

Determinants of Business Sustainability of Agricultural Cooperatives in the Northern Mindanao Region

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ABSTRACT

The research study focused on determining the business sustainability of agricultural cooperatives by its profile (province, number of years of cooperative's operation, size of coop, number of employees, number of members, type of agricultural cooperatives, and its affiliations), management of cooperatives, enterprise characteristics, networks and the business environment in Northern Mindanao region using the Triple Bottom Line Framework, the people, profit and planet introduced by Elkington in 1994. The study utilized a descriptive and correlational design. The data were from the five hundred-two (502) officers, managers, and department heads of the agricultural cooperatives using a combination of an adopted self-constructed and self-made questionnaire to gather data in answering the objectives of the study. Slovin's formula was used to compute the number of samples. Stratified random sampling was employed to obtain the sample population that best represents the entire population being studied. Multiple regression analysis was employed to analyze the data using statistical software. The findings of the study revealed that the following factors: management of cooperatives, enterprise characteristics, networks, and business environment significantly influenced business sustainability (3Ps: People, Profit, and Planet). This study also confirmed that cooperative age moderately influenced business sustainability (people), type of cooperative moderately influenced business sustainability (profit), and number of members moderately influenced business sustainability (planet).

INTRODUCTION

Importance of Agriculture in the Sustainable Development Goals

Agricultural development is one of the most valuable assets to end outrageous poverty. It has provided and fed an extended 9.7 billion individuals by 2050. Development in the agricultural area is two to multiple times more viable in raising wages among the most unfortunate, compared to other sectors. In 2016, investigations found that 65% of helpless working grown-up got by through agriculture. Also, it is indispensable to economic development. In 2014, it represented 33% of the worldwide Gross Domestic Product (GDP) (The World Bank, August 21, 2020). Agricultural cooperatives directly contributed to poverty reduction by offering a democratic and inclusive avenue for growth in the economy. It has been said that cooperatives are the key economic players for improving food security (Ruete, 2014).

Agriculture Sector in the Philippines

Agriculture in the Philippines plays a decisive part in the economy. It highly influences the changing of agribusiness into a dynamic, competitive, and modern sector. A consistent extension of the public economy requires to be preceded with progress in the agrarian segment. Agriculture that includes fisheries and forestry plays a significant role in the economy. The nation's populace is generally 70% of the aggregate, and 66% of this populace relies on farming as a source of income, and about one-half of the workforce is engaged in farming. Prevalently, the country's agricultural industry comprises fishery production, rice, corn, coconut, sugar, banana, animals, poultry, and different yields (Dennis B. Araullo, September 11-15, 2006). The Philippine agribusiness is composed of a blend of small,



medium, and large farms. The greater part of the farms in the nation are generally small farms, which are around 2 hectares. These straightforward ranches are owned and overseen by single families going from resource to business productions (Dennis B. Araullo, September 11-15, 2006). Farming is commonly expected on small homesteads. Just about 66% of all ranches were no bigger than three hectares, and 85% of all farms were close to five hectares. Over a period of ten years, finishing in 1996, the extent of small farms had been expanding.

The Philippine Agrarian Reform Council Secretariat revealed that the legislature had gained and disseminated about 4.1 million hectares of horticultural terrains to the beneficiaries of agrarian reform. Under this program, executing the complete law on agrarian reform, a farm family can't claim a ranch bigger than five hectares. The usual farming system in the Philippines involves significant harvests, with rice, corn, and coconut as normal base yields, and a couple of heads of animals and poultry (Dennis B. Araullo, September 11-15, 2006). The nation's GDP (Gross Domestic Product) in 2019 grew by 6.0 percent. The Gross Value-Added (GVA), aggregated for 9.2 percent of the Gross Domestic Product, showed a 1.2 percent growth during the year, including the (AFF) or the agriculture, fishery, and forestry. The production performance in agriculture rose to 0.3 percent in 2019. The Philippines' income from agricultural exports increased by 9.1 percent in the same year, representing a total of exports 9.4 percent. The following are the top agricultural exports: fresh banana, coconut oil, and pineapple, with a combined share of 52.5 percent in agricultural exports. The country's labor force in 2019 has the sum of 44.69 million persons, and an estimated 94.9 percent were employed persons. The agricultural sector absorbed 9.72 million persons or 22.9 percent of the national employment, with an average daily wage rate of Php 331.10 (Philippine Statistics Authority, 2020). In the second quarter of 2020, agriculture grew by 0.5 percent. Production growths were noted for crops and fisheries during the period. In contrast, livestock and poultry posted decreases in outputs. The assessment of the present cost of production in agriculture summed up to Php 439.8 billion, which is equivalent to 4.6 percent greater than the record of previous years. From January to June 2020, agricultural production declined by 0.6 percent (Philippine Statistics Authority, August 2020).

Cooperatives and Their Importance as a Component of the Agri-Sector

Cooperatives play an important part in the sector of agriculture, both in advanced and emerging nations. By and large, cooperatives have been the primary institutional and (Bank, 2018) authoritative apparatus through which self-administering growers have been able to counter the market power held by local and global merchants. They likewise help to abbreviate the flexibility affixed by allowing producers to consolidate all handling and processes in marketing for significant savings and other related intermediation costs (Tortia, Valentinov, & Iliopoulos, May 2013). The cooperatives in the emerging countries persevere as a vehicle for provincial advancement since they guarantee success as compared to other structures. The role and importance of cooperatives are visible in the global economic crisis. The resilience of cooperatives is progressively known, and makers and opinion-makers are keen to understand how cooperatives can play a vital role in addressing the global crisis and the reform distributed to its generation (Daniela Trifan, 2017). Agricultural cooperatives play an essential role in connecting farmers to market, providing negotiation platforms with buyers, offering aggregating, marketing, and processing services, providing channels of distribution for primary products, delivering training, business planning, and capacity building services to their members (Asian Development Bank, 2018). Various financial institutions have profited through their investment in the agreeable program (William, 2002). The benefits of cooperatives guarantee that they convey an alternative production framework to those people outside state and private ventures (Sibal, 1998). Cooperatives, broadly recognized as a private, deliberate, and free relationship of people consolidating to achieve a specific monetary goal with just control, have been named the biggest financial relationship on the planet. They fill network needs that have been left and neglected by different



enterprises (Deriada, 2005). The cooperative is one of the arms of the government in the promotion of economic progress and social justice. Under the Philippine Development Plan (2011-2016), Cooperatives are extended to give a significant commitment to making, for example, quick, comprehensive, and supported economic development, financial development, and poverty reduction. For the year 2013, the revealing cooperatives posted a total completion equalization of PhP97 billion time/reserve funds stores, settled up capital of PhP71 billion, and net excess of PhP13 billion, all of which added to the consideration of the underestimated segment in the monetary market (Castillo, April 2017). The cooperatives contributed a significant amount of 517 billion pesos or US\$ 9.9 billion or 12.5 percent of the Gross Domestic Product (GDP), which, according to the Cooperative Development Authority (CDA) in 2003, has provided immediate and indirect work for more than 1.5 million Filipinos.

As of December 2015, 9,826 cooperatives conformed to the reportorial prerequisites of CDA, including the accommodation of examined financial statements. Out of this figure, 54 percent were micro, 27 percent were small, 15 percent were medium, and 4 percent were large cooperatives. As far as resource properties, the micro cooperatives included 2%; small-7 7%; medium-19%, and large-72%, as shown in Table 2.1 of the all-out resources of the helpful development. There is an opposite connection between the size of cooperatives and resource holding. The micro cooperatives, which made up 54% of the announced cooperatives, just had 2% of the total resources. Large cooperatives, which made up just 4% of the revealed cooperatives, control 72% of the total resources (Castillo, April 2017). The control of agribusiness cooperatives, which are made up of farming, agrarian reform cooperatives, multi-purpose, and dairy cooperatives, is shown in Table 1.1. Their joint numbers establish 68% of the total number of detailing cooperatives. The all-out volume of business produced by all cooperatives, as of December 2015, was Php 322,697.50 million and supplied direct work to 463,789 people.

