self-identity contribution, KBAC network ought to promote activities with the capacity to drive farmers' productivity and growth. Strengthening *Subak Abian*'s roles as a local farmer community by providing these needs, correspond to locus control and self-identify (Neilson *et al*., 2018; Wijaya, 2019).

In addition to the comprehensive model results and implications, there are several limitations worth discussing for further study. From the empirical strategy point of view, exercising other cases of sustainability scheme or extending the sample size is probably bound to provide additional implications on ethical commitment. In addition, to develop further initial integrated model on ethical commitment in this study, additional latent variables and indicators are also to be exercised, along with the different empirical implementation cases. Finally, considering the KBAC scheme's dynamic development, re-arranging and strengthening the scheme's institutional setting is probably guaranteed to eventually provide positive feedback for farmers' ethical commitment and behaviour adoption, in a broader perspective.

CHAPTER V

LESSONS LEARNED FROM KBAC SCHEME: A GENERAL CONCLUSION

5.1. Summary of findings

Considering the important contribution of GIs scheme to farmers' livelihood, sustainable development goals in the broader term, and some opportunities to develop the market, it is necessary to learn from each stage of the KBAC scheme development. This will not only improve future development but also motivate many potential GIs scheme. In the early stage, understanding farmers' intention to adopt scheme is crucial for the successful development and implementation of a sustainable coffee scheme. Furthermore, in the second stage, there is a need to evaluate the impact of scheme's adoption. This evaluation will provide insight into how effective scheme's implementation has provided economic, social, and environmental benefits to farmers' livelihoods. Finally, in the third stage, there is an important lessons of the farmer's commitment scheme, particularly in implementing and maintaining sustainable farming practices. This stage is important to ensure that the sustainability impact of scheme proceeds simultaneously with the agricultural practices.

This dissertation considered the aforementioned needs and complement previous studies by addressing three substantial issues in GIs scheme development. In Chapter II, the early stage of the KBAC implementation was assessed by analysing the determinant factors of behavioural intention to adopt the KBAC scheme. An integrated Theoretical Interpersonal Behaviour (TIB) model and Diffusion on Innovation (DOI) was applied to accommodate multiple attributes of behavioural intention, while Partial Least Square Structured Equation Modelling (PLS-SEM) technique was used to estimate the model. One of the interesting findings is that perceived attributes, relative advantage, and habit have high and positive effects on the intention to the KBAC scheme. In addition, the intention is

also significantly affected by the evaluation of outcome, norm, self-concept, and perceived trialability.

In Chapter III, the early stage analysed in Chapter II was advanced to the implementation stage by evaluating the sustainability impact of farmers' participation in the KBAC scheme. Propensity Score Matching (PSM) and sustainability impact composite index were measured using the primary data collected from 300 members and non-members of the KBAC scheme. Each indicator of economic, social, and environmental pillars of sustainability was determined based on the Theory of Change (ToC) as well as impact pathways. Based on the results, participation in the KBAC scheme led to higher economic impacts, particularly in terms of increasing coffee yield, reducing the cost of production, as well as increasing profit and income. For social impact, scheme provides benefits in improving capacity building, living standards, business management, gender participation, and access to electricity and information. In terms of environmental impact, scheme provides support for the implementation of sustainable farming practices, as well as improved biodiversity and ecosystem. However, the study revealed the weak sustainability impacts of these pillars.

In Chapter IV which represents the long stage of scheme implementation, the ethical commitment of farmers' participation to sustainable farming practices was analysed. An integrated model of the Investment Model Scale (IMS) and Interactionist theory developed was used to address the issue of ethical commitment. Applying PLS-SEM, the analysis implied that participation in the KBAC scheme does not necessarily have a significant contribution to farmers' ethical commitment. The findings suggest that investment size, expected relationship, self-identity, satisfaction, locus control, and quality alternative contribute more to farmers' ethical commitment to sustainable agricultural practices. However, participation and membership in scheme do not have a significant effect on farmers' ethical commitment.

5.2. Policy Implications

This study provides valuable lessons for the early stage of the KBAC scheme implementation. *First*, the results indicate that promoting the perceived benefits, such as the enhancement of farming productivity and improvement of market reputation can increase the intention to adopt the KBAC scheme. *Second*, this study highlights the

importance of ensuring the accountability and reliability of scheme by providing certainty of its cost and benefits. Policymakers and stakeholders can achieve this by extending the program to target good quality products, increasing the price premiums, ensuring the safety of workers, and improving the environment surrounding the farm. *Third*, it is suggested that the local government needs to maintain *Subak Abians* religious and cultural values as a reference group for implementing sustainable farming practices. *Fourth*, for the effect of perceived trialability on the intention to adopt the KBAC scheme, stakeholders need to increase the deliverability of essential information and the technicality of scheme. *Fifth*, financial capacity and knowledge significantly facilitate interpersonal behaviour and perceived attributes to adopt the KBAC scheme. Stakeholders need to improve access to credit and information to encourage interpersonal behaviour and perceived attributes, which affect the intention to participate in scheme.

In the next stage of the KBAC scheme implementation, the results imply higher economic, social, and environmental impact for participating in scheme, but these impacts are mostly weak, including sustainability. Regarding the detailed results in each pillar, *first*, in terms of the economic impact, participation in scheme benefits farmers during pre-harvest periods, such as reducing production cost minimization and increasing coffee yield compared to post-harvest where they do not receive a premium price. This implies that stakeholders, through CGIP and the trade partners within scheme's supply chain need to commit to trade activities by controlling and organizing post-harvest activities. *Second*, the social pillar contributes a higher impact compared to other sustainability pillars. Participation in the KBAC scheme benefits farmers by improving capacity building such as improved education and information, attitudinal changes in asset investment, as well as gender participation. Therefore, it is suggested that within the trade partnership of CGIP, stakeholders need to optimize the rate of scheme implementation through farmers' capacity-building programs, for instance, record-keeping activity, leadership program, and women's group activity. *Third*, in terms of environmental impact, scheme significantly contributes to maintaining sustainable agriculture practices and improving biodiversity in coffee plantation area. These findings have several policy implications for a stronger sustainability impact; hence, all stakeholders need to improve the institutional arrangement of the KBAC scheme by revitalizing CGIP and initiating a new partnership. CGIP and the partnership are important institutional components for implementing the quality control mechanism in the KBAC labelling based on the Code of Practice (CoP) the KBAC

scheme. In addition, stakeholders also need to optimize each other roles in the KBAC value for a collaborative marketing partnership. Through this new institutional arrangement, coordination problems in promoting the three pillars KBAC scheme sustainability impacts could be lessened.

In the long stage of scheme implementation, farmers' moral development, characterized by investment size, satisfaction, and quality alternative, encourages ethical commitment to sustainable farming practices. In terms of psychological attachment, the locus control and self-identity character influence farmers' ethical commitment to sustainable farming practices. However, participation in the KBAC does not necessarily contribute to farmers' ethical commitment to sustainable farming practices. In other words, the long stage of scheme implementation has several policy implications. Stakeholders should continue promoting sustainable farming practices as part of the KBAC adoption, particularly by assuring the benefits of participation with substantial investments such as access to information, financial institution, input resources, coffee technology, and output markets. The institutional arrangement of the KBAC needs to be developed and the market channels maintained to assure the benefit of sustainable farming practices as also stated in chapter III. Therefore, redeveloping the KBAC institutional arrangement is a necessary condition for supporting and maintaining farmers' commitment to implementing sustainable farming practices.

The lessons learned from each stage of the Kintamani Bali Arabica Coffee (KBAC) scheme implementation could be promoted as strategies for GIs trade development. The value of coffee could be increased through quality improvement and GIs scheme protection. This would create opportunities for niche domestic and international markets of specialty coffee. Regarding production capacity, Indonesian Bali coffee might not economically meet the international demand for coffee in terms of quantity. Therefore, the value of coffee could be increased through GI scheme by enhancing quality improvement based on traditional farming practices. Other strategies included providing credible information on GIs and conducting sustainable agricultural practices. The value addition of coffee products through GIs scheme could positively impact the domestic market penetration of specialty products. This was due to the growth of the global coffee culture, where young people were likely to be the center of GI market. Additionally, the domestic competition opened the niche market of GIs products for local chains and businesses with small quantity export.

This study aimed to examine the lessons learned from the KBAC scheme as a contribution towards GIs development in Indonesia and other countries. According to the findings, several conclusions were made. First, achieving this goal required policymakers to make the scheme program more credible and economically viable for small producers. This necessitated considering costs and benefits, cash flow orientation, and risk mitigation in implementing GIs scheme. Therefore, one important requirement was to revitalise and legalize the Community of Geographical Indication Protection (CGIP). Policymakers and stakeholders should optimise each role in GIs value chain through bottom-up partnerships. Additionally, government needed to institutionalize and grant CGIP a legal status authorized to manage, validate, and control the quality improvement of products based on the Code of Practice (CoP) of GIs scheme. The objective of GI was to connect genuine, historical, and cultural aspects of sustainable production. For this reason, stakeholders should consider local knowledge resources and traditional cultural expressions to conduct sustainable farming practices.

Second, in the next scheme implementation stage, the result showed that adding value to GIs products did not significantly increase the market size. The main reason was that small producers lack the sufficient economies of scale needed to enter the potential market. This resulted in high average costs per unit of production, whose capacity increases to penetrate GIs market. Therefore, the government needed to promote traditional producer organizations to operate as joint enterprises in mitigating market risk and determining the price. This would enable small producers to access the inputs, penetrate the potential GIs market, minimize costs, and optimize their bargaining power. Third, the synergy between government and business should be fostered to facilitate and promote GIs products. This could be realized through trade promotion activities using electronic media, exhibitions, and business matching. Compiling market briefs and intelligence could also help identify potential markets and develop targeted marketing strategies. Fourth, the government should create a buffer stock for post-production activity. This could involve strengthening market opportunities through local channels, for example in GIs coffee by as premium coffee shops and go-to coffee shops.

5.3. Recommendations for Further Studies

In addition to several policy implications, this study also serves as a complementary reference and starting point for the development of future studies.

Regarding the model development in behavioural adoption of the sustainable scheme, other studies need to investigate whether the developed integrated model of behavioural intention and commitment concept work are similar with other cases of sustainability scheme. It is also necessary to explore the conceptual setup and investigate more contributor factors. From the methodological perspective, to avoid potentially biased responses in collecting primary data, relevant guidelines must be followed in the process of transferring model statements to the survey questionnaire and conducting a pre-test survey to anticipate any deviation in the field. Since this study applied a multivariate and complex integrated model, extending the sample size is advisable in further studies. It is also very challenging to develop a chain of changes framework based on ToC. Therefore, each component of a sustainable scheme according to a logical framework, including inputs, activities, outputs, outcome, and impacts need to be carefully defined and structured in further studies.

Bibliography

Abaidoo, S., & Dickinson, H. (2002). Alternative and conventional agroculture paradigms: Evidence from farming in Southwest Saskatchewan. *Rural Sociology, 67*(1), 114-131.

Abbasi, I. S. (2018). The link between romantic disengagement and facebook addiction: Where does relationship commitment fit in? *The American Journal of Family Theraphy, 46*(4), 375-389.

Acosta-Alba, I., Boissy, J., Chia, E., & Andrieu, N. (2020). Integrating diversity of Smallholder coffee cropping systems in environmental analysis. *The International Journal of Lice Cycle Assessment*. 25, 252-266.

Adnan, N., Nordin, S. M., & Anwar, A. (2020). Transition pathways for Malysian paddy farmers to sustainable agricultural practices: An integrated tactics to adopt green fertilizer. *Land Use Policy*.

Agnihotri, R., & Krush, M. (2015). Salesperson empathy, ethical behaviors, and sales performance: the moderating role of trust in one's manager. *Jurnal of Personal Selling and Sales Management, 35*(2).

Aidodo, R., & Fromm, I. (2015). Willingness to adopt certifications and sustainable production methods among small-scale cocoa farmers in the Ashanti region of Ghana. *Journal of Sustainable Development; Vol. 8, No. 1*.

Ajzen, I. (2002). Perceived Behavioral Control, Self-Efficacy, Locus of Control, and the Theory of Planned Behavior. *Journal of Applied Social Psychology, 32*(4), 665-683

Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes, vol. 50, no. 2*, 179-211.

Ajzen, I., & Fishbein, M. (1977). Attitude-behaviour relations: A theoritical analysis and review of empirical reserach. *Psychological Bulletin 84*, 888-918.

Ajzen, I., & Madden, T. J. (1986). Prediction of goal-directed behaviour: Attitudes, intentions and perceived behavioral control. *Journal of Experimental Social Psychology, 22*, 453-474.

Akyüz, N. C., & Theuvsen, L. (2020). The impact of behavioral drivers on adoption of sustainable agricultural practices: The case of organic farming in Turkey. *Sustainability, 12*. doi:10.3390/su12176875

Albani, V., Butler, L. T., Trail, W. B., & Kennedy, O. B. (2018). Understanding fruit and vegetable consumption in children and adolescents. The contributions of affect, self concept and habit strength. *Appetite, 120*, 398-408.

Amirsardari , L., & Khademi, A. (2019). Psychometric properties of Rusbult's relationship investment scale. *Health Resources Journal*. doi: 10.5812/jjhr.85389.

Ansah, E. O. (2016). *Nature and extent of farmer participation in cocoa certificatio in Ghana, West Africa.* A Thesis of Master Science Michigan State University.

Ansah, E. O., Kaplowitz, M. D., Lupi, F., & Kerr, J. (2019). Smallholder participation and procedural compliance with sustainable cocoa certification programs. *Agroecology and Sustainable Food Systems*. doi:DOI: 10.1080/21683565.2019.1579776

Arfini, F., Mancini, M. C., Veneziani, M., & Donati, M. (2016). *Intellectual propety rights for geographical indications : What is at Stake in the TTIP.* Cambridge: Cambridge Scholars Publishing.

Arifin, B. (2010). Global sustainability regulation and coffee supply chains in Lampung province, Indonesia. *Asian Journal of Agriculture and Development, Vol. 7, No. 2*.

Arriaga, X. B., & Agnew, C. R. (2001). Being committed : affective, cognitive and conative components of relationship commitment. *Personality and Social Psychology Bulletin 27*, 1190-1203.