MATERIALS & METHODS

The research study focused on determining the business sustainability of agricultural cooperatives by its profile (province, number of years of cooperative's operation, size of coop, number of employees, number of members, type of agricultural cooperatives, and its affiliations), management of cooperatives, enterprise characteristics, networks and the business environment in Northern Mindanao region. The study utilized a descriptive correlational design. The correlational examination determines the connection between two quantitative factors. The correlational investigation decides if a relationship or affiliation exists between the independent and dependent variables using the triple bottom line (3Ps). Multiple regression analysis was used to analyze the information. The method concentrates on the present condition and provides valuable facts on which scientific judgment will be based. The researcher employed a combination of an adopted self-constructed and self-made questionnaire to gather data in answering the objectives of the study. The questionnaire has three (3) parts: the profile of the agriculture cooperative, factors affecting the agricultural cooperative, and business sustainability indicators. A survey was conducted face-to-face by an assigned enumerator in each province and city/municipality. To ensure the validity of the responses, the researcher randomly called the respondents via phone.

RESULTS AND DISCUSSION

This section presents the findings, analysis, and interpretation of the study that focuses on the key determinants of business sustainability in agricultural cooperatives in Northern Mindanao.



Profile of the Respondents

The profile of the respondents includes the name of the agricultural cooperative, job position that is limited only to the officers, managers, department heads, and members of the board of directors with at least three years of cooperative work experience, sex, educational attainment, and the number of years working in the cooperative. There was a total of five hundred two (502) respondents coming from the five (5) provinces of the Northern Mindanao Region, namely: Bukidnon, Camiguin, Lanao del Norte, Misamis Occidental, and Misamis Oriental. This region includes the nine (9) cities: Cagayan de Oro City, El Salvador City, Gingoog City, Iligan City, Malaybalay City, Oroquieta City, Ozamiz City, Tangub City, and Valencia City.

Table 1
Frequency and Percentage Distribution of Respondents in terms of Job Position

Job Position	Frequency	Percentage
Board of Director	268	53.40%
Chairman	48	9.60%
Treasurer	38	7.60%
Board Secretary	33	6.60%
Manager	28	5.60%
Vice-Chairman	21	4.20%
President	12	2.40%
Auditor	10	2.00%
Vice President	10	2.00%
Finance Officer	9	1.80%
Branch Manager	4	0.80%
Loans Officer	4	0.80%
Officer	3	0.60%
Credit Officer	2	0.40%
Department Head	2	0.40%
Administrative Assistant	1	0.20%
Assistant Manager	1	0.20%
Audit Committee Head	1	0.20%
Cluster Leader	1	0.20%
Collection Officer	1	0.20%
Ethics Committee Head	1	0.20%
General Manager	1	0.20%
Insurance Point Person	1	0.20%
Operations Manager	1	0.20%
Presiding Officer	1	0.20%
Total	502	100.00%

Table 1 shows the frequency and percentage distribution of respondents in terms of their job in the agricultural cooperatives. Most of the respondents are Board of Directors at 53.40% or 268 respondents, followed by 9.60% or 48 respondents are Chairmen, 7.60% or 38 respondents are Treasurers, 6.60% or 33 respondents are Board Secretaries, and 5.60% or 28 respondents are Managers. The remaining 17.20% or 87 respondents are distributed in other job positions, respectively. Of the 502 respondents as shown in Table 4.2, 166 or 33.10% belong to the age bracket of 51-60 years old, followed by 139 or 27.70% belong to 41-50 years old, 96 or 19.10% belong to 31-40 years old, 84 or



16.70% belong to 60 years old and above, and 17 or 3.40% are from the age bracket of 21-30 years old, respectively.

Table 2 shows the frequency and percentage distribution of respondents in terms of age bracket, that in 502 respondents the 166 or 33.10% belong to the age bracket of 51-60 years old, followed by 139 or 27.70% belong to 41-50 years old, 96 or 19.10% belong to 31-40 years old, 84 or 16.70% belong to 60 years old and above, and 17 or 3.40% are from the age bracket of 21-30 years old, respectively.

Table 2
Frequency and Percentage Distribution of Respondents in terms of Age Bracket

Age Bracket	Frequency	Percent
51-60 years old	166	33.10%
41-50 years old	139	27.70%
31-40 years old	96	19.10%
60 up years old	84	16.70%
21-30 years old	17	3.40%
Total	502	100.00%

Table 3 shows the frequency and percentage distribution of respondents in terms of sex, with 227 or 55.20% being male respondents and 225 or 44.80% being female respondents.

Table 3
Frequency and Percentage Distribution of Respondents in terms of Sex

Sex	Frequency	Percentage
Male	227	55.20%
Female	225	44.80%
Total	502	100.00%

Table 4 presents the frequency and percentage distribution of respondents in terms of educational attainment, with 502 respondents, 245 or 48.80% finished high school, followed by 220 respondents, or 43.80%, who finished college, and the remaining 7.40%, or 37 respondents, finished graduate school.

Table 4
Frequency and Percentage Distribution of Respondents in terms of Educational Attainment

Educational Attainment	Frequency	Percentage
High School	245	48.80%
College	220	43.80%
Post Graduate	37	7.40%
Total	502	100.00%

Table 5 presents the frequency and percentage distribution of respondents in terms of the number of years working in the cooperative. The respondent must have at least three years of working experience in the cooperative. There are 267 or 53.20% respondents have below ten years working experience in the cooperative (see Table 4.5), 142 or 28.30% with 11 to 20 72 years working experience, 72 or 14.30% with 21 to 30 years working experience, 18 or 3.60% with 31 to 40 years working experience, and 3 or 0.60% with 41 years and above working experience, respectively.

Table 5
Frequency and Percentage Distribution of Respondents in terms of Number of Years in Cooperative

Number of Years in Cooperative	Frequency	Percentage
Below 10 years	267	53.20%
11 to 20 years	142	28.30%
21 to 30 years	72	14.30%
31 to 40 years	18	3.60%
41 up	3	0.60%
Total	502	100.00%

Profile of the Agricultural Cooperatives

The 502 come from vast agricultural lands of the five provinces of the Northern Mindanao Region, at least registered under the Cooperative Development Authority (CDA). There are 166 or 33.10% from Misamis Oriental, followed by 147 or 29.30% from Lanao del Norte, 136 or 27.10% from Bukidnon, 33 or 6.60% from Misamis Occidental, and 20 or 4.00% from Camiguin, respectively.

Table 6
Distribution of Agricultural Cooperatives in the Northern Mindanao Region According to Location

Province	Frequency	Percent
Misamis Oriental	166	33.10%
Lanao del Norte	147	29.30%
Bukidnon	136	27.10%
Misamis Occidental	33	6.60%
Camiguin	20	4.00%
Total	502	100.00%

In Northern Mindanao Region, in terms of age of the cooperative, 172 or 34.30% of the respondents are working in a cooperative that has been operating for more than 21 years, followed by 123 respondents or 24.30% at 1 to 5 years, 83 respondents or 16.50% 73 at 6 to 10 years, 65 respondents or 12.90% at 11 to 15 years, and 59 respondents or 11.80% at 16 to 20 years (see Table 4.7).

Table 7
Distribution of Agricultural Cooperatives in the Northern Mindanao Region According to the Age of the Cooperative

Number of Years	Frequency	Percentage
21 above	172	34.30%
1 to 5 years	123	24.50%
6 to 10 years	83	16.50%
16 to 20 years	65	12.90%
11 to 15 years	59	11.80%
Total	502	100.00%

According to the Cooperative Development Authority (2019), the agricultural cooperatives in Northern Mindanao are composed of different types, namely: agriculture, agrarian reform, multi-purpose, producers, dairy, marketing, credit, and consumers. As shown in Table 4.8, most of the agricultural cooperatives are registered or engaged into multi-purpose type with 351 or 69.90%, followed by

registered agricultural type with 67 or 13.30%, 32 or 6.40% are agrarian reform, 16 or 3.20% are dairy, 15 or 3.00% are marketing, 14 or 2.80% are producers, 7 or 1.40% are consumers.

Table 8

Distribution of Agricultural Cooperatives in the Northern Mindanao Region According to the Agricultural Cooperative Type

Agricultural Cooperative Type	Frequency	Percentage
Multi-purpose	351	69.90%
Agriculture	67	13.30%
Agrarian Reform	32	6.40%
Dairy	16	3.20%
Marketing	15	3.00%
Producers	14	2.80%
Consumers	7	1.40%
Credit	0	0.00
Total	502	100.00%

The size of the cooperative in the Northern Mindanao Region is shown in Table 4.9. Of the 502 cooperatives, 335 or 66.70% are micro cooperatives, followed by 112 or 22.30% are small cooperatives, 30 or 6.00% are large cooperatives, and 25 or 5.00% are medium cooperatives.

Table 9

Distribution of Agricultural Cooperatives in the Northern Mindanao Region According to the Size of Cooperative

Size of Cooperative	Frequency	Percentage
Micro Cooperative	335	66.70%
Small Cooperative	112	22.30%
Large Cooperative	30	6.00%
Medium Cooperative	25	5.00%
Total	502	100.00%

Most of the agricultural cooperatives are micro cooperatives, having 363 or 72.30% respondents with 1-9 employees, followed by 103 or 20.50% with 10-99 employees, 28 or 5.60% with more than 199 employees, and 8 or 1.60% with 100-199 employees.

Table 10

Distribution of Agricultural Cooperatives in Northern Mindanao Region According to the Present Number of Employees

Number of Employees	Frequency	Percent
1 to 9	363	72.30%
10 to 99	103	20.50%
More than 199	28	5.60%
100 to 199	8	1.60%
Total	502	100.00%

In terms of the number of members, Table 4.11 shows that there are 381 respondents or 75.90% with 15-150 members, followed by 71 respondents or 14.10% with 151-300 members, 28 respondents or 5.60% with 751 and up members, 17 respondents or 3.40% with 301-450 members, and the remaining 8 or 1% with 451-750 members.

Table 11
Distribution of Agricultural Cooperatives in the Northern Mindanao Region According to the Number of Members

Number of Members	Frequency	Percent
15 to 150	381	75.90%
151 to 300	71	14.10%
751 and up	28	5.60%
301 to 450	17	3.40%
601 to 750	3	0.60%
451 to 600	2	0.40%
Total	502	100.00%

Table 12 shows that 258 respondents or 51.40% answered “others” with no specification of the name of the affiliations/membership with a cooperative organization, followed by 59 respondents or 11.80% who are members of the National Confederation of Cooperatives, 33 or 6.60% are members of Philippine Co-operative Center, another 33 or 6.60% are members of Philippine Federation of Credit Cooperatives, and the remaining 23.60% are members of their local organizations.

Table 12
Distribution of Agricultural Cooperatives in the Northern Mindanao Region According to the Affiliations/Memberships

Affiliations/ Membership	Frequency	Percentage
Others	258	51.4%
National Confederation of Cooperatives	59	11.80%
Philippine Co-operative Center	33	6.60%
Philippine Federation of Credit Cooperatives	33	6.60%
Claveria Federation of Cooperatives	30	6.00%
City Cooperative Development Council	21	4.20%
Municipal Association of Cooperatives	11	2.20%
Opol Federation of Cooperative	10	2.00%
Philippine Fiber Industry Development Authority	8	1.60%
Agri Aqua Mindanao	7	1.40%
Federation of Free Farmers' Cooperative	6	1.20%
National Confederation of Cooperatives/ Association of Asia	6	1.20%
Confederation of Credit Union		
Gingoog Farmers' Cooperative	5	1.00%
Cagayan de Oro Chamber of Commerce (BSO)	4	0.80%
Federation of People Sustainable Development Cooperative	4	0.80%
Association of Asia Confederation of Credit Union	3	0.60%
Lanao Zamboanga Misamis Cooperative Network	2	0.40%
Cagayan de Oro Chamber of Commerce (BSO)/ Association of Asia	1	0.20%
Confederation of Credit Union		
Misamis Oriental Farmers and Fisherfolks Agriculture Cooperative	1	0.20%
Total	502	100%

Level of Business Sustainability

The level of influence on the business sustainability of the agricultural cooperative in the Northern Mindanao Region in terms of management of the cooperative, enterprise characteristics, networks, and business environment was measured. It was interpreted using a five-point Likert scale, where five (5) is the highest and one is the lowest. Management of cooperatives has an overall mean of 4.44, strongly



influenced by business sustainability. Among the four (4) independent variables, the management of cooperatives is the highest, as shown in Table 4.13. Indicator no. 3 on organizational leadership ranked first with 4.55. It is followed by indicator no. 1 on the development of the eco-accommodating cooperative at 4.50. Among the lowest are the indicators number 15 on continuing education at 4.37 and indicator no. 9 on the invention at 4.36. All the indicators of management of cooperatives have a mean of more than 4.21, which means that each indicator strongly influenced business sustainability. In the management of cooperatives, among the five (5) main indicators, aspiration to sustain the business has the highest mean of 4.50, which means that it strongly influences business sustainability. It is followed by the entrepreneur's education, training, and business experience at 4.45; willingness to take risks at 4.43; opportunity seeking at 4.42; and innovativeness and creativeness at 4.40, which also means that it strongly influenced business sustainability.

Table 13
Management of Cooperative

Management of Cooperatives	Mean	Interpretation
Aspiration to Sustain the Business- 4.50		
1. The management has the desire to develop the eco-accommodating cooperative.	4.50	Development of eco-accommodating cooperative strongly influenced sustainability.
2. The management has the desire to support the eco-accommodating cooperative.	4.44	Support of eco-accommodating cooperative strongly influenced sustainability.
3. The management is fully aware of the responsibility to create a development plan of activities to sustain the life of the organization	4.55	Organizational leadership strongly influenced business sustainability.
Opportunity Seeking – 4.42		
4. The management assesses and seeks applicable and practical income and benefit, creating exercises/open doors for network advancement, new business sectors, and undertaking.	4.39	Strategic management strongly influenced business sustainability.
5. The management sees the significance of being observant.	4.43	Market sensitivity strongly influenced business sustainability.
6. The management explores the business environment for the many opportunities that the cooperative can spot on.	4.43	Opportunity seeking influenced business sustainability
Willingness to take Risks – 4.43		
7. The management bravely faces challenges to improve the business execution of the cooperative.	4.45	Risk-taking strongly influenced business sustainability
8. The management sees things as positive problems that will not affect the operation of the cooperative.	4.40	Optimism strongly influenced business sustainability
Innovativeness and Creativeness – 4.40		
9. The management seeks after the advancement of novel thoughts or items to develop economic business execution.	4.36	Invention strongly influenced business sustainability
10. The management sees the significance of being creative in terms of thinking “outside the box” for the development of products.	4.41	Creativity strongly influenced business sustainability
11. The management sees the significance of being creative in terms of thinking “outside the box” for the services of the cooperative.	4.42	Innovativeness strongly influenced business sustainability
Entrepreneurs Education, Training, and Business Experience – 4.45		
12. The management sees the pertinence of training to create quality in the business execution of the cooperative.	4.47	Training strongly influenced business sustainability
13. The management sees the pertinence of education to create quality in the business execution of the cooperative.	4.48	Education strongly influenced business sustainability
14. The management sees the pertinence of experience to create quality in the business execution of the cooperative.	4.46	Work experience strongly influenced business sustainability
15. The management sees the significance of going to further studies to enhance managerial skills in the operation of the cooperative.	4.37	Continuing education strongly influenced business sustainability
Overall Mean	4.44	Management of cooperative strongly influenced business sustainability



Table 14 shows that the overall mean for enterprise characteristics is 4.35, which is strongly influenced by business sustainability. Among the top three (3) indicators for this independent variable are indicator 1 on financial management at 4.55, followed by indicator 2 on financial reporting at 4.49, and indicator 9 on customer satisfaction with services at 4.42. Indicators 5 on advanced technological systems at 4.18 and indicator 6 on advanced technological innovations at 4.16 were rated lowest, with a moderately influenced business sustainability interpretation. There are five (5) main indicators under enterprise characteristics: financial management, research and development, advanced technology, skills development, and customer satisfaction. Among these indicators, financial management has the highest mean of 4.52, which strongly influences business sustainability. Customer satisfaction is at 4.42, skills development is at 4.37, and research and development is at 4.29, which means that these indicators strongly influenced business sustainability. While an advanced technology at 4.17 is the lowest, which only means it moderately influenced business sustainability.