Astuti, E. S., Offermans, A., & Glasbergen, P. (2015a). Sustainability certification and economic performance an analysis of coffee marketing channel in Indonesia. *Journal of Economics and Sustainable Development, 6*(24), 84-98.

Astuti, E. S., Offermans, A., Kemp, R., & Cörvers, R. (2015b). The impact of coffee certification on economic performance of Indonesian actors. *Asian Journal of Agriculture and Development, 2*(12).

Austin, P. C. (2011). A tutorial and case study in propensity score analysis: An application to estimating the effect of in-hospital smoking cessation counseling on mortality. *Multivariate Behavioral Research, 46*, 119-151.

Azizi, S., & Javidani, M. (2015). Internal branding in agriculture bank of Iran : an application of Rusbult's investment model. *Int. J. Financial Services Management* , Vol. 8 No 1.

Bager, S., & Lambin, E. (2020). Sustainability strategies by companies in the global coffee sector. *Business Strategy and the Environment*. doi:10.1002/bse.2596

Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science, 16*, 79-94.

Baker, L. R., McNulty, J. K., & Vander Drift, L. E. (2017). Expectations for future relationship satisfaction: Unique sources and critical implications for commitment. *J Exp Psychol Gen, 146*(5), 700–721. doi:10.1037/xge0000299

Bali Provincial Plantation Service (2019, March). KBAC establishment and development. (Rachmaningtyas, Interviewer)

Bantham, H. J., Celuch, G. K., & Kasouf, C. J. (2003). A prespective of partnership based on interdependence and dialectical theory. *Journal of Business Research Vol 56*, 265-274.

Bappebti. (2023). Info harga komoditi. http://infoharga.bappebti.go.id/harga-komoditi_petani.

Barera, A. G. (2020). Geographical indications for UN sustainable development goals: intellectual property, sustainable development and M&E systems. *International Journal of Intellectual Property Management, 10*(2)

Barham, E. (2003). Translating terroir: the global challenge of French AOC Labeling. Journal of Rural Studies 19: 127–38.

Barjolle, D., Paus, M., & Perret, A. (2009). Impact of geographical indications review of methods and empirical Evidences. *International Association of Agricultural Economist Conference.* Beijing.

Barjolle, D., Quinone-Ruiz, X. F., Bagal, M., & Comoe, H. (2017). The role of the state for geographical indications of Cofee: Case sStudies from Colombia and Kenya. *World Development, 98*, 105-119.

Barnette, J. (2012). Geographic indications as a tool to promote sustainablity? Cafe' de Colombia and Tequila Compared.

Bassey, B. C., Ikpi, E. L., & Valentine Ogar, E. C. (2011). Perception of utilitarian values of agrobiodiversity by rural farmers in Akwa Ibom State, Nigeria. *African Journal of Agricultural Research, 6*(32), 6622-6634. doi: 10.5897/AJAR11.870

Becker, S. O., & Caliendo, M. (2007). Sensitivity analysis for average treatment. *The Stata Journal, 1*, 71-83.

Belletti, G.; Marescotti, A.; Touzard, J.M. (2017). Geographical indications, public goods, and Sustainable development: The roles of actors' strategies and public policies. World Dev. 98, 45–57

Berard, L., & Marchenay, P. (2006). Local products and geographical indication: Taking account of local knowledge and biodiversity. *International of Social Science Journal, 187*, 109 - 116.

Birgit, S., Christian , W., & Achim, S. (2009). (Dis)loyalty in the german dairy industry: A Ssupplier relationship management View; Emprirical Evidence ann Managemen Implications. *Econstar Discussion Papers Nr 0806 ISBN 1865-2697*.

Bitzer, V., & Glasbergen, P. (2015). Business-NGO partnerships in global value chains: Part of the solution or part of the problem of sustainable change. *Current Opinion in Environemntal Sustainability, 12*, 35-40. doi: 10.1016/j.cosust.2014.08.012

Blowfield, M. (2004). Ethical supply chains in the cocoa, coffee and tea industries. *Greenleaf Publishing*.

Boazar, M., Yazdanpanah, M., & Abdeshahi, A. (2019). Response to water crisis: How do Iranian farmers think about and intent in relation to switching from rice to less water-dependent crops? *Journal of Hidrology, 570*, 523-530.

Bonanno, A., Sekine.,K., Feuer, H. 2020. Geographical Indication and Global Agro-Food: Development and Democration. Routledge, London and NewYork

Bonanno, A. (2020). Geographical indication in agri-food and its role in the global neoliberal era. In Bonanno, A., Sekine.,K., Feuer, H. Geographical Indication and Global Agro-Food: *Development and Democration. Routledge,* London and NewYork.

Bonke, V., & Musshoff, O. (2020). Understanding german farmer's intention to adopt mixed cropping using the theory of planned behavior. *Agronomy for Sustainable Development*, 40-48.

Borrella, I., Mataix, C., & Carrasco-Gallego, R. (2015). Smallholder farmers in the speciality coffee industry: Opportunities, constraints and the businesses that are making it possible. *IDS Bulletin*, 46(3), 29–44.

Borges, J. A., Domingues, C. d., Caldara, F. R., da Rosa, N. P., Senger, I., & Guidolin, D. G. (2019a). Indetifying the factors impacting on farmers' intention to adopt animal friendly practices. *Preventive Veterubary Medicine, 170*.

Borges, J. A., Lansink, A. G., & Emvalomatis , G. (2019b). Adoption of innovation in agriculture: a critical review of economic and psychological models. *Int. J. Innovation and Sustainable Development, 13*(1).

Borges, J. R., Lansink, A. O., Ribeiro, M. C., & Lutke, V. (2014). Understanding farmers' intention to adopt improved natural grassland using the theory of planned behaviour. *Livestock Science, 169*, 163-174.

Bose, A., Vira, B., & Garcia, C. (2016). Does environmental certification in coffee promote "Business as Usual"? A Case Study from The Western Ghats India. *Ambio, 45*, 946-955. doi: 10.1007/s13280-016-0796-3

Bowen , S. (2010). *Embedding local places in goal spaces : Geographical indications as a territoial development strategy.* 209-243: Rural Sociology 75 (2).

Bowen, S. (2015). Divided spirits: tequila, mezcal and the politics of production. Oakland, CA: University of California Press.

Bowen, S., & Zapata, A. V. (2009). Geographical indications, terroir and socioeconomic and ecological sustainability : The case of Tequila. *Journal of Rural Studies 25*, 108-119.

Bray, J. G., & Neilson, J. (2017). Reviewing the impact of coffee certification programmes on smallholder livelihoods. *International Journal of Biodiversity Science, Ecosystem Service & Managament 13:1*, 216-232.

Brown, N. (2017). 2017 US coffee drinking trends include more gourmet, more youth. In D. C. News.

Buller, H., Blokhuis, H., Jensen, P., & Keeling, L. (2018). Towards farm animal welfare and sustainability. *Animals*, *8*(6), 81.

Cadby, J., Araki, T., & Villacis, A. H. (2021). Breaking the mold: Craft chocolate makers prioritize quality, ethical and direct sourcing, and environmental welfare. *Journal of Agriculture and Food Research*, 100122.

Caliendo, M., & Kopeinig, S. (2008). Some practical guidance for the implementation of propensity score matching. *Journal of Economics, 1*, 31-72.

Cardoso, P. S., & James Jr, S. H. (2011). Ethical frameworks and farmers participation in controversil farming practise. *Journal Agriculture Environmental Ethics*, 25 (3), pp 477-404.

Carpenter, C. J., & Tong, S. T. (2017). Relational distancing and termination between online friends: An application of the investment model. *CHI.* Denver: CHI.

Chilkoti, A. (2016). Indonesia's aspiring coffee kings. In F. Times.

Chiputwa, B., Spielman, D. J., & Qaim, M. (2015). Food standards, certification and poverty among coffee farmers in Uganda. *World Development*, 66 (0) pp. 400-412.

Chiu, W., & Won, D. (2016). Consumer-brand relationships in sports products and repurchase intention: An application of the investment model. *International Jounral of Sorts Marketing and Sponsorship*, 243-259. doi: 10.1108/IJSMS-08-2016-013

CNN Indonesia "Kemendag Dorong Indikasi Geografis Kopi Produksi RI" https://www.cnnindonesia.com/ekonomi/20200921183528-92-549075/kemendag-dorong-indikasi-geografis-kopi-produksi-ri

Cochran, W. G. (1963). *Sampling technique.* New York: John Wiley and Sons Inc.

Coombe, R. J., & Malik, S. A. (2017). Rethinking the work of geographical indications in Asia: Addressing hidden geographic of gendered labor. In *Geographical Indications at The Crossroads of Trade, Development and Culture* (pp. 87-121). Cambridge University Press.

Coordinating Ministry of Human Development and Culture Republic of Indonesia. (2015). *Integrated agricultural system of Tri Hita Karana-Tri mandala in Bali Indonesia.* Coordinating Ministry of Human Development and Culture; Local Government of Karangasem District, Bali ; Bogor Agricultural University.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika, 16*, 297-334.

Cullen, P., Ryan, M., O'Donoghue, C., Hynes, S., OhUallachain, D., & Sheridan, H. (2020). Impact of farmer self-identity and attitudes on participation in agri-environment schemes. *Land Use Policy, 95*.

Davis, J. L., Green, D. J., & Reed, A. (2009). Interdependence with environment: commitment, interconnectedness and environmental behaviour. *Journal of Environmental Psychology*, (29) 173-180.

Davis, J. L., Le, B., & Coy, A. E. (2011). Building a model of commitment to the natural environment to predict ecological behavior and willingness to sacrifice. *Journal of Environmental Psychology*, 257-265. doi:10.1016/j.jenvp.2011.01.004

Dessart, F. J., Hurle, J. b., & van Bavel, R. (2019). Behavioural Factors affecting the adoption of sustainable farming practices: a Policy-Oriented Review. *European Review of Agricultural Economics*, 417-471. doi: 10.1093/erae/jbz019

Dietz, T., Grabs, J., & Chong, E. A. (2019). Mainstreamed voluntary sustainability standards and their effectiveness: Evidence from the Honduran coffee sector. *Regulation & Governance*. doi:10.1111/rego.12239

DiPrete, T. A., & Gangl, M. (2004). Assessing bias in the estimation of causal effects: Rosenbaum bounds on matching estimators and instrumental variable´s estimation with imperfect instruments. *AZB Discussion paper No SP I 2004-101*.

Directorate General of Estate Crops. (2019). Tree crop estate statistics of Indonesia. *Secretariat of Directorate General of Estate Crops*. Ministry of Agriculture.

Directorate General of Intellectual Property (2015). *Trademark protection in Indonesia.* Jakarta: Ministry of Law and Human Rights Republic of Indonesia.

DJHKI. (2020). Directorate General Intellectual Property Rights. DJHKI Kemenhukum. https://indonesianig.id/#tenant-list

Dogan, B., & Gokovali, U. (2012). Geographical indications: The aspect of rural development and marketing through the traditional products. *Social and Behavioral Sciences 62*, 761 - 765. doi:10.1016/j.sbspro.2012.09.128

Durand, C., & Fournier, S. (2017). Can geographical indications modernize Indonesian and Vietnamese agriculture? Analyszing the role of national and local government and producers' strategies. *World Development Vol 98*, 93-104.

Durko, A. M., & Petrick, J. F. (2015). Travel as relationship therapy: Examining the effect of vacation satisfation applied to the Investment Model. *Journal of Travel Research*, 1-15. doi: 10.1177/0047287515592970

Eaton, A. A., Visser, S. P., & Burns, V. (2017). How gender-role salience influences attitude strength and persuasive message processing. *Psychology of Women Quarterly, 41*(2). doi: 10.1177/0361684317696257

Eggleston, B. (2012). Utilitarianism. *Encyclopedia of Applied Ethics, 4*, 452-45. doi:10.1016/B978-0-12-373932-2.00220-9.

Elamin, N. E.A., & de Cordoba, S. F. (2020). The trade impact of voluntary sustainability standards: A review of empirical evidence. *UNCTAD Research Paper, 50*, UNCTAD/SER.RP/2020/9.

Elder, S. D., Hisham, Z., & Phillippe, L. (2012). Effects of fair trade certification on social capital: The case of Rwandan coffee producers. *World Development*, 2355-2367.

Elmustapha, H., Hoppe, T., & Bressers, H. (2018). Understanding Stakeholders' Views and the Influenceof the Socio-Cultural Dimension on the Adoption ofSolar Energy Technology in Lebanon. *Sustainability, 10*. doi:10.3390/su10020364

Engman, A., & Cranford, C. (2016). Habit and the body : Lessons for social theories of habit form the experience of people with physical disabilities. *Sociological Theory, 34*(1), 27-44.

Etcheverry, P. E., & Agnew, C. R. (2004). Subjective norms and the prediction of romantic relationship state. *Personal Relationship*, 11, pp 409-428.

Etcheverry, P. E., Le, B., Wu, F., & Wei , M. (2013). Attachment and the investment model : Predictor of relationship commitment, maintanance and persistance. *Journal of The International Association for Relationship Research*.

Fahmi, M. Y. (2020). Understanding agricultural innovation adoption in developing countries : An Indonesian study. *Msc Thesis Wageningen University and Research*.

FAO. (2017). Geographical indication-towards a sustainability manifest. *Concept Note for The Inception Workshop.* Origin and FAO.

FAO & European Bank. (2018). *Strengthening sustainable food systems through geographical indications: An analysis of economics impacts.* Rome: FAO

Feola, G., & Binder, C. R. (2010). Why dont pesticide applicators protect themselves? Exploring the use of personal protecting equipment among Colombian smallholders. *International Journal Occ Environment Hea*, 11-23.

Fishbein, M., & Ajzen , I. (2010). *Predicting and changing behavior: The reasoned action.* New York: Psychology Press.

Forbes. (2018). *Arabica versus robusta: which coffee is better for birds?*

Galtier, F., Belleti, G., & Marescotti, A. (2013). Factors constraining building effective and fair geographical indication for coffee: Insights from Dominican Case Study. *Development Policy Review 31*, 597-615.

Gangjee, D. S. (2012). Geographical indications and cultural heritage. *WIPO Journal 4*, 91-102.

Gangjee, D. (2016). Research Handbook on Intellectual Property and Geographical Indications. *Research Handbooks in Intellectual Property series*. Page 608

Garrido, M. M., Kelley, A. S., Paris , J., Roza, K., Meier, D. E., Morrison, R. S., & Aldridge, M. D. (2014). Methods for constructing and assessing propensity score. *Health Research and Educational Trust*, 1701-1720.

Geisser, S. (1974). A Predictive approach to the random effect model. *Biometrika, 61*, 101-107.

Gertler, P. J., Martinez, S., Premanad, P., Rawlings, L. B., & Vermeersch, C. M. (2016). *Impact evaluation in practice.* Washington: International Bank for Reconstruction and Development/ The World Bank.

Giovannucci, D., & Koekoek, F. (2003). The state of sustainable coffee: A study of twelve major markets. *Munich Personal RePEc Archieve, 17172*.

Giovannucci, D., & Ponte, S. (2005). Standards as a new form of social contract? Sustainability initiatives in the coffee industry. *Food Policy, 30*(3), 284-301.

Giovannucci, D., Hagen, O., & Wozniak, J. (2013). Corporate social responsibility and the role of voluntary sustainability standards. In S. Schmitz-Hoffmann, & P. Hansmann, *Voluntary Standard Systems: A Contribution to Sustainable Development.* Spring.

Giovannucci, D., Josling, T., Kerr, W., O'Connor, B., & Yeung, M. T. (2011). Guide to geographical indications: Linking products and their origins (Summary). *Munich Personal RePEc Archieve*.

Glasbergen, P. (2013). Legitimation of certifying partnership in the global market place. *Environmental Policy and Governance, 23 (6)*.

GlobalCoffeeReport. (2015). *German coffee drinkers move towards out of home consumption.* GlobalCoffeeReport.

Grabs, J., Kilian, B., Hernandez, D. C., & Dietz, T. (2016). Understanding coffee certification dynamics : A spatial analysis of voluntary sustainability standard proliferation. *International Food and Agribusiness Management Review, 19*(3).

Greenbaum, R. L., Hill, A., Mawritz, M. B., & Quade, M. J. (2014). Employee machiavellianism to unethical behaviour: The role of abusive supervision as a trait activator. *Journal of Management, 43*(2).

Grind, P. D. (2017, April 10). What is "Third wave of coffee" & How is it different to Specialty.

Grootaert, C., & Bastelaer, T. V. (2002). *Understanding and measuring social capital: A multidiciplinary tool for practistioners.* Washington DC: World Bank.

Grootaert, C., Narayan, D., Woolcock, M., & Nyhan-Jones, V. (2004). Measuring social capital : An integrated questionnaire. *World Bank Working Paper no 18*.

Haidt, J. (2001). The emotional dog and its rational tail. *Psychological Review* , 108, pp. 814-834.

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review, 31*(1), 2-24.

Hair, J. F., Hult, G. M., Ringle, C. M., & Sarstedt, M. (2017). *A primer on partial least squares structural equation modeling (SEM)* (2nd ed.). SAGE.

Hair, J. F., Sarstedt, M., Hopkins, L., & Kupperwieser, V. (2014). Partial Least Squares Structural Equation Modeling (PLS-SEM) : An emerging tool in business research. *European Business Revies Vol 26 Issue 2*, 106-121.

Hanseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of The Academy of Marketing Science, 43*, 115-135. doi: 10.1007/s11747-014-0403-8

Hansson, H., Ferguson, R., & Olofsson, C. (2012). Psychological constructs underlying farmers' decisions to diversify or specialise their businesses—An application of theory of planned behaviour. *Journal of Agricultural Economics, 63*(2), 465-482. doi:10.1111/j.1477-9552.2012.00344.x

Hart, F. (2020). Geographical Indication Out of Context and in Vogue. In Bonanno, A., Sekine.,K., Feuer, H. Geographical Indication and Global Agro-Food: Development and Democration. Routledge, London and NewYork.

Harrington, L. M. (2016). Sustainability theory and conceptual considerations: a review of key ideas for sustainability, and the rural context. *Papers in Applied Geography, 2*, 365-382.

Heckman, J. J., Ichimura, H., & Todd, P. (1998). Matching as an econometric evaluation estimator. *Review of Economic Studies 65*, 261-294.

Helga Willer, Gregory Sampson, Vivek Voora, Duc Dang, Julia Lernoud. (2019). The State of Sustainable Markets 2019 – Statistics and Emerging Trends. ITC, Geneva.

Hendrickson, M. K., & James, H. S. (2005). The ethics of constrained choice: How the industrialization of agriculture impacts farming and farmer behaviour. *Journal of Agricultural and Environmental Ethics, 18*, 269–291. doi:10.1007/s10806-005-0631-5

Henrike, L., Christian , S., & Ludwig, T. (2016). Acceptance of a sustainability standards: Evidence from an empirical study of future-oriented dairy farmers. *System Dynamics and Innovation in Food Networks.* www.centmapress.org.

Henseler, J., Dijkstra, T. K., Sarstedt, M., Ringle, C. M., Diamantopoulos, A., Straub, D. W., . . . Calantone, R. J. (2014). Common beliefs and reality about PLS: Comments

on Rönkkö and Evermann 2013. *Organizational Research Methods, 14*(2), 182-209.

Hoang, H. (2017). *Determinants of pro-environmenrtal behaviour: bioethanol fuel purchasing in Vietnam.* New Zealand: Lincoln University.

Hoffmann, U., & Grothaus, F. (2015). Assuring coherence between the market/access and livelihood impact of private sustainability standards. *United Nations Forum on Sustainability Standards.* Genewa.

Hu, L.-t., & Bentler, P. M. (1999). Cut off criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*(1), 1-55.

Ibanez, M., & Blackman, A. (2015). Environmental and economic impacts of growing certified organic coffee in Colombia. *Environmental for Development*.

Ibnu, M., Glasbergen, P., Offermans, A., & Arifin, B. (2015). Farmer preferences for coffee certification: A Conjoint Analysis of The Indonesia Smallholders. *Journal of Agricultural Science , 7*(6), 20-35.

Ibrahim, A., Knox, K., Thiele, S. R., & Arli, D. (2018). Segmenting a water use market: Theory of interpersonal behaviour insight. *Social Marketing Quarterly, 24 (I)*, 3-17. doi: 10.1177/1524500417741277

ICO, ITC, & CFC. (2000). *The gourmet coffee project: Adding value to green coffee.* International Coffee Organization (ICO).

IISD. (2019). *Global market report: Coffee.* Canada: International Institute for Sustainable Development.

Indonesia Coffee and Cocoa Institute (2019, March). KBAC and sustainable farming practice. (Rachmaningtyas, Interviewer)

Jaya, R., Machfud, M., Raharja, S., & Marimin , M. (2014). Prediction of sustainable supply chain management for Gayo coffee using system dynamic approach. *Journal of Theoretical and Applied Information Technology.*

Jackson, T. (2004). *Motivating Sustainable Consumption. A review of evidence on consumer behaviour and behavioural change.* University of Surrey. Guilford: Sustainable Development Research Network.

Jacovidis, J. N. (2017). *Evaluating the performance of propensity score matching methods: A simulation study.* James Medison University.

Jacqueline, v., & Schmeets, H. (2013). Developing a social capital index for the Netherlands. *Soc Indic Res 113*, 859-886.

James, H. S. (2005). The ethical challanges in farming: A report on conservations with Missouri corn and soybean producers. *Journal of Agricultural Safety and Health*.

Jena, P. R., & Grote, U. (2010). Changing institution to protect regional heritage : A case for geographical indication in the Indian agrifood sector. *Development Policy Review 28(2)*, 217-236.

Jena, P. R., & Grote, U. (2015). Geograpahical indication protection and rural livelihoods: Insights from India and Thailand. *Asian Pasific Economic Literature*.

Jena, P. R., Chichaibelu, B. B., Stellmacher, T., & Grote, U. (2012). The impact of coffee certification on small-scale producers' livelihoods: a case study from the Jimma Zone, Ethiopia. *Agricultural Economics, 43*, 429-440.

Jena, P. R., Stellmacher, T., & Grote, U. (2017). Can coffee certification schemes increase incomes of smallholder farmers? Evidence from Jinotega Nicaragua. *Environment Develompment Sutainbility*, 45-66.

Jones, T. M. (1991). Ethical decision-making in organization: An issue-contingent model. *Acad. Manag.Rev*, 16 (2) pp.66-395.

Jurjonas, M., Crossman, K., Jennifer, S., & Baez, W. L. (2016). Potential links between certified organic coffee and deforestation in a protected area in Chiapas, Mexico. *World Development, 78*, 13-21.

Kampf, R. (2003). Administration of a regional system for gegraphical inducation: How to specify and to control geographical indications. *WIPO Asia and The Pasific Regional Symposhium on The Protection of Geographical Indications.* New Dehli.

Khandker, S. R., Koolwal , G. B., & Samad, H. A. (2010). Handbook on impact evaluation : quantitative methods and practise. *The World Bank*.

Kim, S., Coliccchia, C., & Menachof, D. (2016). Ethical sourcing: An analysis of the literature and implications for future research. *Journal of Business Ethics*.

Kimura, J., & Rigolot, C. (2021). The potential of geographical indications (GI) to enhance sustainable development goals (SDGs) in Japan: Overview and Insights from Japan GI Mishima Potato. *Sustainability, 13*(961).

Kock, N., & Hadaya, P. (2018). Minimum sample size estimation in PLS-SEM: The inverse square root and gamma-exponential methods. *Info System, 28*, 227-261.

Kompas. (2020, April 03). Dampak wabah corona ke industri kopi. *Kompas*. Retrieved from https://money.kompas.com/read/2020/04/03/200100426/ini-dampak-wabah-corona-ke-industri-kopi?page=all.

Kroll, M., Wright, P & Heiens, R,. A. (1999). The contribution of product quality to competitive advantage: Impacts on systematic variance and unexplained variance in returns. *Strategic Management Journal*,.Vol. 20, No. 4. pp. 375-84.

Kumi, R., Reychav, I., & Sabherwal, R. (2012). The impact of facilitating conditions on anxiety, attitude, self-efficacy, and performance: Insights from an empirical study of iPad adoption. *IAIM Conference.* AIS SIG-ED IAIM.

Kwon, I.-W. G., Hamilton, J. H., & Hong, S.-J. (2012). Cost optimization: An exploratory study. In *Inter-Organizational Information Systems and Business Management.* Paris: Bordeux Business of Management .

Laing, K., & Todd, L. (2015). Theory-based approach methodelogy: Using theories of change for development, research and evaluation. *Research Centre for Learning and Teaching* , Newcastle University.

Lakhal, L. (2009). Impact of quality on competitive advantage and organizational performance. *Journal of the Operational Research Society*. Vol. 60, No. 5. pp. 637-45.

Lampach, N., & Morawetz, U. B. (2016). Credibility of propensity score matching estimates. An example from Fair Trade certification of coffee producers. *Journal of Applied Economics*(44), 4227 - 4237.

Läpple , D., & Kelley, H. (2010). Understanding farmers' intake of organic farming: An application of the theory of planned behaviour. *The 84th Annual Conference of The Agricultural Economics Society.* Endinburg.

Lemay Jr, E. P. (2016). The forecast model of relationship commitment. *Journal Personality and Social Psychology*.

Lemay Jr, E. P., & Spongberg, K. (2014). Perceiving and wanting to be valued by others: Implications for cognition, motivation, and behaviour in romantic relationships. *Journal of Personality*, 464-478. d

Lewin, B., Giovannucci , D., & Varangis, P. (2004). *Coffee market-new paradigms in global supply and demand.* Washington DC: The World Bank.

Liem, D. G., Turchini, G. M., Wanich, U., & Keast, R. (2018). Sustainability descriptive labels on farmed salmon: do young educated consumers like it more? *Sustainability*, *10*(7), 2397.

Luhmann, N. (1988). Familiarity, confidence, trust : problem and alternative. In D. G. Gambetta, *Trust* (pp. pp 94-107). New York: Basil Blackwell.

Malde, B. (2014, June 29). Social norms and the role of the extended family. *Institute for Fiscal Studies*.

Marx, A., Shrarma, A., & Becault, E. (2015). *Voluntary sustainanility standards : An overview, Acropolis Report.* Klimos.

Martins, D. M., de Faria, A. C., Prearo, L. C., & Souza Arruda, A. G. (2017). The level of influence of trust, commitment, cooperation, and power in the interorganisational relationship of Brazilian credit cooperative. *Revista de Administração, 52*, 47-58.

Mawardi, S. (2009a). Advantages, constraints and key success factors in establishing origin and tradition-linked quality signs: The case of Kintamani Bali Arabica Coffee Geographical Indication, Indonesia. *FAO Fiat Panis*.

Mawardi, S. (2009b). Establishment of geographical indication protection system in Indonesia, case in coffee. *Worldwide Symposium On Geographical Indications.* Sofia: The Patent Office Of The Republic of Bulgaria and World Intelectual Property Organization.

Mayne, J. (2015). Useful theory of change models. *Canadian Journal of program Evaluation*, 119-142. doi:10.3138/cjpe.230

Mboga, J. (2017). Ethical sourcing to ensure sustainability in the food and beverage industry and eliciting millennial perspectives. *European Journal of Economic and Financial Research*.

McDonald, F. V. (2014). Developing an integrated conceptual framework of pro-environmental behaviour in the workplace through synthesis of the current literature. *Administrative Sciences*, 276-303. doi:10.3390/admsci4030276

McGuire, J., Morton, L. W., & Cast, A. D. (2012). Recontructing the good farmer identity: Shifts in farmers identities and farm management practise to improve water quality. *Agriculture Humanity Value 30 (1)*, 57-69.

Medeiros , M. d., Passador, C. S., & Passador, L. J. (2016). Implications of geographical indications: a comperhensive review of papers listed in Capes' Journal Database. *RAI Revista de Administracai e Inovacao, 13*, 315-329.

Meemken, E., & Qaim, M. (2018). Organic agriculture, food security, and the environment. *Annual Review of Resource Economics*.

Meier, C., Sampson, G., Larrea, C., Schlatter, B., Voora, V., Dang, D., Bermudez, S., ozniak, J., and Willer, H. (2020). The State of Sustainable Markets 2020: Statistics and Emerging Trends. ITC, Geneva.

Meijboom, F. L., & Stafleu, F. R. (2016). Farming ethics in practice: from freedom to professional moral autonomy for farmers. *Agric Hum Values, 33*, 403-414.