Table 14a
Enterprise Characteristics

Enterprise Characteristics	Mean	Interpretation
Financial Management – 4.52		
1. The cooperative sees the significance of cash flow management including inflation and interest rates in the operations.	4.55	Financial management strongly influenced business sustainability
2. The cooperative gives priority to the regular reporting of the finances for management decisions.	4.49	Financial reporting strongly influenced business sustainability
Research and Development – 4.29		
3. The cooperative sees the significance of research and development initiatives to assess business sustainability.	4.33	Research and development on sustainability strongly influenced business sustainability
4. The cooperative sees the importance of research and development initiatives to improve the products and services.	4.25	Research and development on products and services strongly influenced business sustainability

Table 14b
Enterprise Characteristics

Enterprise Characteristics	Mean	Interpretation
Advanced Technology – 4.17		
5. The cooperative employs advanced technological tools (or systems) to improve service products.	4.18	Advanced technological systems moderately influenced business sustainability
6. The cooperative integrates advanced technological innovations to support production efficiency.	4.16	Advanced technological innovations moderately influenced business sustainability
Skills Development – 4.37		
7. The cooperative gives priority to employees' skills development to enhance the quality of services.	4.34	Employees skills development strongly influenced business sustainability
8. The cooperative gives importance to member's skills development to enhance the quality and production.	4.39	Members skills development strongly influenced business sustainability
Customer Satisfaction – 4.42		
9. The cooperative considers customer satisfaction in the services as relevant in the development of business sustainability.	4.42	Customer satisfaction in services strongly influenced business sustainability
10. The cooperative considers customer satisfaction in the products as relevant to the development of business sustainability.	4.41	Customer satisfaction in products strongly influenced business sustainability
Overall Mean	4.35	Enterprise characteristics strongly influenced business sustainability

The third independent variable is the networks. It has ten (10) indicators with an overall mean of 4.34, which also means that networks strongly influence business sustainability. Indicator 5 on the relationship with suppliers topped the list at 4.49. Second, on the list is indicator 6, or relationships



with service-providers at 4.48, and the third is indicator 3 on support from family and relatives at 4.45. However, indicator 10 on educational institutions partnerships and projects was rated the lowest in all indicators at 3.98, which is moderately influenced by business sustainability. Other remaining indicators are rated at 4.21 and above, strongly influencing business sustainability (See Table 4.15). The table shows five (5) main indicators: affiliation in business organizations and business associations, family and friends support, relationship to consumers, benchmarking with competitors, and linkage with colleges and universities. The data shows that the relationship to consumers has the highest mean at 4.49, which means that it strongly influences business sustainability. Three other indicators on family and friends support at 4.42, affiliation in business organizations and associations at 4.34, and benchmarking with competitors at 4.34, which also means it strongly influenced business sustainability. However, linkage with the colleges and universities got the lowest mean at 4.10, which moderately influenced business sustainability.

Table 15
Networks

Networks	Mean	Interpretation
Affiliations in Business Organizations and Associations – 4.34		
1. The cooperative joins actively with other organizations to increase the networks.	4.30	Organizations strongly influenced business sustainability
2. Affiliations strongly influenced affiliations in various business organizations to business sustainability enhance its products and services.	4.37	Affiliations strongly influenced affiliations in various business services.
Family and Friends Support – 4.42		
3. The cooperative sees the prominence of support of family and relatives in business sustainability.	4.45	Family and relatives strongly influenced business sustainability
4. The cooperative values the support of friends to increase the reach of networks that will contribute to business sustainability.	4.39	Friends strongly influenced business sustainability
Relationship to Consumers – 4.49		
5. The cooperative values a good relationship with the suppliers as an important element in business sustainability.	4.49	Relationship with suppliers strongly influenced business sustainability
6. The cooperative values a good relationship with the service providers as an important element in business sustainability.	4.48	Relationship with service providers strongly influenced business sustainability
Benchmarking with Competitors – 4.34		
7. The cooperative sees the relevance of benchmarking to improve business sustainability.	4.39	Benchmarking strongly influenced benchmarking with competitors
8. The cooperative sees the importance of the competitors applicable for business sustainability operation.	4.32	Competitors strongly influenced benchmarking from the competitors
Linkage with the Colleges and Universities – 4.10		
9. The cooperative links with educational institutions for training and other support services to enhance business sustainability.	4.21	Educational institutions on trainings and support services strongly influenced business sustainability
10. The cooperative links with colleges and universities for projects and partnerships to enhance business sustainability.	3.98	Educational institutions on projects and partnerships moderately influenced business sustainability
Overall Mean	4.34	Networks strongly influenced business sustainability

Business environment is the last factor with an overall mean of 4.34 that strongly influenced business sustainability. Business location (indicator 12) at 4.54 topped the list, followed by government support in training and development (indicator 10) at 4.47, government partnerships (indicator 9) at 4.44, and diversity, peace, and order (indicator 11) at 4.44. Among the low-rated indicators were availability of affordable high-value raw materials (indicator 3) at 4.18, access to financial institutions (indicator 1) at 4.17, and access to credit facilities (indicator 2) at 4.14, which moderately influenced business



sustainability. In the business environment factor, business locations have the highest mean at 4.49, which strongly influences business sustainability. It is followed by support of the government at 4.42 and access to the market at 4.35, which also means that these two indicators strongly influenced business sustainability. The other two indicators, availability of raw materials at 4.20 and access to finance at 4.16, both moderately influenced business sustainability.

Table 16a
Business Environment

Business Environment	Mean	Interpretation
Access to Finance – 4.16		
1. The cooperative considers the banks and other financial institutions in the Northern Mindanao as funding channels for the improvement of the cooperative.	4.17	Access to financial institutions moderately influenced business sustainability
2. The cooperative looks into the offering of other financial institutions with low interest to evaluate the organization's products and services.	4.14	Access to credit facilities moderately influenced business sustainability
Availability of Raw Materials – 4.20		
3. The cooperative sees the significance of the availability of reasonable high-value raw materials for use in production.	4.18	Availability of affordable, high-value raw materials moderately influenced business sustainability
4. The cooperative sees the importance of having enough and abundant raw materials for the operation.	4.22	Sufficient raw materials strongly influenced business sustainability

Table 16b
Business Environment

Business Environment	Mean	Interpretation
Access to Market – 4.35		
5. Market opportunities match with the community's readiness to accept new technologies.	4.27	Access to technology strongly influenced business sustainability
6. The cooperative sees the importance of access to the market to deliver products and services.	4.43	Access to market strongly influenced business sustainability
Support of the Government – 4.42		
7. The government agencies (such as legal, government regulatory agencies) help boost the business sustainability of the cooperative.	4.40	Availability of government agencies strongly influenced business sustainability
8. The government supports cooperatives through its various agencies by providing financial assistance to enhance business sustainability.	4.37	Government financial assistance strongly influenced business sustainability
9. The government supports cooperatives through its various agencies by providing partnerships to enhance business sustainability.	4.44	Government partnerships strongly influenced business sustainability
10. The government supports the cooperatives through its various agencies by providing training and capability building to enhance business sustainability.	4.47	Government support in training and development strongly influenced business sustainability
Location of the Business – 4.49		
11. It is evident that Northern Mindanao is characterized by the diversity of cultures, enjoys peace, and order a low incidence of natural calamities.	4.44	Diversity, peace, and order strongly influenced business sustainability
12. The cooperative sees the business location as an important aspect to thrive in the community.	4.54	Business location strongly influenced business sustainability
Overall Mean	4.32	Business environment strongly influenced business sustainability

Correlations



Correlations: Management of Cooperatives to Business Sustainability

Table 17 shows that “management of cooperative” is significantly correlated to “business sustainability”: People (.408) mean weak and positive relationships between the variables tested, Profit (.620) means strong and positive relationships between the variables tested, and Planet (.501) means moderate and positive relationships between the variables tested.

Table 17
Correlations: Management of Cooperatives to Business Sustainability Correlations

Management of Cooperatives			People	Profit	Planet
Management of Cooperatives	Pearson Correlation	1	.408**	.620**	.501**
	Sig. (2-tailed)		.000	.000	.000
	N	502	502	502	502
People	Pearson Correlation	.408**	1	.406**	.607**
	Sig. (2-tailed)	.000		.000	.000
	N	502	502	502	502
Profit	Pearson Correlation	.620**	.406**	1	.573**
	Sig. (2-tailed)	.000	.000		.000
	N	502	502	502	502
Planet	Pearson Correlation	.501**	.607**	.573**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	502	502	502	502

** . Correlation is significant at the 0.01 level (2-tailed).

Correlations: Enterprise Characteristics to Business Sustainability

Table 4.18 shows that “enterprise characteristics” is significantly correlated to “business sustainability”: People (.576) mean moderate and positive relationships between the variables tested, Profit (.595) means moderate and positive relationships between the variables tested, and Planet (.614) means strong and positive relationships between the variables tested.