Menidjel, C., Bilgihan, A., & Benhabib, A. (2020). Exploring the impact of personality traits on perceived relationship investment, relationship quality and loyalty in retail industry. *The International Review of Retail, Distribution and Consumer Research*.

Misselbrook, D. (2013). Duty, Kant, and Deontology. *British Journal of General Practice, 609*(63). doi:https://doi.org/10.3399/bjgp13X665422

Moody, G. D., & Siponen, M. (2013). Using the theory of interpersonal behaviour to explain non work related personal use of the internet at work. *Information & Management 50*, 322-335.

Moos JH, Schrader S, Paulsen HM (2017) Reduced tillage enhances earthworm abundance and biomass in organic farming: A meta-analysis. Landbauforsch Appl Agric Forestry Res 67(3-4):123-128, DOI:10.3220/LBF1512114926000

Mordor Intelligence. (2018). *Coffee Market - Growth, trends and forecast (2018-2023)*. Retrieved from https://www.mordorintelligence.com/industry-reports/coffee-market

Morgan, R. M., & Hunt, S. D. (1994). The commitment-trust theory of relationship marketing. *Journal of Marketing*, Vol 58. pp. 20-38.

Morton, L. W., & Weng, C. Y. (2009). Getting to better water quality outcomes: The promise and challange of the citizen effect. *Agriculture and Human Value, 26*(1-2), 83-94.

MPIG. (2007). *Buku Persyaratan Indikasi Geografis : Kopi Arabica Kintamani Bali.* Masyarakat Perlindungan Indikasi Geografis (Setifikat IG No ID IG 000000001).

MPIG. (2011). *Buku Persyaratan Indikasi Geografis : Kopi Arabica Kintamani Bali.* Masyarakat Perlindungan Indikasi Geografis (Setifikat IG No ID IG 000000001).

Negi, A., & Perez-Pineda, J. A. (2020). *Sustainability standards and global governance: Experience of emerging economies.* Singapore: Springer.

Neilson, J. (2008). Global private regulation and value-chain restructuring in Indonesian smallholder coffee systems. *World Development, 39*(9), 1607-1622.

Neilson, J., & Aklimawati, L. (2018). Geographical indications and value capture in the Indonesian coffee sector. *Journal of Rural Studies*.

Neilson, J., & Hartatri, D. F. (2014). Relationship coffees in the specialy coffee sector : What benefits for Indonesian smallholders.

Netemeyer, R. G., Bearden, W. O., & Sharma, S. (2003). *Scaling Procedures : Issues and Applications.* Sag Publication, Inc.

Nusair, K. "., Parsa, H. G., & Cobanoglu, C. (2011). Building a model of commitment for generation Y : An Empirical Study on e-travel retailer. *Tourism Management* , (32) 833-843.

Nusair, K. K., & Hua, N. (2010). Comparative assessment of structural equation modeling and multiple regression research methodologies: E-commerce context. *Tourism Management, 31*, 314-324.

Nusair, K. K., Hua, N., & Li, X. (2010). A conceptual framework of relationship commitment: e-travel agencies. J*ournal of Hospitality and Tourism Technology, 1*(2), 106-120. doi: 10.1108/17579881011065029

Nusair, K. K., Parsa, H., & Cobanoglu, C. (2011). Building a model of commitment for Generation Y: An empirical study on e-travel retailers. *Tourism Management, 32*, 833-843.

Nyaga, G. N., Whipple, J. M., & Lynch, D. F. (2010). Examining supply chain relationship: Do buyer and supplier perspectives on collaborative relationship differ. *Journal of Operations Management, 28*, 101-114. doi:10.1016/j.jom.2009.07.005

OECD (2010), *Guidance on Sustainability Impact Assessment*, OECD Publishing, Paris, https://doi.org/10.1787/9789264086913-en

Orbell, S., & Verplanken, B. (2015). Commentary : The strength of habit. *Health Psychology Review*.

Osbourne, J. A., & Clarke, M. (2006). Factor motivating the acceptance of new information and communication technologies in UK Healthcare: A Test of Three Models. *International Journal of Healthcare Information Systems and Informatics 1*, 23-39.

Pannell, D.J., Marshall, G.R., Barr, N., Curtis, A., Vanclay, F., Wilkinson, R. (2006). Understanding and promoting adoption of conservation practices by rural landholders. *Australian Journal of Experimental Agriculture* 46.

Parasecoli, F. (2017). Knowing where it comes from: labelling traditional food to compete in a global market. Ames, AI: Iowa State University Press.

Perfecto, I., Soto-Pinto, L., & Vandermeer, J. (2005). Biodiversity, yield and shade coffee certification. *Ecological Economics*, 435-446.

Perkins, A. R. (2011). Using Rogers' theory of perceived attributes as a framework for understanding the challenges of adoption of open educational resources. *International Journal of Humanities and Social Science Vol 1 No 18*.

Piati, C., & Dwiartama, A. (2020). Provenance for Whom? A Comparative Analysis of Geographical Indication in The European Union and Indonesia. In Bonanno, A., Sekine.,K., Feuer, H. Geographical Indication and Global Agro-Food: Development and Democration. Routledge, London and NewYork

Pinto, G. L., Gardner, T., McDermott, C. L., & Ayub, L. K. (2014). Group certification supports an increase in the diversity of sustainable agriculture network-Rainforest Alliance Certified Coffee producers in Brazil. *Ecological Economics, 107*, 59-94.

Poetschki , K. (2018). *Impact of geographical indications for food products on farm income in the EU* . Wageningen University and University of Bonn.

Pollack, J. M., Coy, A. E., Green, J. D., & Davis, J. L. (2013). Satisfaction, investment, and alternatives predict entrepreneurs' networking group commitment and subsequent revenue generation. *Baylor University*. doi:10.1111/etap.12075

Pracchio, R., Resche-Rigon, M., & Chevret, S. (2012). Evaluation of the propensity score methods for estimating marginal odds ration in case of small sample size. *BMC Medical Research Methodelogy, 12*, 70.

Pune. (2005, January 29). Ethics is an asset not a liability: Wipro Chief. *The Financial Express*.

Purnomo, M., Daulay, P., Utomo, M. R., & Riyanto, S. (2019). Moderating role of connoisseur consumers on sustainable consumption and dynamic capabilities of Indonesia single origin shops. *Sustainability, 11*. doi:10.3390/su11051319

Putnam, R. (2000). *Bowling alone. The collapse and revival of American community.* New York: Simon & Schuster.

Putnam, R. D., & Gross, K. A. (2002). Introduction. In R. D. Putnam, *Democracy in Flux.* Oxford: Oxford University Press.

Quintão, R. T., Zamith Brito, E. P., & Belk, R. W. (2017). Connoisseurship consumption community and its dynamics. *Review of Business Management, 19*(63). doi: 10.7819/rbgn.v0i0.2982

Radar derplantation. (2021). Analisis Kinerja dan Propek Komoditas kopi. Opini dan Analisis Perkebunan. Vol.2 no 2.

Rahmah, M. (2017). The protection of agricultural products under geographical indication: An alternative tool for agricultural in Indonesia. *Journal of Intelectua; Property Roghts Vol 22*, 90-103.

Razie, F., Samani, E. b., & Ganjali, M. (2016). A latent variable model for analyzing mixed longitudinal (k , l)-inflated count and ordinal responses. *Journal of Applied Statistics, 43*(12), 1-22.

Rajedran, N., Tey, Y., Brindal, M., Ahmad Sidique, S. F., Shmasudin, Radam, & Abdul , H. (2016). Factors influencing the adoption of bundled sustainable agricultural Practise : A Sytematic Literature Review. *International Food Research Journal 23(5)*, 2271-2279.

Reimer, A. P., Weinkauf, D. K., & Prokopy, L. S. (2012). The influence of perception of practice characteristics: An examination of agricultural best management practice adoption in Two Indiana watersheds. *Journal Rural Studies 28*, 118-128.

Rest, J. R. (1986). *Moral development: Advances in research and theory*. New York, NY: Praeger.

Reynolds, S. J. (2006). Moral awareness and ethical predispositions: Investigating the role of individual differences in the recognition of moral issues. *Journal of Applied Psychology, 91*(1), 233-243.

Rhinehart, R. (2016, January). *Specialty coffee association news*. Retrieved from scanews: https://scanews.coffee/2016/01/19/a-new-flavor-wheel-a-message-from-ric-rhinehart/

Rijsbergen, B., Elbers, W., Ruben, R., & Njuguna, S. N. (2016). The Ambivalent impact of coffee certification on farmers welfare : A matched panel approach for cooperative in Central Kenya. *World Development Vol 77*, 277-293.

Ringle, C. M., Wende, S., & Jan-Michael. (2015). Smart PLS 3. Bönningstedt.

Rise, J., Sheeran, P., & Hukkelberg, S. (2010). The role of self-identity in the theory of planned behaviour: A Meta-analysis. *Journal of Applied Social Psychology, 40*(5).

Roger, P. (2014). Theory of Change. *Methodelogical Briefs Impact Evaluation No 2*.

Rogers , E. M. (2003). *Diffusion of Innovations.* 5th edition, New York: Free Press.

Rose, D. C. (2018). *Understand how to influence farmers' decision-making behaviour.* School of Geography, University of Nottingham on Behalf AHDB.

Rosenbaum, Paul R. (2002). Observational Studies, Second Edition. New York: Springer

Rosenbaum, P. R., & Rubin, D. B. (1983). The Central role of the propensity score in obsevational studies for causal effects. *Biometrika, 70 no 1*, 41-55.

Rotter, J. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs, 80*, 1-28.

Ruben, R., & Fort, R. (2012). The impact of fair trade certification for coffee farmers in Peru. *World Development, 40*, 570-582.

Ruben, R., & Zuniga, G. (2011). How standards compete; A comparative impact of coffee certification scemes in Northern Nicaragua. *Supply Chain Management: An International Journal 16/2.*, 98-109.

Rubin, D. B. (2001). Using propensity scores to help design observational studies: Application to the tobacco Litigation. *Health Services and outcomes Reserach Methodelogy, 2*, 169-188.

Rubin, D., & Thomas, N. (1996). Matching using estimated propensity scores: Relating theory to practice. *Biometrics 52*, 249-264.

Rueda, X., & Lambin, E. F. (2013). Responding to globalization: Impacts of certification on Colombian small-scale coffee growers. *Ecology and Society, 18*(3).

Rusbult, C E. (1980). Commitment and satisfaction in romantic associations: A test of the investment model. *Journal of Experimental Social Psychology*, 16 pp.172-186.

Rusbult, C E. (1983). A longitudinal test of the investment model: The development satsifaction and commitment in hetersexual involvements. *Journal of Personality and Socila Psychology*, 45 (1) pp.101.

Rusbult, C. E., & Martz, J. M. (1995). Remaining in an abusive relationship: An investment model analysis of nonvoluntary dependence . *Personality and Social Psychologycal Bulletin*.

Rusbult, C. E., Agnew, C., & Arriaga, X. (2011). *The investment model of commitment process.* Department of Psychological Sciences Faculty Publication Paper 26.

Rusbult, C. E., Martz, J. M., & Agnew, C. W. (1998). The investment model scale : Measuring commitment level, satisfaction level and quality alternative and investment size. *Personal Realtionship 5*, pp. 357-391.

Russel, S. V., Young, W. C., Unsworth, K. L., & Robinson, C. (2017). Bringing habits and emotions into food waste behaviour. *Resources, Conseravation and Recycling, 125*, 107-114.

Ryu , S. H., & So, C. K. (2009). The role of partnership in supply chain performance. *Industrial Management & Data Systems Vol. 109 No. 4*, 496-514.

Salado, A. (2018). Five most promising markets in coffee. *Seminario International DNA Cafe.* Euromonitor International.

Salonen, A. O., & Heine, T. (2012). Vegetarian diets: A way towards a sustainable society. *Journal of Sustainable Development, 5*(6).

Samoggia, A., & Riedel, b. (2018). Coffee consumption and purchasing behaviour: Insight for further research. *Appetite, 129*, 70-81.

Samper, F. L., & Quiñones-Ruiz, X. F. (2017). Towards a balanced sustainability vision for the coffee industry. *Resources, 6*(17). doi:10.3390/resources6020017

Sarstedt, M., Ringle, C. M., Smith, D., Reams, R., & Hair Jr, J. F. (2014). Partial Least Squares Structural Equation Modeling (PLS-SEM): A useful tool for family business researchers. *Journal of Family Business Strategy*, 105-115.

SCA. (2018). Celebrating Erna Knutsen's Specialty Coffee. *25 Magazine: Issue 6. SCA News.*

Schüßler, L. (2009). Protecting 'single origin coffee' within the globalcoffee market: the role of geographical indications and trademarks. *The Estey Centre Journal of International Law and Trade Policy, 10*(21), 149-185

Segal, N., & Fraley, C. R. (2016). Broadening the investment model: An intensive longitudinal study on attachment and perceived partner responsiveneness in commitment dynamics. *Journal of Social and Personal Relationships, 33*(5), 581-599.

Sekine, K & Bonanno,. A. (2018). Geographical indication and resistance in global agri-food: the case of Miso in Japan In Resistance to the Neoliberal Agri-Food Regime: A Critical Analysis, edited by Alessandro Bonanno and Steven A. Wolf, 106–19. New York: Routledge

Sekine, K. (2020). The impact of geographical indications on the power relations between producers and agri-food corporation. In Bonanno, A., Sekine.,K., Feuer, H. Geographical indication and global agro-food: development and democration. Routledge, London and NewYork

Seline, M. S., Catacutan, D., Ajayi, O. C., Sileshi, G. W., & Nieuwenhuis, M. (2015). The role of knowledge, attitude and percepetions in the uptake of agricultural and agroforestry innovations among smallholder farmers in SubSaharan Africa. *International Journal of Agricultural Sustainability, 13:1*, 40-54. doi:10.1080/14735903.2014.912493

Sepulveda , W., & Chekmam, L. (2016). Consumers' preference for the origin and quality attributes associated with production of specialty coffees: Results from a Cross-Cultural Study. *Food Research International 89, 89*. doi:10.1016/j.foodres.2016.03.039

Sheibani, S., & Ahangar, A. G. (2013). Effect of tillage on soil biodiversity. *Journal of Novel Applied Sciences*.

Shetty, Y., K. (1987). Product quality and competitive strategy," Busziness Horizons, Vol. 30, No. 3, 1987, pp. 46-52.

Smith, R. A., Kim, Y., Zhu, X., Doudou, D. T., Strenberg, E. D., & Thomas, M. B. (2018). Integrating models of diffusion and behaviour to predict innovation adoption, maintanance and social diffusion. *Journal of Heath Communication, 23*, 264-271.

Smith, S. (2013). Assessing the gender impacts of fairtrade. *Social Enterprise, 9*, 102-122.

Soeryaningrum Agustin, E. S. (2018). The impact of coffee certification on the economic impact of Indonesian actors. *Dissertation for degree of Doctor at Maastricht University*.

Sommeren, M. (2019). *The influence of a farmers' self-identity on the decision making about adopting technological innovations.* Netherland: Wageningen University and Research.

Stanford Encyclopedia of Philosophy. (2016). *Kant's moral philosophy*. Retrieved from https://plato.stanford.edu/entries/kant-moral/.

Statistics Bangli (2018). *Statistics of Bangli regency. Bangli Regency in Figure.* BPS-Statistics

Statistics Indonesia (2019). *Bali province in figure.* BPS-Statistics.

Stern, Louis, W., & El-Ansary, A. I. (1992). *Marketing channel 4th.* Prentice-Hall Inc.

Stern, P. (2000). Toward a coherent theory of environmentally significant behaviour. *Journal of Social Issues 56 (3)*, 407-424.

Stone, M. (1974). Cross-validatory choice and assessment of statistical predictions. *Journal of the Royal Statistical Society Series B (Methodological), 36*, 111-147.

Suacana, I. G. (2016). The gender equality and justice of Balines women in traditional life. *International Journal of Linguistics, Language and Culture, 2 (3)*, 37-44. doi:http://dx.doi.org/10.21744/ijllc.v2i3.162

Sulemana, I., & James Jr, H. S. (2014). Analysis farmer identity, ethical attitudes and environmental practices. *Ecological Economics*, 98, pp 49-61.

Sun, S., Wang, X., & Zhang, Y. (2017). Sustainable traceability in the food supply chain: the impact of consumer willingness to pay. *Sustainability*, *9*(6), 999.

Sylvander, Bertil, and Elisabeth., B. (2011). Introduction in labels of origin for food:local development, global Recognition, edited by Bertil Sylvander and Elisabeth Barham, ix–xviii. Wallingford, UK: CABI.

Taherdoost, H. (2018). A review of technology acceptance and adoption models and theories. *Procedia Manufacturing, 22*, 960-967.

Tanye, H. A. (2016). Perceived attributes of innovation: Perceived security as an additional attribute to Roger's diffusion of innovation theory. *International Journal of Multicultural and Multireligious Understanding Vol 3 Issies 6*, 6-18.

TechnoServe. (2014). *Indonesia a business case for sustainable coffee production.* Sustainable Coffee Program IDH.

Tempo. (2020, April 23). Corona: Penjualan industri kecil kopi bisa anjlok 90 persen. Retrieved from https://bisnis.tempo.co/read/1334833/corona-penjualan-industri-kecil-kopi-bisa-anjlok-90-persen

Terano, R., Mohamed, Z., Shamsudin, M. N., & Latif, I. A. (2015). Factors influencing intention to adopt sustainable agriculture practices among paddy farmers in Kada, Malaysia. *Asian Journal of Agricultural Research*. doi:10.3923/ajar.2015

Teuber, R. (2010). Geographical indications of origin as a tool of product differentiation: the case of coffee. *Journal of International Food & Agribusiness Marketing, 22*(3-4), 277-298.

Tey, S. Y. (2013). *The adoption of sustainable agriculture practises : An integrative approach for Malaysian vegetable farmers.* Adelaide: Dissertation of Doctor of Philosophy School of Agriculture, Food and Wine The University of Adelaide.

Tey, S. Y., Li, E., Bruwer, J., Abdullah, M. A., Cummins, J., Radam, A., . . . Darham, S. (2012). Adoption rate of sustainable agriculture practices: A focus on Malaysia's vegetable sector for research implications. *African Journal of Agriculture Research, 7 (19)*, 2901-2909. doi:10.5897/AJAR11.1876

Tey, Y. S., Li, E., Bruwer, J., Abdullah, A. M., Brindal, M., Radam, A., . . . Darham, S. (2014). The relative importance of factors influencing the adoption of sustainable agricultural practices: A factor approach for Malaysian vegetables farmers. *Sustainable Science, 9*, 17-29.

Thibaut, J., & Kelley, H. (2008). Social exchange theory. In Griffin, *A First Look at Coounication Theory* (pp. pp 196-205). McGraw Hill.

Thibaut, N., & Kelley, H. (1959). *The Social Psychology of Groups.* New York: Wiley.

Tokunaga, R. S. (2016). Interpersonal surveillance over social network sites: Applying a theory of negative relational mantainance and the investment model. *Journal of Social and Personal Relationship, 33*(2), 171-190. doi:10.1177/0265407514568749

Török, Á., Jantyik, L., Maró, Z. M., & Moir, H. V. (2020). Understanding the real-world impact of geographical indications: A critical review of the empirical economic literature. *Sustainability, 12*, 9434. doi:10.3390/su12229434

Tregear , A., Torok, A., & Gorton, M. (2016). Geographical indication and upgrading of small scale producers in global agro-food chains case study of the Mako onion protected designation of origin. *Environment and Planning A 48 (2)*, 433-451.

Trevino, L. K., Weaver, G. R., & Reynolds, S. J. (2006). Behavioral ethics in organizations: A review. *Journal of Management, 32*(6), 951-990. doi:10.1177/0149206306294258

Trevino, Linda Klebe. (1986). Ethical decision making in organizations: A person-situation interactionist model. *The Academy of Management Review*, Vol 11 No3, pp 601-617.

Triandi, H. C. (1977a). *Interpersonal Behaviour.* Brook/Cole: Monterey C A.

Triandis, H. C. (1977b). Cross cultural social and personality psychology. *PSPB 3*, 143-158.

Triandis, H. C. (1979). Values, attitude and interpersonal behaviour. *Nebraska Symposium on Motivation, 27*, 195 - 259.

Trimarchi, E. (2014). The environmental, social and economic impact of different certification programes of coffee in Santander, Colombia : A case study on smallholder producers certified with Organic, Fair Trade and RainForest Alliance. *Master Thesis Utrech University Repository*.

Tookes, J. S., Barlett, P., & Yandle, T. (2018). The case for local and sustainable seafood: A Georgia example. *Culture, Agriculture, Food and Environment*, *40*(1), 55-64.

UNCTAD. (2015). *Why geographical indications for least developed countries (LDCs).* UNCTAD

UNDAF. (2017). *Theory of Change: UNDAF Campanion Guidance.* United Nations Development Group.

UNDP. (2014). *Human Development Report Technical Notes.* UNDP.

UNDP. (1990). *Human Development Report 1990: Concept and Measurement of Human Development. New York. http://www.hdr.undp.org/en/reports/global/hdr1990.*

UNESCO. (2009). *Education Indicators: Technical Guidelines.*

UNFSS. (2018). *Voluntary Sustainability Standards, Trade and Sustainable Development.* UNFSS.

Urminsky, O., Bartels, D. M., Giuliano, P., Newman, G. E., Puntoni, S., & Rips, L. (2014). Choice and self: how synchronic and diachronic identity shape choices and decision making. *Marketing Letters, 25*(3), 281-291.

Vainio, A., & Kauppinen, T. (2006). Utilitarian and moralistic farmers take equally good care of animal welfare in Findland. *Forskningsnytt*.

Valkila, J., & Nygren, A. (2010). Impacts of Fair Trade certification on coffee farmers, cooperatives, and laborers in Nicaragua. *Agriculture and Human Values volume, 27*, 321-333.

Valkila, J. (2014). Do fair trade pricing policies reduce inequalities in coffee production and trade? *Dev Policy Rev, 32*, 475-493.

Vandecandelaere, E., Teyssier, C., Barjolle, D., Jeanneyux, P., France, S., & Beucherie, O. (2018). *Strengthening sustainable food system through geographical indication.* FAO Report.

Vanharanta, H., Kantola, J., & Seikola, S. (2015). Customers' conscious experience in a coffee shop. *Porcedia Manufacturing , 3*, 618-625.

Vecchio, Y., Iddrisu., A-L., Adinolfi, F., De Rosa, M. (2020). Geographical indication to build up resilient rural economies: A case study from Ghana. *Sustainability*, 12, 2052.

Velasquez, M., Andre, C., Shanks, T., S.J, & Meyer, M. J. ((Fall 1987), revised version 2010). What is Ethic. *Ethics*, IIE V1 N1.

Vellema, W., Casanova, A. B., Gonzales, C., & D'Haese, M. (2015). The effect of specialty coffee certification on household livelihood strategies and specialisation. *Food Policy 57*, 13-25.

Venkatesh, V., Morris, G. M., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly, 27*, 425-478.

Waas, T., Huge, J., Verbruggen, A., & Wright, T. (2011). Sustainable development: A bird's eye view. *Sustainability, 3*(10), 1637-1661.

Wahyudi, A., Wulandari, S., Aunillah, A., & Alouw, J. C. (2020). Sustainability certification as a pillar to promote Indonesian coffee competitiveness. *IOP Conference Series: Earth and Environmental Science, 418*.

Wahyudi, T., & Jati, M. (2010). Challenges of sustainable coffee certification in Indonesia. *Seminar on Economic, Social and Environmental Impact of Certification on the Coffee Supply Chain, International Coffee Council 109th session.* London.

Ward, H. (2019, February). *U.S. Coffee Market Overview 2017: A View of the Current Coffee Landscape*. Retrieved from scanews: https://scanews.coffee/2019/02/01/2017-u-s-market-overview-a-view-of-the-current-coffee-landscape/

WCED, 1987 Our common future. World Commission on Environment and Development Oxford University Press, Oxford (1987)

Wasselmann, E. D., VanderDrift, L. E., & Agnew, C. R. (2015). Religious commitment: An interdependence approach. *Psychology of Religion and Spiritual*. doi:http://dx.doi.org/10.1037/rel0000024

Wauters , E., Luwers, L., & D'Haene, K. (2014). Social psychology and biodiversity conservation in agriculture. *Research Gate; Conference Paper*.

Weber, J. G. (2011). How much more do growers receive for Fair Trade Organic Coffee. *Food Policy, 36*, 677-684.

Weintraub, K. (2018). *Coffee beans are good for birds, Fancy Brew or Not*.

White, H. (2010). A contribution to current debates in impact evaluation. *Evaluation, 16*(2), 152-164.

Wieland , A., Handfiel, R. B., & Durach, C. F. (2016). Mapping the landscape of future research themes in supply chain management. *Journal of Business Logistics : Strategic Supply Chain Research*, pp 1- 8.

Wieselquist, J. (2009). Interpersonal forgivenss, trust and the investment model of commitment. *Journal of Social and Personal Relationships 26*, 531-548.

Wijaya, A. (2019). Tri Hita Karana: Subak Abian's wisdom to improve the coffee quality . ICEL.

Wijaya, A. (2017). *Contested sustainability standards in Indonesian agriculture : on The Process of Claiming Government Authority.* Maastrich: Maastrich University.

Wijaya, A., Glasbergen, P., & Mawardi, S. (2017). The mediated partnership model for sustainable coffee production: Experience from Indonesia. *International Food and Agribusiness Management Review* .

Wilson, R. B., Conley, F. J., Harris, M. T., & Lafone, F. (2012). New terrains of taste: Spatial analysis of price premiums for single origin coffees in Central America. *Applied Geography, 35*(1-2), 499-507.

Winkel, C., von Meyer-Höfer, M., & Heise, H. (2020). Understanding German pig farmers' intentions to design and construct pig housing for the improvement of animal welfare. *Sustainability, 10*(10).

WIPO. (2018). *G*eographical indications : An introduction. World Intellectual Property Organization.

WIPO. (2019). Geographical indications. World Intellectual Property Organization.

World Coffee Research. (2020). *Annual Report 2020: ensuring the future of coffee.* World Coffee Research.

Wulandari, S., Djufry, F., Villano, R. (2022). Coping strategies of smallholder coffee farmers under the COVID-19 impact in Indonesia Agriculture. https://doi.org/10.3390/agriculture12050690

Zhang, J., Chiu, R., & Wei, L.-Q. (2009). On whistleblowing judgmentand intention: The roles of positive mood andorganizational ethical culture. *Journal of Managerial Psychology, 24*(7), 627-649.

Zhao, Z. (2005). Sensitivity of Propensity Score Methods to the Specifications. *IZA, 1873*.

Appendices

Appendix A. Questionnaire of Farmers Household Survey

SUPERVISOR _____ ⌊_⌊_⌊_⌋ EDITOR_____ ⌊_⌊_⌊_⌋	**CONFIDENTIAL**	IDRT ⌊_⌋⌊_⌋⌊_⌊_⌋⌊_⌊_⌋⌊_⌋⌊_⌋

INTERVIEWER _____ ⌊_⌊_⌊_⌋

SURVEY OF FARMERS PARTICIPATION IN GEOGRAPHICAL INDICATION SCHEME

NAME OF HOUSEHOLD HEAD_____ ⌊_⌊_⌋

RESPONDENT NAME_____ ⌊_⌊_⌋

Number of visit : ⌊_⌋

	INTERVIEW I	INTERVIEW II	INTERVIEW III	
DATE:	⌊_⌊_⌋/⌊_⌊_⌋/⌊_⌊_⌋ DATE/MONTH/YEAR	⌊_⌊_⌋/⌊_⌊_⌋/⌊_⌊_⌋ DATE/MONTH/YEAR	⌊_⌊_⌋/⌊_⌊_⌋/⌊_⌊_⌋ DATE/MONTH/YEAR	LANGUAGE? A. Bahasa B. Local Language : _____
START TO INTERVIEW:	⌊_⌊_⌋/⌊_⌊_⌋ TIME/MINUTE	⌊_⌊_⌋/⌊_⌊_⌋ TIME/MINUTE	⌊_⌊_⌋/⌊_⌊_⌋ TIME/MINUTE	
FINISH:	⌊_⌊_⌋/⌊_⌊_⌋ TIME/MINUTE	⌊_⌊_⌋/⌊_⌊_⌋ TIME/MINUTE	⌊_⌊_⌋/⌊_⌊_⌋ TIME/MINUTE	
INTERVIEW RESULT:	⌊_⌋	⌊_⌋	⌊_⌋	

3. INTERVIEW CODE	4. EXAMINATION BY SUPERVISOR	5. EXAMINATION BY EDITOR	6. DATA ENTRY STATUS
1. Finished 2. Finished Partially_____ 3. Refused_____ **(IF No 3, THANK AND END)**	Yes No 1. Observed 1 3 2. Checked 1 3	1. Checked without error 2. Checked and corrected	1. Inputted without correction 2. Inputted and corrected

INSTRUCTION FOR INTERVIEWER:

1) **CLOSED QUESTIONS** : SINGLE ANSWER WITH **NUMBERS (1,2,3,..);** MORE THAN ONE ANSWER WITH **ALPHABET (A, B, C,...)**
2) **OPEN QUESTIONS** : WRITE THE ANSWER WITH CAPITAL WORDS

GREETING:

Good….. Sir/Madam, My name is (…….), we are part of the Göttingen University team. You are being asked to voluntary participate in a research study of Arabica Bali Kintamani. The purpose of this study is to understand the adoption of geographical indication systems. This survey will take around 45 minutes. Your answer will be completely confidential. We appreciate your help by to answering these questions.