Table 18
Correlations: Enterprise Characteristics to Business Sustainability Correlations

Enterprise Characteristics			People	Profit	Planet
Enterprise Characteristics	Pearson Correlation	1	.576**	.595**	.614**
	Sig. (2-tailed)		.000	.000	.000
	N	502	502	502	502
People	Pearson Correlation	.576**	1	.406**	.607**
	Sig. (2-tailed)	.000		.000	.000
	N	502	502	502	502
Profit	Pearson Correlation	.595**	.406**	1	.573**
	Sig. (2-tailed)	.000	.000		.000
	N	502	502	502	502
Planet	Pearson Correlation	.614**	.607**	.573**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	502	502	502	502

** . Correlation is significant at the 0.01 level (2-tailed).

Correlations: Networks to Business Sustainability

Table 19 shows that “network” is significantly correlated to “business sustainability”: People (.581), mean moderate and positive relationship between variables tested, Profit (.573), means a moderate and



positive relationship between variables tested, and Planet (.623), means a strong and positive relationship between variables tested.

Table 19
Correlations: Networks to Business Sustainability Correlations

		Networks	People	Profit	Planet
Networks	Pearson Correlation	1	.581**	.573**	.623**
	Sig. (2-tailed)		.000	.000	.000
	N	502	502	502	502
People	Pearson Correlation	.581**	1	.406**	.607**
	Sig. (2-tailed)	.000		.000	.000
	N	502	502	502	502
Profit	Pearson Correlation	.573**	.406**	1	.573**
	Sig. (2-tailed)	.000	.000		.000
	N	502	502	502	502
Planet	Pearson Correlation	.623**	.607**	.573**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	502	502	502	502

** . Correlation is significant at the 0.01 level (2-tailed).

Correlations: Business Environment to Business Sustainability

Table 4.20 shows that “business environment” is significantly correlated to “business sustainability”: People (.546), Profit (.552), and Planet (.554). These results signify a moderate and positive relationship between the variables tested.

Table 20
Correlations: Business Environment to Business Sustainability Correlations

		Business Environment	People	Profit	Planet
Business Environment	Pearson Correlation	1	.546**	.542**	.554**
	Sig. (2-tailed)		.000	.000	.000
	N	502	502	502	502
People	Pearson Correlation	.546**	1	.406**	.607**
	Sig. (2-tailed)	.000		.000	.000
	N	502	502	502	502
Profit	Pearson Correlation	.542**	.406**	1	.573**
	Sig. (2-tailed)	.000	.000		.000
	N	502	502	502	502
Planet	Pearson Correlation	.554**	.607**	.573**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	502	502	502	502

** . Correlation is significant at the 0.01 level (2-tailed).

Multiple Regression Analysis (MRA)

MRA is a parametric technique. It assumes strictly that the data are normally distributed. Another assumption is Collinearity, which means that the independent variables should not be highly correlated (a correlation of .80). The MRA assumption of homoscedasticity should be observed. Homoscedasticity refers to the assumption that the independent variable exhibits an equal level of

variance across the range of predictor variables (Hair et al., 2014). Lastly, the assumption of the sufficiency of observation must adhere. Multiple regression analysis was applied to test the explanatory and predictive power of the different independent variables (Management of Cooperatives, Enterprise Characteristics, Networks, and Business Environment) on the dependent variables (Business Sustainability: People Bottom Line, Profit Bottom Line, and Planet Bottom Line). Using the stepwise method, the following tests were performed first before the different models were tested for their predictive and explanatory power: normality test, collinearity test, homoscedasticity test, and a sufficient number of observations. Then the results of multiple regression models, such as model summary, ANOVA, coefficients, and moderating effect for every dependent variable (Business Sustainability: People Bottom Line, Profit Bottom Line, and Planet Bottom Line) were analyzed. The three sets of dependent variables were analyzed using stepwise multiple regression as follows, with five hundred two (502) sample respondents. Below is the table of interpretation for r^2 :

Table 21
R Square Value and Interpretation

Range		Description
From	To	
0.81	1.00	Very Strong
0.61	0.80	Strong
0.41	0.60	Moderate
0.21	0.40	Weak
0.00	0.20	Very Weak

Dependent Variable: Business Sustainability – People Bottom Line

On Normality Test, the Kolmogorov-Smirnov and Shapiro-Wilk tests on standardized residuals were performed to determine the null hypothesis (there is no significant normality concern among the observed variables). Table 4.22 shows that the p values of .000 (Kolmogorov-Smirnov) and .000 (Shapiro-Wilk) are significant. The Normal P-P Plot (Please see page 181) did not show a close fit between the dotted line and the 45-degree curve, which guarantees normality. Since the Kolmogorov-Smirnov and Shapiro-Wilk test results are less than .05, the null hypothesis, which corresponds to a normal distribution of the variable, is rejected. Thus, the observed data were not normally distributed for Business Sustainability. The normality can have a serious effect in small samples (fewer than 50 cases), but the impact effectively diminishes when sample sizes reach 200 cases or more (Hair et al., 2014).

Table 22
Tests of Normality: Business Sustainability–People Bottomline

	Kolmogorov-Smirnov ^a			Shapiro-Wi k		
	Statistic	Df	Sig.	Statistic	df	Sig.
Standardized Residual	.143	502	.000	.923	502	.000

On the collinearity test, the collinearity statistics in Table 4.23 show that there are no VIF values greater than 5 for all the models, which indicates a strong presence of collinearity. The highest VIF for model 4 is 3.498. Thus, the researcher asserts that there is no multicollinearity issue for Business Sustainability–People Bottom Line. On the Homoscedasticity Test, the ZPRED(X) and ZRESID(Y) were measured on the scatterplot (please see page 182) to test the presence of a pattern in a graph. The



test does not show a diamond pattern or a triangle shape, either to the left or right. Thus, the researcher can say that all the variables in Business Sustainability–People Bottom Line are relevant.

Table 23
Coefficients: Business Sustainability–People Bottom Line

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
1 (Constant)	.735	.213		3.454	.001		
Networks	.776	.049	.581	15.967	.000	1.000	1.000
2 (Constant)	.155	.226		.685	.494		
Networks	.522	.063	.391	8.336	.000	.562	1.780
Business Environment	.388	.063	.288	6.136	.000	.562	1.780
3 (Constant)	.046	.225		.203	.839		
Networks	.331	.081	.248	4.063	.000	.325	3.079
Business Environment	.319	.065	.236	4.883	.000	.514	1.946
Enterprise Characteristics	.285	.079	.221	3.620	.000	.325	3.079
4 (Constant)	.385	.249		1.544	.123		
Networks	.399	.084	.298	4.763	.000	.302	3.311
Business Environment	.341	.065	.253	5.237	.000	.507	1.971
Enterprise Characteristics	.373	.083	.289	4.486	.000	.286	3.498
Management of Cooperatives	-.251	.082	-.164	-3.065	.002	.414	2.413

The coefficient of determination (R^2) for the final model (Model 4) is .411 (see Table 4.24 Model Summary). Its ANOVA, as shown in Table 4.25, has an F value of 86.733 (p-value=.000) which means that all the independent variables used together in this model as a set are significantly related to the dependent variable. Although it may not have a good practical significance because of its weak explanatory value, it still accounts for 41.1% variances. Thus, it can still explain the variance with 41.1% explanatory power. Specifically, Networks (b_1 of .399, t value of 4.763, p-value of .000), Business Environment (b_2 of .341, t value of 5.237, p-value of .000), Enterprise Characteristics (b_3 of .373, t value of 4.786, p-value of .000), and Management of Cooperatives (b_4 of -.251, t value of -3.065, p-value of .002) explain the variances of 41.1%.