A. SAMPLING INFORMATION	CODE
A1. Province _____	⌊_⌊_⌋
A2 District	⌊_⌊_⌋
A3 Sub-District _____	⌊_⌊_⌊_⌋
A4 Village	⌊_⌊_⌊_⌋
A5 Area: 1. Urban 3. Rural	⌊_⌋

A6 Census Number ⌊_⌊_⌋

A7 Sampling :

1. **Participate in Arabica Kintamani Bali (KBAC)**
2. **Not participate in KBAC**

A8 GPS Code
a. Latitude : S/N* ⌊_⌋ ⌊_⌊_⌋ o ⌊_⌊_⌋ ⌊_⌊_⌋ , ⌊_⌋ ,
b. Longitude : E/W* ⌊_⌋ ⌊_⌊_⌊_⌋ o ⌊_⌊_⌋ ⌊_⌊_⌋ , ⌊_⌋ ,
c. Elevation : ⌊_⌊_⌋ . ⌊_⌊_⌊_⌋ meter

* Choose one

A9 a. Address :_____

_____ RT : _____ RW : _____

b. Location description :_____

c. Postcode : ⌊_⌊_⌊_⌊_⌊_⌋

A10 Phone a. 1. Phone ⌊⌋⌊⌋⌊⌋⌊⌋ - ⌊⌋⌊⌋⌊⌋⌊⌋⌊⌋⌊⌋⌊⌋⌊⌋ 3. No

b. 1. Cell Phone ⌊⌋⌊⌋⌊⌋⌊⌋ - ⌊⌋⌊⌋⌊⌋⌊⌋⌊⌋⌊⌋⌊⌋⌊⌋ 3. No

c. 1. WhatsApp ⌊⌋⌊⌋⌊⌋⌊⌋ - ⌊⌋⌊⌋⌊⌋⌊⌋⌊⌋⌊⌋⌊⌋⌊⌋ 3. No

B. HOUSEHOLD DEMOGRAPHIC INFORMATION

INTERVIEWER INSTRUCTIONS: **FILL IN INFORMATION ABOUT HOUSEHOLD (HH) MEMBER/S ABOVE 15 YEARS OLD.**

*HH IS A PERSON OR GROUP OF PEOPLE WHO NORMALLY LIVE TOGETHER IN PART OR WHOLE PHYSICAL BUILDING AND EAT IN THE SAME KITCHEN (INCLUDING SERVANTS AND OTHER WORKERS).

* TENANT WHO PAYS RENT IS NOT CONSIDERED AS HOUSEHOLD MEMBER.

(Sources: Statistics Indonesia)

B1 : ID, number based on family member age >15, 1 is household head.
B2 : Name of family member […].
B3 : Year of age of family member […].
B4 : Gender of family member […], 1: Male, 2: Female.
B5 : "What is family member's […] relationship with household head?"
B6 : Marriage status of family member […].
B7 : Education attainment of family member […].
B8 : Main occupation for the past 12 months of family member […].
B9 : Industry of occupation for the past 12 months of family member […].
B10 : "Does family member […] participate in farm work owned by HH?"
B1 : Formal training in the past 12 month of family member […].

B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13
			1 2		⌊⌋	⌊⌋					1 2	
			1 2		⌊⌋	⌊⌋					1 2	
			1 2		⌊⌋	⌊⌋					1 2	

B5	B6	B7	B8	B9	B10	B11	B12
1. Household head 2. Spouse 3. Children 4. Grandchild 5. Parents/in-laws 6. Son in law 7. Siblings (from no 1) 8. Others families 9. Foster child/foster /step 10. Housemaid 11. Others_____	1. Married 2. Separated 3. Divorced 4. Spouse deceased 5. Never married	1. Bali Agha 2. Bali 3. Jawa 4. Sunda 5. Sasak 95. Other,__	1. Islam 2. Protestant 3. Catholic 4. Hindu 5. Budha 95. Other_____	1. Did not pass elementary school 2. Elementary school/equal 3. Primary school/*Mts* 4. Secondary school /*MA* 5. D1/D2/D3 (diploma) 6. Master/doctor 95. Other _____	1. Government Employee 2. Private Employee 3. Self-employed (assisted by family members, permanent employment from outside/not from HH) 4. Freelance 5. Unpaid family worker 6. Not yet working 7. Coffee farmer 8. Orange farmer 95. Others_____	1. Agriculture 2. Fishery 3. Livestock 4. Industry 5. Services, _____ 6. Finance V. Other_____	A. Coffee growing B. Wet processing C. Harvesting & storage D. Gender Equality E. Animal husbandry F. Business management G. Marketing H. Cup Test I. Vocational V. Other, _____

Off-Farm Income

(INTERVIEWER INSTRUCTIONS**: PROVIDE OFF FARM INCOME INFORMATION IN THE PAST 12 MONTH)**

B14 : Does the member participate in off farm work?
B15 : In the past 12 months, how much wages earned from employment outside Agriculture? (IDR)
B16 : Wage from agriculture labour from other farms outside HH? (IDR)
B17 : Revenue from leasing out land (IDR)
B18 : Revenue from renting out animals/machinery to other farms (IDR)
B19 : Revenue from sales of forest product (tree poles, firewood) (IDR)
B20 : Revenue from sales of HH assets (land, furniture) (IDR)
B21 : Pension, transfer, grant, inheritance, remittance (IDR)

B1	B14	B15	B16	B17	B18	B19	B20	B21
	1 Yes 2 No ➔ Section **C**							
	1 Yes 2 No ➔ Section **C**							
	1 Yes 2 No ➔ Section **C**							
	1 Yes 2 No ➔ Section **C**							

C. PRODUCTION FOR GENERAL CROPS AND LIVESTOCK (cows, poultry, dairy)

C1. Total Area and Land Status

	(1)	(2)	(3)	(4)
Provide area for the following land	**Current** Area (Acres) in average	**Area in past 5 years** (Acres) in average	**Land Ownership Status** (if available, provide the share of land ownership (Acres)	How did you acquire this land?
1. Total Land				
2. Land rented-in				
3. Land rented-out				
4. Total Area Cultivated				
5. Area under Pasture				
6. Fallow Land				
7. Area Under Coffee			1. Freehold: ____acres 2. Customary Right : _____acres 3. Leasehold : _____acres 95. Other _____: _____acres	
			1. Freehold 4. Other, _____ 2. Customary Rights 3. Leasehold	1. Purchased 2. Inherited (family) 3. Inherited (spouse) 4. Agreement with land/ use rights owner 95. Other, _____

C2	How do you usually go to your farm/plot to provide your crops?	1. On foot 2. Bicycle 3. Motorcycle 95. Other_____
C3	How much time (in minutes) do you spend to reach the farm plot?	Nearest farm: _____ minute Furthest farm: _____ minute

C.4 In the following section, provide the possible crops (rice, oranges, mango, banana, tomato, vegetables, etc.) **in the last 12 months (January – December 2018)**

(ENUMERATOR: MAKE SURE TO CAPTURE CROPS THAT ARE GROWN IN TWO SEASONS PER YEAR, BY ADDING ANOTHER LINE. PLEASE INDICATE IF THE CROPS ARE INTERCROPPED)

Crops Grown (list all crops in the past 12 month)		(1)	(2)	(3)	(4)	(5) Cost of Production (Quantity (kg) x Price (IDR))							(6) Who makes decision (COPY ID from section B)			Note
		Total Area Grown (acres)	Quantity Harvested (kg)	Quantity Sold (kg)	Price if Sold (kg)	Seeds Purchased (IDR)	Synthetic Fertilizer (IDR)	Manure (IDR)	Pesticides (IDR) (herbicide, fungicide)	Hired Labour (IDR)	Machinery (IDR) (fuel, hiring, maintenance, variable cost)	Others (IDR) (packaging)	Production activities	Retained Harvest	Revenue From Sold Output	
Wet Season	1) Coffee															
	2)															
	3)															
Dry Season	4)															
	5)															
	6)															

Note: Cost of production includes seeds, fertilizer, manure, pesticides (herbicide, fungicide), hired labour, machinery cost, fuel, hiring, and maintenance
Wet Season: November – May; **Dry Season:** June – October.

C5. Provide the livestock owned by HH in the past 12 months (From January – December 2018)

Livestocks	(1) Number currently owned	(2) Number owned 5 years ago	(3) Estimated the value if sold (C5.1) (IDR)	(4) Did you sell […] in the last 12 month?	(5) What was the total value received (IDR)	(6) Total Cost of Production (IDR)
1.				1 2➔ **C5.6**		
2.				1 2➔ **C5.6**		
3.				1 2➔ **C5.6**		
4.				1 2➔ **C5.6**		
5.				1 2➔ **C5.6**		
6.				1 2➔ **C5.6**		
Livestock products						
7. Meat						
8. Milk						
9. Eggs						
10. Honey						
11. Skin						
95. Other						
				1 = Yes 2 = No		**C6.6 Calculate the production cost : Fodder, Hired Labour, Veterinary and Other Cost**

D. COFFEE PRODUCTION

D1.	How long have you been growing coffee?			_____ years
D2.	Farm Altitude			_____meter
D3.	On average, how old are your coffee trees? Note : productive tree : 5-20 years			Productive = _____ years Unproductive = _____years
D4.	**Interviewer: "We are going to ask about Arabica Bali Kintamani (KBAC) Scheme"**			
Do you participate in KBAC? (Check A1.7)				1. Yes, I am participating (fully certified), When did you apply it for the first time? ____ 2. Yes, but I am not fully certified (still awaiting the member status). When did you apply it? __ 3. No, but have participated. When did you apply it? _____ until _____ **Skip to D10** 4. No, I never participate. Why? _____**Skip to D10**
D5.	**Type**	**(1) Year Certified**	**(2) Status (1. Fully certified, 2. In- Transition)**	**(3) Area Certified (acres)**
	KBAC			
	Organic			
	Fair Trade			
	UTZ			
	Other (e.g. National Standard)			
D6.	Have you ever renewed your certification			1. Yes, _____ (year) 3. No. not necessary 95. Don't know
D7 .	How were you informed about KBAC			A. *Subak Abian* B. CGIP *Subak Abian* C. Neighbour D. Electronic media E. Newspaper F. ICCRI (International Coffee Cocoa Research Institute) G. Government H. Other, _____
D8.	Why did you choose KBAC rather than other certifications? (choose four and ranked it)			└┴┘ LESS REQUIREMENTS └┴┘ LOW COST └┴┘ CREDIT OPTION [……..] : (1. PRE-FINANCE; 2. CASH PAYMENT * CHOOSE ONE) └┴┘ HIGH MARKET OPPORTUNITY └┴┘ PREMIUM PRICE └┴┘ ENVIRONMENT FOCUS └┴┘ SUSTAINABILITY PRODUCTION └┴┘ FAIRNESS └┴┘ PRIDE OTHER_____

D9.	What are the requirements to apply KBAC?	A. _____ B. _____ C. _____ D. _____
D10.	In your perception, what is the important characteristic for coffee standards? (1= less important, 5 =most important)	
	1. Standards should provide benefits (net of costs) for the greatest number of people. 2. Standards should provide benefits, but not at the expense of interfering with universal morals, laws, rules, duties and personal rights 3. Standards should provide benefits in fairly and equally distributed for in society.	1 2 3 4 5 1 2 3 4 5 1 2 3 4 5

D11. Provide information on coffee production in the last 12 months (January – December 2018)

Type of Coffee	Seasons	No.	(1)	(2)	(3)	(4)		(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
			ID Garden	Which varieties did you grow?	Area under coffee (Acres)	Number of Coffee Trees		Quantity of coffee bean harvested (kg)	Quantity of red cherries harvested (percent)	Quantity Coffee Sold (kg)					Coffee Price Received by Farmer				
						Productive (productive tree : 5-20 years)	Un-Productive			Flowers (kg)	Red Cherries (kg)	Dry Cherries (kg)	FAQ (kg)	Green Beans (kg)	Flowers (IDR)	Red C(IDR)	Dry cherries (IDR)	FAQ (IDR)	Green beans (kg)
Arabica Kintamani Bali (KBAC) Coffee	**Wet Season**	1																	
		2																	
		3																	
	Dry Season	4																	
		5																	
		6																	
Non KBAC (including Robusta coffee) (PLEASE	**Wet Season**	7																	
		8																	
		9																	

	Dry Season	10																	
		11																	
		12																	

INTERVIEWER: Flowers: coffee sold in the field as flowers (include **Green Berries); Red Cherries:** wet coffee still in husks sold soon after harvesting**; Dry Cherries:** beans sun-dried for 1-2 weeks**; FAQ:** dry, hulled green beans but not graded. **: Green beans** : dry, hulled and graded beans
Wet Season : November – May; Dry Season: June – October.

D12. Provide details of cost of production in past 12 months (January – December 2018).
INTERVIEWER: MAINTAIN THE SAME ORDER AS IN D11

Type of Coffee	Season	ID	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
			Garden ID (D11)	Synthetic Fertilizer		Manure		Pesticides (organic, non-organic)		Labour	Machinery Costs (fuel, hiring, maintenance)	Other Costs (i.e. Packaging)
				Quantity (kg)	Cost (IDR/kg)	Quantity (kg)	Cost (IDR/kg)	Quantity (kg)	Cost (IDR/kg)	Cost (IDR)	(IDR)	(IDR)
Arabica Kintamani Bali	Wet Season	1										
		2										
		3										
	Dry Season	4										
		5										
		6										
Non KBAC (including Robusta coffee)	Wet Season	7										
		8										
		9										
	Dry Season	10										
		11										
		12										

Wet Season : November – May; Dry Season: June – October

INFORMATION: COFFEE PRODUCTION ACTIVITY

D13	What is your main source of coffee seedlings/cuttings	1. Self 2. Other farmers 3. CGIP *Subak Abian* 4. Exporters 5. Government 95. Other_____
D14	How do you process your coffee?	1. Dry Processing 2. Wet Processing 3.Semi dry process (wet grinding)
D15	How do you dry your coffee?	1. Do not dry ➔**skip to D 18** 2. On bare ground 3. On concrete 4. Tarpaulin 95. Other_____
D16	Do you dry it to certain moisture content?	1. Yes, up to what moisture content to dry it ?_____ 3. No
D17	How do you ascertain the moisture content?	1. Moisture meter 2. Biting 3. Hand shaking 95. Other
D18	How do you store your coffee after harvesting?	1. On Ground 2. Off the ground 95. Other
D19	Who is responsible for coffee quality control? copy ID from B1 (household member)	1. General bean condition = [ ] 2. Graded = [ ] 3. Taste (cup test) = [ ]
D20	What is the main disease affecting your coffee?	1. Coffee berry disease 2. Coffee leaf rust 3. Coffee wilt disease 4. Coffee blight disease 5. None 95. Other
D21	What is the main pest affecting your coffee?	1. Coffee borer 2. Coffee Bean Weevil 3. None 95. Other
D22	What efforts are you making to solve disease and pest problems?	A. Applying biological control as insecticide (borer beetle) B. Applying synthetic fungicide C. Renovating coffee plantation/shade D. Planting rust-resistant varieties

		E. Manually weeding F. Applying synthetic herbicide G. Taking no action V. Other
D23	What kind of **fertilizers** do you use?	A. Synthetic fertilizers B. Organic fertilizers (manure) V. Other
D24	How often do you use **soil analysis?** (1= never, 5 = very often)	1 2 3 4 5
D25	How often do you apply **Mulching Methods** for soil conservation (1= never, 5 = very often)	1 2 3 4 5
D26	Waste management activity : (1= never, 5 = very often) 1. Do you apply household recycling method? 2. Do you burn or bury your trash? 3. Do you collect trash from your field?	1 2 3 4 5 1 2 3 4 5 1 2 3 4 5
D27	Do you apply **live barriers** to protect bodies of water?	1. Yes, how many live barriers? _____ 3. No
D28	Do you apply **contour ridges or trenches** to avoid erosion?	1. Yes 3. No
D29	How often do you till your soil?	_____times/season
D30	How many crops cover your coffee trees?	crops (state the tree species:)
D31	How often do you **prune** your coffee trees?	_____times/season
D32	Do you keep records for your coffee production and activities?	1. Yes, who : copy ID _____ 3. No
D33	Number of bird species in the coffee plot (on average)	_____species
D34	What are the obstacles in coffee production?	

E. MARKETING CHANNEL

		Arabica Kintamani Bali (KBAC)					Non KBAC (including robusta)				
		Flowers	**Red Cherries**	**Dry Cherries**	**FAQ**	**Green Beans**	**Flowers**	**Red Cherries**	**Dry Cherries**	**FAQ**	**Green Beans**
E1	To whom do you normally sell the following type of coffee?										
E2	What are some of the reasons you sell this type of coffee?										

E3	Who is in the household negotiates for the coffee prices with buyers											

E1	**E2. list from the most important**	**E4**
1. Subak Abian 2. CGIP *Subak Abian,* 3. Middlemen 4. Local Collector 5. Local Exporter 95. Others, _____	A. To get cash immediately V. OTHERS,_____ B. Higher price C. Advance Payment D. Value addition E. Low transport cost F. Able to get cash on credit **G.** Trustworthy	A. HEAD B. SPOUSE V. Others, _____

ENUMERATOR: Flowers: coffee sold in the field as flowers (include Green Berries)**; Red Cherries:** wet coffee still in husks sold soon after harvesting**; Dry Cherries:** beans sun-dried for 1-2 weeks**; FAQ (fair average quality):** dry, hulled green beans but not graded; **Green beans** : dry, hulled and graded beans

No	**Selling Coffee to […]**	**E5** How many coffee buyers in your village?	**E6** How do you usually interact with […]	**E7** How often they visited you in the last 12 months?(…….times/month)
1	*Subak Abian*			
2	CGIP *Subak Abian*			
3	Middlemen			
4	Local Collector			
5	Local Exporter			
95	Others_____			
95	Others_____			
95	Others_____			
			E6 1. Directly go to the office/ home ➔ **skip E8** 2. Waiting for their visit	

E8	How far is the distance to an input market for coffee?	⌊_⌊_⌋ km , how do you usually go to input market? , how much time minute
E9	How far is the distance to an output market for coffee? (Different from farm gate)?	⌊_⌊_⌋ _____ km , how do you usually go to output market? _____, how much time _____minute

E10	How far is the distance to a coffee collection centre?	⌊_⌋⌊_⌋⌊_⌋ _____ km , how do you usually go to collection centre? _____, how much time _____minute
E11	How do you feel about the market location (input and output) of coffee?	1. Very easy to reach 2. Easy to reach 3. Difficult to reach

Note : How do you usually go to ….market : (1) walking (2) bicycle (3) motorcycle

F. GENDER PARTICIPATION

Provide the information about gender participation in the last 12 month (January – December 2018).
WORKER BELOW 14 YEARS OLD IS CONSIDERED AS CHILDREN

			(1)	(2)			(3)		
Type of Coffee	**Garden ID**	**Season**	**Average Total Labour (person)**	**Family Labour**			**Hired Labour**		
				Male (person)	**Female (person)**	**Children (person)**	**Male (person)**	**Female (person)**	**Children (person)**
Arabica Kintamani Bali (KBAC)	**1**	**Wet Season**							
		Dry Season							
	2	**Wet Season**							
		Dry Season							
	3	**Wet Season**							
		Dry Season							
Non KBAC and Robusta	**1**	**Wet Season**							
		Dry Season							
	2	**Wet Season**							
		Dry Season							
	3	**Wet Season**							
		Dry Season							

Wet Season: November – May; Dry Season: June – October

G. Access to Social Network (Farmer's Organization, Informal Rural Organization, Financial Institution)

		G1	G2	G3	G4	G5	G6	G7	G8
No.	**Type of Organization**	Does household member participate in […]	How long have you been member of […] (years)	What are the requirements to be a member of [….]? State it?	Leadership position in this organization	Are any of your relatives also a member of […]?	Are any of your neighbours also a member of [….]?	What services do you receive from this group?	On average, how often have you interacted with […..] in the last 12 months? (……times/month)
1	*Subak Abian*								
2	CGIP *Subak Abian*								
3	Centre of CGIP								
4	Farmer's Association {……..]								
5	Woman Group [……]								
6	Saving Group (*Lumbung desa, Arisan)*								
7	Credit Group (*KSP/USP)*								
8	Religion Group								
9	Other; …….								

	G1. **1.** Yes → **who (….) Copy ID B.2** **2.** No → go to↓	**G3.** **A. Membership fee (Rp……..)** **B. Other payment (……)** **C. ID Card** **V. Other (…..)**	**G4.** 1. Chairman 2. Secretary 3. Treasure 4. Group Leader 5. Member 95. Other _____	**G5 and G6** 1. Yes 3. No	**G7.** A. Information about coffee (price, quality) B. Input market for coffee C. Credit provision D. Access to market E. Extension services and training F. Cash advance G. Information on other crops H. Religion and culture activity I. Internal Inspection J. External auditing V. Other_____

INTERVIEWER INSTRUCTION: The following questions are about your relationship with *Subak Abian*

G9	How is the location of *Subak Abian*?	1. Very easy to reach 2. Easy to reach 3. Difficult to reach				
G10	How do you usually go there?	1. Walking 2. Bicycle / Motorcycle 3. Private car			4. Public transport 95. Other _____	
G11	Distance to *Subak Abian* and how much time spends to reach Subak Abian (in one way)	⌊_⌊_⌊_⌋ km ⌊_⌊_⌊_⌋ minute				
TRUST SHOW CARD (1= do not agree at all, 5 = completely agree)						
G12	" I feel connected with Subak Abian"	1	2	3	4	5
G13	***"I believe that Subak Abian's* executives are honest "**	1	2	3	4	5
G14	***"I believe that Subak Abian's* executives are reliable"**	1	2	3	4	5
G15	"In our relationship, I can count on CGIP"	1	2	3	4	5
G16	**"Member of *CGIP* have high integrity"**	1	2	3	4	5
G17	**"Female participation in *Subak* Abian is high"**	1	2	3	4	5
G18	**"I feel engaged with other farmers from *Subak Abian*"**	1	2	3	4	5
G19	**"When making important decisions, *Subak Abian* is concerned about farmers' welfare"**	1	2	3	4	5
G20	"Though cicumstances change, we believe that CGIP will offer us assistance and support"	1	2	3	4	5
G21	"I can trust Subak Abian	1	2	3	4	5
G22	"Farmer participation in Subak Abian is high"	1	2	3	4	5

H. ACCESS TO INFORMATION AND CREDIT

H1	**"I have enough information for developing my business"**	1 2 3 4 5
H2	Do you able to access the agricultural information when you need it?	1. Yes, what is the useful source : A. Staff of *Subak Abian* B. Bulletins C. Other farmers D. Family E. Radio F. TV V. Other, _____
		3. No, why : A. No extension B. No access to media C. Not interested in information
H3	Do you able to receive agricultural access to finance (credit) when you need it?	1. Yes, what is the useful source : *1. Subak Abian* 2. CGIP *Subak Abian* 3. Local Bank (BRI, Rural Credit Bank; BNI, ect) 4. Exporter 5. Middleman 6. Family 7. Government (_____) 95. Other, _____
		3. No, why : 1. No available source of credit 2. No collateral 3. High interest rate 4. Stringent loan condition 95. Other.
H4	Do you have bank account (BRI, BPR, BNI, ect)	1. Yes 3. No

I. PREFERENCES AND ATTITUDES

Farmer Identity (Which are these statements reflect your identity?) (1= do not agree at all,5 = completely agree)						
I1	"For me, environmental protection is of great importance"	1	2	3	4	5
I2	"Economic growth is important"	1	2	3	4	5
I3	"Job creation is crucial"	1	2	3	4	5
I4	"New technology is of great importance for success"	1	2	3	4	5
I5	"Traditional farming is better than modern practice"	1	2	3	4	5
I6	"Humanity has a promising future"	1	2	3	4	5
I7	"Humanity has a bleak future"	1	2	3	4	5
I8	"Arabica Kintamani Bali reflects my identity" (SHOW KBAC PICTURE)	1	2	3	4	5
I9	"KBAC helps me show my self confidence" (SHOW KBAC PICTURE)	1	2	3	4	5
I10	"I am proud of KBAC"	1	2	3	4	5
Attitude SHOW CARD (1= do not agree at all, 5= completely agree)						
I11	"If I produce KBAC, I will reduce my production costs"	1	2	3	4	5
I12	"If I produce KBAC, I will increase my farm income"	1	2	3	4	5
I13	"If I produce KBAC, I will receive a higher level of financial support"(credit)	1	2	3	4	5
I14	"KBAC will produce a good quality harvest"	1	2	3	4	5
I15	"KBAC will improve safety for my workers"	1	2	3	4	5
I16	"KBAC will increase my price premium"	1	2	3	4	5
I17	"KBAC will enhance the environment surrounding my farm"	1	2	3	4	5
Social factor SHOW CARD (1= do not agree at all, 5 = completely agree)						
I18	"My family would expect that I adopt Arabica Kintamani Bali for my farming practice"	1	2	3	4	5
I19	My friends outside my work would support my adoption of KBAC into my farming practice"	1	2	3	4	5
I20	"My co-workers would expect that I adopt KBAC for farming purposes"	1	2	3	4	5
I21	"Most farmers in *Subak Abian* would support me in adopting KBAC for farming practice"	1	2	3	4	5
I22	"My village community always motivates me to adopt KBAC into my farming practice"	1	2	3	4	5
I23	"CGIP would support me in implementing KBAC into my farming practice"	1	2	3	4	5
I24	"For me, as a coffee farmer in Bali, it is appropriate to practice KBAC on my farm"	1	2	3	4	5
I25	"Adopting KBAC for farming is suitable for me as a coffee farmer of *Subak Abian*"	1	2	3	4	5
I26	"Due to my role in my village community, it is appropriate to use KBAC"	1	2	3	4	5
I27	"I would feel bad if I didn't adopt KBAC"	1	2	3	4	5
I28	"No-one would associate with me if I didn't adopt KBAC on my farm"	1	2	3	4	5
I29	"Adopting KBAC on my farm would be against my principles"	1	2	3	4	5