MRA Equation is shown below:

$$Y = b_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + \epsilon$$

Where:

- Y = People
- $b_0 = \beta$ constant
- $b_1 = \beta$ coefficient of Networks
- $b_2 = \beta$ coefficient of Business Environment
- $b_3 = \beta$ coefficient of Enterprise Characteristics
- $b_4 = \beta$ coefficient of Management of Cooperative
- X_1 = mean of Networks
- X_2 = mean of Business Environment
- X_3 = mean of Enterprise Characteristics
- X_4 = mean of Management of Cooperatives
- ϵ = error term

Business Sustainability – People Bottom Line = .385 + .399 networks + .341 business environment + .373 enterprise characteristics - .251management of cooperatives (Please see Table 18)

The model also shows that the independent variables management of cooperative, enterprise characteristics, networks, and business environment are significant and moderately influence business

sustainability–people’s bottom line. Prediction based on the MRA equation is not performed anymore because the value of R^2 is moderate.

Table 24
Model Summary: Business Sustainability–People Bottom Line

Model	R	R Square	Adjusted R Square	Sig. F Change
1	.581	.338	.336	.000
2	.620	.384	.382	.000
3	.632	.400	.396	.000
4	.641	.411	.406	.002

Table 25
ANOVA: Business Sustainability–People Bottom Line

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	98.530	1	98.530	254.951	.000 ^b
	Residual	193.233	500	.386		
	Total	291.763	501			
2	Regression	112.085	2	56.043	155.642	.000 ^c
	Residual	179.677	499	.360		
	Total	291.763	501			
3	Regression	116.693	3	38.898	110.648	.000 ^d
	Residual	175.070	498	.352		
	Total	291.763	501			
4	Regression	119.941	4	29.985	86.733	.000 ^e
	Residual	171.822	497	.346		
	Total	291.763	501			

Dependent Variable: Business Sustainability-Profit Bottom Line

On the Normality Test, the Kolmogorov-Smirnov and Shapiro-Wilk tests on standardized residuals were performed to determine the null hypothesis (there is no significant normality concern among the observed variables). In Table 4.26, the result showed that the p-values of .000 (Kolmogorov-Smirnov) and .000 (Shapiro-Wilk) are significant. The Normal P-P Plot (Please see page 194) did not show a close fit between the dotted line and the 45-degree curve, which is to guarantee normality. Since the Kolmogorov-Smirnov and Shapiro-Wilk test results are less than .05, the null hypothesis, which corresponds to a normal distribution of the variable, is rejected. Thus, the observed data were not normally distributed for Business Sustainability. The normality can have a serious effect in small samples (fewer than 50 cases), but the impact effectively diminishes when sample sizes reach 200 cases or more (Hair et al., 2014).

Table 26
Tests of Normality: Business Sustainability-Profit Bottom Line

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
Standardized Residual	.065	502	.000	.987	502	.000

a. Lilliefors Significance Correction



The collinearity statistics in Table 4.27 show that there are no VIF values greater than 5 for all the models, which indicates a strong presence of collinearity. The highest VIF for model 3 is 2.6838, which suggests that there is no multicollinearity issue for Business Sustainability–Profit Bottom Line. On the Homoscedasticity Test, the ZPRED(X) and ZRESID(Y) were measured on the scatterplot (please see page 195) to test the presence of a pattern in a graph. The test does not show the presence of a diamond pattern or a triangle shape, either to the left or right. Thus, the researcher can say that all the relevant variables are in Business Sustainability–Profit Bottom Line.

Table 27
Coefficients: Business Sustainability-Profit Bottom Line

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
1 (Constant)	1.450	.171		8.503	.000		
Management of Cooperatives	.674	.038	.620	17.648	.000	1.000	1.000
2 (Constant)	1.084	.173		6.270	.000		
Management of Cooperatives	.501	.045	.460	11.097	.000	.660	1.515
Business Environment	.262	.040	.273	6.587	.000	.660	1.515
3 (Constant)	1.091	.171		6.388	.000		
Management of Cooperatives	.385	.054	.353	7.089	.000	.446	2.244
Business Environment	.192	.043	.201	4.442	.000	.541	1.848
Enterprise Characteristics	.186	.050	.203	3.765	.000	.379	2.638

The coefficient of determination (R^2) for the final model (Model 3) is .449 (see Table 4.28 Model Summary). ANOVA, as shown in Table 4.29, has an F value of 135.164 (P value=.000), which means that all the independent variables used together in this model as a set are significantly related to the dependent variable. Although it may not have a good practical significance because of its weak explanatory value, it still accounts for 44.9% of the variance. Thus, it can still explain the variance with 44.9% explanatory power. Specifically, Business Environment (b_2 of .192, t value of 4.442, p-value of .000), Enterprise Characteristics (b_3 of .186, t value of 3.765, p-value of .000), and Management of Cooperatives (b_1 of .385, t value of 7.089, p-value of .000) explain the variances of 44.9%. See Table 27 (Coefficients).

MRA Equation is shown below:

$$Y = b_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 + \varepsilon$$

Where: Y = Profit $b_0 = \beta$ constant
 $b_1 = \beta$ coefficient of Management of Cooperative
 $b_2 = \beta$ coefficient of Business Environment
 $b_3 = \beta$ coefficient of Enterprise Characteristics
 X_1 = mean of Networks
 X_2 = mean of Business Environment
 X_3 = mean of Enterprise Characteristics
 ε = error term

Business Sustainability – Profit Bottom Line = .1.091 + .385 management of cooperatives + .192 business environment + .186 enterprise characteristics (Please see Table 27)

In the table below, there are only three (3) independent variables significant and moderately influence business sustainability-profit bottom line: management of cooperative, enterprise characteristics, and



business environment. The network is not significant in business sustainability. Networks and alliances involving universities influence growth in innovation sectors (Machado, 2016) since they only moderately influence business sustainability. Prediction based on the MRA equation is not performed anymore because the value of R^2 is moderate.

Table 28
Model Summary: Business Sustainability-Profit Bottom Line

Model	R	R Square	Adjusted R Square	Sig. F Change
1	.620	.384	.383	.000
2	.658	.433	.431	.000
3	.670	.449	.445	.000

Table 29
ANOVA: Business Sustainability – Profit Bottom Line

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	56.463	1	56.463	311.468	.000 ^b
	Residual	90.640	500	.181		
	Total	147.102	501			
2	Regression	63.713	2	31.856	190.626	.000 ^c
	Residual	83.390	499	.167		
	Total	147.102	501			
3	Regression	66.020	3	22.007	135.164	.000 ^d
	Residual	81.082	498	.163		
	Total	147.102	501			

Dependent Variable: Business Sustainability – Planet Bottom Line

On the Normality Test, the Kolmogorov-Smirnov and Shapiro-Wilk tests on standardized residuals were performed to determine the null hypothesis (there is no significant normality concern among the observed variables). In Table 4.30, the result showed that the p-values of .000 (Kolmogorov-Smirnov) and .000 (Shapiro-Wilk) are significant. The Normal P-P Plot (Please see page 208) did not show a close fit between the dotted line and the 45-degree curve, which is to guarantee normality. Since the Kolmogorov-Smirnov and Shapiro-Wilk test results are less than .05, the null hypothesis, which corresponds to a normal distribution of the variable, is rejected. Thus, the observed data were not normally distributed for Business Sustainability. The normality can have a serious effect in small samples (fewer than 50 cases), but the impact effectively diminishes when sample sizes reach 200 cases or more (Hair et al., 2014).

Table 30
Tests of Normality: Business Sustainability–Planet Bottom Line

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
Standardized Residual	.120	502	.000	.946	502	.000

a. Lilliefors Significance Correction



The collinearity statistics shown in Table 4.31 show no VIF values greater than 5 for all the models, which indicates a strong presence of collinearity. The highest VIF for Model 3 is 3.079. Thus, the researcher can say that there is no multicollinearity issue for Business Sustainability–Planet Bottom Line. On the Homoscedasticity Test, the ZPRED(X) and ZRESID(Y) were measured on the scatterplot (please see page 208) to test the presence of a pattern in a graph. The test does not show the presence of a diamond pattern or a triangle shape, either to the left or right. Thus, the researcher can say that all the relevant variables are in Business Sustainability– Planet Bottom Line.

Table 31
Coefficients: Business Sustainability–Planet Bottom Line

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
1 (Constant)	1.061	.185		5.748	.000		
Networks	.751	.042	.623	17.788	.000	1.000	1.000
2 (Constant) Networks	.782	.186		4.207	.000		
Enterprise Characteristics	.440	.069	.365	6.397	.000	.355	2.817
	.374	.066	.321	5.631	.000	.355	2.817
3 (Constant) Networks	.490	.196		2.500	.013		
Enterprise Characteristics	.353	.071	.293	4.999	.000	.325	3.079
Business Environment	.291	.068	.249	4.254	.000	.325	3.079
	.237	.057	.195	4.179	.000	.514	1.946

The coefficient of determination (R^2) for the final model (Model 3) is .444 (see Table 4.32 Model Summary). Its ANOVA, as shown in Table 4.33, has an F value of 132.374 (p-value=.000) which means that all the independent variables used together in this model as a set are significantly related to the dependent variable. Although it may not have a good practical significance because of its weak explanatory value, it still accounts for 44.4% variances. Thus, it can still explain the variance with 44.4% explanatory power. Specifically, Networks (b_1 of .353, t value of 4.999, p-value of .000), Business Environment (b_3 of .237, t value of 4.179, p-value of .000), and Enterprise Characteristics (b_2 of .291, t value of 4.254, p-value of .000) explain the variances of 44.4%. See Table 31 (Coefficients).

MRA Equation is shown below:

$$Y = b_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 + \varepsilon$$

Where: Y = Planet $b_0 = \beta$ constant
 $b_1 = \beta$ coefficient of Networks $b_2 = \beta$ coefficient of Enterprise Characteristics
 $b_3 = \beta$ coefficient of Business Environment
 X_1 = mean of Networks
 X_2 = mean of Enterprise Characteristics
 X_3 = mean of Business Environment
 ε = error term

Business Sustainability – Planet Bottom Line = .490 + .353 networks + .291 enterprise characteristics + .237 business environment (Please see Table 4.31)

In the table for business sustainability–planet bottom line, the management of the cooperative is not significant. The following factors are significant and moderately influence business sustainability: planet bottom line, networks, enterprise characteristics, and business environment. The management and farmers have to be fully empowered for environmental protection in terms of improving their farm

productivity and economic opportunities, and improving their standards of living to foster sustainable livelihood (Quilloy, 2015). Prediction based on MRA equation is not performed anymore because the value of R^2 is moderate.

Table 32
Model Summary: Business Sustainability – Planet Bottom Line

Model	R	R Square	Adjusted R Square	Sig. F Change
1	.623 ^a	.388	.386	.000
2	.651 ^b	.424	.422	.000
3	.666 ^c	.444	.440	.000

Table 33
ANOVA: Business Sustainability–Planet Bottom Line

	Model	Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	92.112	1	92.112	316.399	.000 ^b
	Residual	145.563	500	.291		
	Total	237.675	501			
2	Regression	100.808	2	50.404	183.766	.000 ^c
	Residual	136.867	499	.274		
	Total	237.675	501			
3	Regression	105.445	3	35.148	132.374	.000 ^d
	Residual	132.230	498	.266		
	Total	237.675	501			

Moderation Analysis

Moderation analysis was performed using Hierarchical Multiple Regression. Through SPSS and Process by Prof Hayes, the categorical moderating variables cooperative age, cooperative type, and number of members were transformed into binary data and applied moderation analysis. The results for the dependent variables (Business Sustainability–People Bottom Line, Business Sustainability–Profit Bottom Line, and Business Sustainability–Planet Bottom Line) are shown below:

In Table 34, there is no moderating effect except for category W1 (Coop Age 1-5 years = p-value .0016) and W5 (21 above = p-value .0001), which are significant, the rest of the categories (W2, W3, and W4) nominal variable Age of Cooperative are not significant. Thus, overall, it moderates the effect of the relationship between independent variables on the dependent variable, People (p-value =.0416).



Table 34

Moderation Analysis for Dependent Variable: Business Sustainability–People Bottom Line (Age of Cooperative)

OUTCOME VARIABLE: People

Model Summary

	R	R-sq	MSE	F	df1	df2	p
	.5953	.3544	.5391	24.4519	11.0000	490.0000	.0000

Model	coeff	se	t	p	LLCI	ULCI
Constant	1.3437	.4928	2.7269	.0066	.3755	2.3120
Networks	.4572	.1438	3.1800	.0016	.1747	.7397
W1	.2414	.1069	2.2579	.0244	.0313	.4515
W2	.0135	.1195	.1132	.9099	-.2212	.2482
W3	.1131	.1139	.9929	.3213	-.1107	.3370
W4	-.0238	.0868	-.2737	.7844	-.1944	.1468
Int_1	-.1698	.1952	-.8702	.3846	-.5533	.2137
Int_2	-.2614	.1916	-1.3644	.1731	-.6379	.1150
Int_3	-.5940	.2293	-2.5905	.0099	-1.0445	-.1435
Int_4	.0173	.1520	.1137	.9096	-.2814	.3160
EntChar	.4263	.1002	4.2528	.0000	.2293	.6232
BusEnvi	.2101	.0821	2.5580	.0108	.0487	.3715

Test(s) of highest order unconditional interaction(s):

	R2-chng	F	df1	df2	p
X*W	.0132	2.5032	4.0000	490.0000	.0416

Table 35 shows that there is no moderating effect except for category W2 (6-10 years, p-value=.0068) and W4 (21 years and up, p-value=.0013), which is significant; the rest of the categories (W1 and W3), the nominal variable age of cooperative, are not significant. Thus, overall, it does not moderate the effect of the relationship between independent variables on the dependent variable Profit (p-value=.4657).

Table 35

Business Sustainability Profit Bottom Line (Age of Cooperative)

OUTCOME VARIABLE: Profit

Model Summary

	R	R-sq	MSE	F	df1	df2	p
	.6876	.4728	.1583	39.9487	11.0000	490.0000	.0000

Model	coeff	se	t	p	LLCI	ULCI
constant	2.6829	.2236	11.9972	.0000	2.2435	3.1223
MgtCoop	.4186	.0857	4.8851	.0000	.2502	.5869
W1	.0468	.0567	.8255	.4095	-.0646	.1581
W2	.1760	.0647	2.7189	.0068	.0488	.3032
W3	-.0175	.0614	-.2854	.7755	-.1382	.1031
W4	.1522	.0471	3.2336	.0013	.0597	.2447
Int_1	.0192	.1095	.1753	.8609	-.1960	.2344
Int_2	.0070	.1153	.0609	.9514	-.2195	.2336
Int_3	-.2224	.1375	-1.6171	.1065	-.4925	.0478
Int_4	-.0399	.1025	-.3897	.6969	-.2413	.1614
BusEnvi	.2100	.0437	4.8076	.0000	.1242	.2958
EntChar	.1773	.0499	3.5547	.0004	.0793	.2753

Test(s) of highest order unconditional interaction(s):

	R2-chng	F	df1	df2	p
X*W	.0039	.8967	4.0000	490.0000	.4657

There is no moderating effect except for category W3 (16-20 years, p-value=.0136), which is significant. The rest of the categories, the nominal variable age of the cooperative, are not significant.



Thus, overall, it does not moderate the effect of the relationship between independent variables on the dependent variable Planet (p-value=.1597) as seen in Table 36.

Table 36

Business Sustainability Planet Bottom Line (Age of Cooperative)

OUTCOME VARIABLE: Planet

Model Summary

	R	R-sq	MSE	F	df1	df2	p
	.6867	.4716	.2563	39.7519	11.0000	490.0000	.0000

Model	coeff	se	t	p	LLCI	ULCI
constant	1.8534	.3398	5.4549	.0000	1.1858	2.5210
Networks	.4088	.0991	4.1237	.0000	.2140	.6036
W1	.1248	.0737	1.6928	.0911	-.0201	.2697
W2	.1440	.0824	1.7482	.0811	-.0178	.3058
W3	-.1946	.0786	-2.4770	.0136	-.3490	-.0402
W4	-.0047	.0599	-.0781	.9378	-.1223	.1129
Int_1	-.2444	.1346	-1.8159	.0700	-.5088	.0200
Int_2	-.0974	.1321	-.7376	.4611	-.3570	.1621
Int_3	-.2786	.1581	-1.7621	.0787	-.5892	.0320
Int_4	-.0133	.1048	-.1272	.8988	-.2193	.1926
EntChar	.3149	.0691	4.5568	.0000	.1791	.4507
BusEnvi	.2503	.0566	4.4199	.0000	.1390	.3616

Test(s) of highest order unconditional interaction(s):

	R2-chng	F	df1	df2	p
X*W	.0071	1.6533	4.0000	490.0000	.1597

As shown in Table 37, there is no moderating effect except for category W3 (Agrarian Reform, p-value=.0018) and W6 (Consumers, p-value=.0499), which is significant; the rest of the categories (W1, W2, W4, and W5) have nominal Type of Cooperative and are not significant. Thus, overall, it does not moderate the effect of the relationship between independent variables on the dependent variable People (p-value=.1792).