Affection SHOW CARD (1= do not agree at all, 5 = completely agree)						
I30	"If I have the opportunity to adopt Arabica Kintamani Bali, I will be happy"	1	2	3	4	5
I31	"I think that strictly following KBAC is good"	1	2	3	4	5
I32	"I feel that practicing KBAC is interesting"	1	2	3	4	5
I33	"If I can not adopt KBAC, I will feel frustated"	1	2	3	4	5
I34	"I will lose my interest in farming if I adopt KBAC"	1	2	3	4	5
I35	"I feel dissapointed using KBAC on my farm"	1	2	3	4	5
I36	"I feel like I would be moving too slowly if I adopted KBAC"	1	2	3	4	5
Habits SHOW CARD (1= do not agree at all, 5 = completely agree)						
I37	"I practice sustainable farming practice regularly"	1	2	3	4	5
I38	"Adopting sustainable farming practice is natural for me"	1	2	3	4	5
I39	"Adopting sustainable farming practice is socially acceptable"	1	2	3	4	5
I40	"I am comfortable with sustainable farming practice"	1	2	3	4	5
I41	"I have been practising sustainable farming for a long time	1	2	3	4	5
I42	"It would require effort to adopt sustainable farming"	1	2	3	4	5
Perceived Attributes (1= do not agree at all, 5 = completely agree)						
I43	"Using KBAC increases farmer reputation in market"	1	2	3	4	5
I44	"Using KBAC enhances farm productivity"	1	2	3	4	5
I45	"KBAC method is compatible with most aspect of work"	1	2	3	4	5
I46	"The name "KBAC" make me want to apply the program"	1	2	3	4	5
I47	"I have no difficulty finding the information about KBAC that I want"	1	2	3	4	5
I48	"I have no difficulty understanding how KBAC technically work"	1	2	3	4	5
I49	"Being able to try out KBAC is important in my decision to use it"	1	2	3	4	5
I50	"I really will not lose much by trying KBAC, even if I do not like it"	1	2	3	4	5
I51	"I adopt KBAC, when other farmers also adopt it"	1	2	3	4	5
I52	"I have no difficulties in telling friends what KBAC is like"	1	2	3	4	5
Intentions SHOW CARD (1= do not agree at all, 5= completely agree)						
I57	"I intend to use the KBAC method to produce coffee in the future"	1	2	3	4	5
I58	"I will continue to implement the KBAC scheme in the future"	1	2	3	4	5
I59	"I expect to apply the KBAC method to produce coffee in the future"	1	2	3	4	5
Control over life SHOW CARD						
I60	**"How much freedom of choice do you have"** (1= very weak, 5 = very strong)	1	2	3	4	5
I61	**"How often do you attend the temple/mosque/church"** (1= never, 5 = very often) **(____ times/month)**	1	2	3	4	5

J. ASSETS OWNERSHIP

TYPE	J1 Do you or household member recently own [---]? 1. Yes 2. No	J2 Total?	J3 Did HH own this asset 5 years ago? 1. Yes 2. No	J4 Who has decided to buy J1? Copy ID from B2
1. Phone **(check A)**	1 2 ↓		1 2 ↓	
2. Mobile Phone **(check A)**	1 2 ↓		1 2 ↓	
a. Who does usually use the mobile phone? Copy ID from B ⌊_⌋⌊_⌋				
b. Do you have WA groups 1 3 → **skip to J3** .3				
c. How many WA group do you have: ⌊_⌋⌊_⌋ , is there any special group for coffee farmer ? 1. Yes 3. No				
3. TV	1 2 ↓		1 2 ↓	
4. Radio	1 2 ↓		1 2 ↓	
5. Parable	1 2 ↓		1 2 ↓	
6. Bicycles	1 2 ↓		1 2 ↓	
7. Motorcycles	1 2 ↓		1 2 ↓	
8. Car	1 2 ↓		1 2 ↓	
9. Private borehole	1 2 ↓		1 2 ↓	
10. Water tanks	1 2 ↓		1 2 ↓	
11. Generator	1 2 ↓		1 2 ↓	
12. Water pump	1 2 ↓		1 2 ↓	
13. Animal plough	1 2 ↓		1 2 ↓	
14. Wheel barrow	1 2 ↓		1 2 ↓	
15. Knapsack sprayer	1 2 ↓		1 2 ↓	
16. Dog	1 2 ↓		1 2 ↓	
17. Other……..	1 2 ↓		1 2 ↓	

K. INVESTMENT MODEL

COMMITMENT SHOW CARD (1= do not agree at all, 5 = completely agree)						
K1	"I definitely keep applying pruning"	1	2	3	4	5
K2	**"**I will certainly continue to be dedicated to the "cherry picking practice"	1	2	3	4	5
K3	**"**I am committed in applying manure"	1	2	3	4	5
K4	"I will definitely keep applying the wet processing technique"	1	2	3	4	5
K5	"I maintain to apply crops cover"	1	2	3	4	5
K6	"I maintain to apply crops cover"	1	2	3	4	5
K7	"I apply pesticides to crops"	1	2	3	4	5
SATISFACTION SHOW CARD (1= do not agree at all, 5 = completely agree)						
K9	"I feel satisfied with my coffee channel because it provides me a competitive price"	1	2	3	4	5
K10	"I am satisfied with the technical training assistance"	1	2	3	4	5
K11	"I am satisfied with my financial access (credit) "	1	2	3	4	5
K12	"Overall I am satisfied with the market chain "	1	2	3	4	5
QUALITY OF ALTERNATIVE SHOW CARD (1= do not agree at all, 5 = completely agree)						
K13	" My alternatives channel (middleman, collector/CGIP) is close to ideal	1	2	3	4	5
K14	"If I leave my channel, I would have financial losses"	1	2	3	4	5
K15	"Market competition has influenced me to switch to an alternative program/channel"	1	2	3	4	5
INVESTMENT SIZE SHOW CARD (1= do not agree at all, 5 = completely agree)						
K16	"I have invested time, money and energy to implement coffee farming practice "	1	2	3	4	5
K17	"I have invested more than other people"	1	2	3	4	5
K18	"I am emotionally invested in the coffee technique"	1	2	3	4	5
K19	"I keep in touch with members of CGIP"	1	2	3	4	5
K20	"I have high expectations of the KBAC program"	1	2	3	4	5
FORECASTED SATISFACTION SHOW CARD (1= do not agree at all, 5 = completely agree)						
K21	"I will be happy with my relationship with this coffee channel in the future"	1	2	3	4	5
K22	"In the near future, I will continue receive high coffee price"	1	2	3	4	5
K23	"I expect this channel will improve technical assistance for coffee farmers in the future"	1	2	3	4	5
K24	"I expect the coffee channel will improve the financial access for farmers in the near future"	1	2	3	4	5
K25	"I believe this product will take a leading position in the national coffee market "	1	2	3	4	5

L. EXPENDITURE

ENUMERATOR: PROVIDE THE LIST OF HOUSEHOLD EXPENDITURE (Sources : IFLS and A2F)

Household spending normally in a Week	**L1**
TYPE	**Value**
a. In-house food and food ingredients: rice / corn / *sago* (and similar products), seasonings, side dishes, tubers, vegetables, etc.	Rp └┴┘.└┴┴┘.└┴┴┘
b. Foods consumed from outside the home	Rp └┴┘.└┴┴┘.└┴┴┘
c. Non-food consumption goods: cigarettes, tobacco, betel, liquor	Rp └┴┘.└┴┴┘.└┴┴┘
d. Religion activity	Rp └┴┘.└┴┴┘.└┴┴┘

Household spending in the last 30 days	**L2**
TYPE	**Value**
a. Home :House rent, maintenance fees, water bills, etc.	Rp └┴┘.└┴┴┘.└┴┴┘
b. Fuel and lighting: Electricity, Kerosene, Firewood, gas, lighters, candles, batteries, etc.	Rp └┴┘.└┴┴┘.└┴┴┘
c. Non-durable goods: Personal care products such as soaps, cleansers, etc.	Rp └┴┘.└┴┴┘.└┴┴┘
d. Health cost: Costs to doctors, hospitals and medicines	Rp └┴┘.└┴┴┘.└┴┴┘
e. Tuition fee: monthly tuition, course fee, stationery, etc.	Rp └┴┘.└┴┴┘.└┴┴┘
f. Transportation Train / bus, transportation money to school, etc.	Rp └┴┘.└┴┴┘.└┴┴┘
g. Communication: Phone, credit, postage, postcard, etc.	Rp └┴┘.└┴┴┘.└┴┴┘
h. Recreation and entertainment: To the movies, books, traveling, sweepstakes, pets, etc.	Rp └┴┘.└┴┴┘.└┴┴┘
i. Household services: Laundry, maid, etc.	Rp └┴┘.└┴┴┘.└┴┴┘
j. Other_____	Rp └┴┘.└┴┴┘.└┴┴┘

Household spending in the last 12 month	**L3**
TYPE	**Value**
a. Cloths	Rp └┴┘.└┴┴┘.└┴┴┘
b. Socks	Rp └┴┘.└┴┴┘.└┴┴┘
c. Electronic stuffs : TV, DVD / VCD, radio, etc.	Rp └┴┘.└┴┴┘.└┴┴┘
d. Household equipment : Furniture, cutlery, rugs / carpets, etc.	Rp └┴┘.└┴┴┘.└┴┴┘
e. Household appliances: Washing machine, fridge / freezer, sewing machine, etc.	Rp └┴┘.└┴┴┘.└┴┴┘

f. Home maintenance	Rp └┴┘.└┴┴┘.└┴┴┘
g. Tuition fee: starting fee, re-registration fee, building fee, uniform money, textbooks etc.	Rp └┴┘.└┴┴┘.└┴┴┘
h. Feast and ceremony: Marriage, death, circumcision, birthday, Lebaran, natalan, etc.	Rp └┴┘.└┴┴┘.└┴┴┘
i. Taxes: PBB, vehicle tax,	Rp └┴┘.└┴┴┘.└┴┴┘
v. Other_____	Rp └┴┘.└┴┴┘.└┴┴┘

M. FOLLOW-UP

M1	Do you know of any relative, neighbour that participates in KBAC?	(1) Yes (2) No
M2	Provide name of farmer from M1	Name : _____ Address : _____ _____ Phone: 1. └┴┴┴┴┘-└┴┴┴┴┴┴┴┘ 3. NO
M3	We want to get the name of someone that currently lives with you and will stay at the same address even if you moved.	1. _____ 3. NO
M4	Now, we want to get the name of another friend or family who does not live with you at this address but will know how to contact you	Name : _____ Address : _____ _____ Phone : 1. └┴┴┴┴┘-└┴┴┴┴┴┴┴┘ 3. NO

N. INTERVIEWER CHECK

N1	Did respondent answer the questions by themselves?	1. Yes → **stop** 3. No
N2	The person who accompanied respondent for answering questions is a member of HH?	1. Yes 3. No → **stop**
N3	Copy ID	⌊__⌋⌊__⌋

NOTE:

Declaration

1. I, hereby, declare that this Ph.D. dissertation has not been presented to any other examining body either in its present or a similar form.

   Göttingen, December 2021

   …….
   (Signature)

   LYLA RACHMANINGTYAS

2. I hereby, solemnly declare that this dissertation was undertaken independently and without any unauthorized aid.

   Göttingen, December 2021

   …….
   (Signature)

   LYLA RACHMANINGTYAS

Curriculum Vitae

Surname:	Rachmaningtyas
First Name:	Lyla
Date of Birth:	November 11th, 1979
Academic Qualification:	1. Bachelor degree of Economics, Airlangga University (2004) 2. Diploma degree of Chemical Engineering, Institute Technology Sepuluh Nopember Surabaya (2004) 3. Master degree in economics, Gadjah Mada University (2006) 4. PhD of Agriculture Economics and Rural Development, Georg August Universitat Göttingen (2022)
Venia Legendi (qualification to teach):	Professional lecturer certification registration number (issued by the Indonesian Ministry of Education and Culture): 0011117907
At the Higher Education Institution since:	2008
Level of Employment:	Full-time
Teaching Focus:	1. Industrial Economics 2. Agriculture Economics 3. Microeconomics
Interdisciplinary Aspects:	1. Sustainable Agriculture and Certifications 2. Managerial Economics
Activities in the Areas:	
- **Research**	1. Integrated Model of Interpersonal Behaviour and Diffusion of Innovation on The Intention to Adopt Kintamani Bali Arabica Coffee Scheme 2. Sustainability Impact Assessment of Participation in Geographical Indication Scheme: The Case of Kintamani Bali Arabica Coffee 3. Moral Development and Psychological Attachment in Ethical Commitment to Sustainable Farming Practices 4. The Public Expenditure and Revenue Analysis in East Java. The Impact of Infrastructure on Economic Development in East Java: Analysing Local Government Spending on Infrastructure and Its Impact on Economic Growth and Poverty Alleviation.
- **Consultancy**	Commission for the Supervision of Business Competition of Indonesia (KPPU). **Project title**: Oligopoly analysis and impact assessment and two-sided market SEADI – USAID **Project title**: The Impact of Infrastructure Expenditure on Economic Development in East Java : Analyzing Local Government Spending on Infrastructure and its Impact on Economic Growth and Poverty Alleviation in East Java Province".

	The World Bank Group **Project title**: Public Expenditure Analysis Update.
How are personal research activities reflected in teaching activities?	All research activities contribute and integrate in lecturing. For example : through research can help students to understand what works and why, what the short and long-term implications and impact assessment for standards implementation are, provide a justification and rationale for decisions and actions, help to build a repertoire to help deal with the unexpected, identify problems, inform improvement and so forth.
Work experience:	
- **General**	*Department of Economics, Universitas Airlangga* **Lecturer (2008-present)**
- **Activities as an Expert:**	Senior Researcher Inpartner Consultant, Vereinigung Indonesischer Studenten in Deutschland e.V
Publications:	1. Rachmaningtyas, L & Theuvsen, L. 2021. "Toward an Understanding of The Ethical Commitment to Sustainable Farming Practices". The 16th Indonesian Regional Science Association (IRSA) Institute. 12-13 July 2021. 2. LPEP FEB UA – Rachmaningtyas, L, etl. 2013. *"The Impact of Infrastructure Expenditure on Economic Development in East Java : Analyzing Local Government Spending on Infrastructure and its Impact on Economic Growth and Poverty Alleviation in East Java Province",* The 23rd Pacific Conference of the Regional Science Association International (RSAI) and the 4th Indonesian Regional Science Association (IRSA) Institute. 3. Rachmaningtyas, L. 2012. *"Economic Resilience and Vulnerability of East Java*". The 1st International Conference on the Global Economic Crisis and the ASEAN Economy". Consortium on Department of Economics Conference (CDEC). Proceeding. 4. Rachmaningtyas, L and Handoyo, R. 2012. *"Study Competitiveness and The Impact of Asia China Free Trade Area on Textile and Products Textile Industry in the context of National Fair Competition*". Journal Socio Economics (J-SEA) ISSN 1693-4784. 5. Handoyo, R and Rachmaningtyas, L. 2010. "*SME Mapping and Its Competitiveness Performance: Case Study on Kediri Municipality". 10 th* International Regional Science Association Institute (IRSA), Surabaya.
Memberships:	Indonesian economist association, Indonesian Regional Science Association (IRSA) Institute
International experience in:	
- **Academic Activities**	Junior Researcher of the Center for Management in International Agribusiness (CMIA), Department of Agriculture Economics and Rural Development, Georg-August Göttingen University (2015-2022)