Table 37

Business Sustainability People Bottom Line (Cooperative Type)

OUTCOME VARIABLE: People

Model Summary

	R	R-sq	MSE	F	df1	df2	p
	.6080	.3696	.5307	18.9990	15.0000	486.0000	.0000

Model	coeff	se	t	p	LLCI	ULCI
constant	1.5760	.4726	3.3347	.0009	.6474	2.5046
Networks	.1424	.2022	.7043	.4816	-.2549	.5397
W1	-.1634	.1142	-1.4315	.1529	-.3877	.0609
W2	.0764	.2308	.3310	.7408	-.3771	.5299
W3	-.5613	.1785	-3.1448	.0018	-.9120	-.2106
W4	-.8196	.8043	-1.0191	.3087	-2.4000	.7607
W5	-.2637	.2224	-1.1855	.2364	-.7008	.1734
W6	-.6316	.3213	-1.9660	.0499	-1.2629	-.0004
Int_1	.3233	.1983	1.6305	.1037	-.0663	.7129
Int_2	.1690	.3919	.4312	.6665	-.6011	.9391
Int_3	.2332	.3465	.6729	.5013	-.4477	.9140
Int_4	1.4272	1.3151	1.0852	.2783	-1.1568	4.0112
Int_5	-.6892	.5042	-1.3669	.1723	-1.6798	.3014
Int_6	.8829	.6003	1.4707	.1420	-.2967	2.0625
EntChar	.4160	.0979	4.2497	.0000	.2237	.6084
BusEnvi	.2134	.0818	2.6080	.0094	.0526	.3742

Test(s) of highest order unconditional interaction(s):

	R2-chng	F	df1	df2	p
X*W	.0116	1.4910	6.0000	486.0000	.1792

There is no moderating effect except for category W1 (Multipurpose, p-value=.0002) and W3 (Agrarian Reform, p-value=.0314) are significant; the rest of the categories (W2, W4, W5, and W6)



are of nominal Type of Cooperative and are not significant. Thus, overall, it moderates the effect of the relationship between independent variables on the dependent variable Profit (p-value=.0053) as seen in Table 38.

Table 38
Moderation Analysis for Dependent Variable: Business Sustainability – Profit Bottom Line (Cooperative Type)

OUTCOME VARIABLE: Profit

Model Summary

	R	R-sq	MSE	F	df1	df2	p
	.7040	.4956	.1527	31.8344	15.0000	486.0000	.0000
Model	coeff	se	t	p	LLCI	ULCI	
constant	2.7978	.2147	13.0290	.0000	2.3759	3.2197	
MgtCoop	.3820	.1040	3.6737	.0003	.1777	.5864	
W1	.2138	.0576	3.7142	.0002	.1007	.3269	
W2	-.1262	.1321	-.9548	.3401	-.3858	.1334	
W3	.1989	.0922	2.1577	.0314	.0178	.3800	
W4	.4738	.4055	1.1684	.2432	-.3229	1.2704	
W5	.1805	.1506	1.1985	.2313	-.1154	.4765	
W6	.3335	.1715	1.9445	.0524	-.0035	.6705	
Int_1	.0226	.1078	.2101	.8337	-.1891	.2344	
Int_2	.7669	.2646	2.8983	.0039	.2470	1.2869	
Int_3	-.2023	.1901	-1.0645	.2876	-.5758	.1711	
Int_4	-.2242	.8236	-.2723	.7855	-1.8425	1.3940	
Int_5	-1.0475	.4225	-2.4793	.0135	-1.8777	-.2173	
Int_6	.2469	.3022	.8171	.4143	-.3468	.8406	
BusEnvi	.1973	.0425	4.6394	.0000	.1138	.2809	
EntChar	.1408	.0492	2.8631	.0044	.0442	.2375	

Test(s) of highest order unconditional interaction(s):

	R2-chng	F	df1	df2	p
X*W	.0194	3.1138	6.0000	486.0000	.0053

Table 39 shows that the nominal variable cooperative type is not significant. Thus, overall, it does not moderate the effect of the relationship between independent variables on the dependent variable Planet (p value=.2756).

Table 39
Moderation Analysis for Dependent Variable: Business Sustainability – Planet Bottom Line (Cooperative Type)

OUTCOME VARIABLE: Planet

Model Summary

	R	R-sq	MSE	F	df1	df2	p
	.6799	.4623	.2629	27.8594	15.0000	486.0000	.000
Model	coeff	se	t	p	LLCI	ULCI	
constant	1.9757	.3327	5.9394	.0000	1.3221	2.6293	
Networks	.3097	.1423	2.1757	.0301	.0300	.5893	
W1	.0283	.0804	.3524	.7247	-.1296	.1862	
W2	.1719	.1625	1.0583	.2904	-.1473	.4911	
W3	-.0942	.1256	-.7502	.4535	-.3411	.1526	
W4	.7049	.5661	1.2451	.2137	-.4075	1.8172	
W5	-.1942	.1566	-1.2403	.2155	-.5018	.1134	
W6	.2960	.2261	1.3088	.1912	-.1484	.7403	
Int_1	.0424	.1396	.3036	.7615	-.2318	.3166	
Int_2	.0076	.2759	.0276	.9780	-.5344	.5496	
Int_3	.2896	.2439	1.1872	.2357	-.1897	.7688	
Int_4	-.7971	.9257	-.8612	.3896	-2.6159	1.0216	
Int_5	-.6571	.3549	-1.8516	.0647	-1.3543	.0402	
Int_6	-.2998	.4226	-.7095	.4784	-1.1301	.5305	
EntChar	.2808	.0689	4.0747	.0001	.1454	.4162	
BusEnvi	.2518	.0576	4.3726	.0000	.1387	.3650	

Test(s) of highest order unconditional interaction(s):

	R2-chng	F	df1	df2	p
X*W	.0083	1.2575	6.0000	486.0000	.2756



Table 40 shows that the nominal variable number of members is not significant. Thus, overall, it does not moderate the effect of the relationship between independent variables on the dependent variable People (p-value=.3148).

Table 40
Moderation Analysis for Dependent Variable: Business Sustainability – People Bottom Line
(Number of Members)

OUTCOME VARIABLE: People

Model Summary

R	R-sq	MSE	F	df1	df2	p
.5786	.3347	.5488	49.9160	5.0000	496.0000	.0000

Model	coeff	se	t	p	LLCI	ULCI
constant	1.6619	.4708	3.5297	.0005	.7368	2.5870
Networks	.3873	.1023	3.7865	.0002	.1864	.5883
NumMem	.0518	.0317	1.6365	.1024	-.0104	.1141
Int_1	-.0665	.0661	-1.0062	.3148	-.1964	.0634
EntChar	.3787	.0983	3.8539	.0001	.1856	.5717
BusEnvi	.1959	.0816	2.3994	.0168	.0355	.3563

Test(s) of highest order unconditional interaction(s):

R2-chng	F	df1	df2	p
X*W	.0014	1.0124	1.0000	496.0000
				.3148

The nominal variable number of members is not significant. Thus, overall, it does not moderate the effect of the relationship between independent variables on the dependent variable Profit (p-value =.3157), as seen in Table 41.

Table 41
Moderation Analysis for Dependent Variable: Business Sustainability – Profit Bottom Line
(Number of Members)

OUTCOME VARIABLE: Profit

Model Summary

R	R-sq	MSE	F	df1	df2	p
.6714	.4507	.1629	81.4086	5.0000	496.0000	.0000

Model	coeff	se	t	p	LLCI	ULCI
constant	2.7900	.2197	12.6996	.0000	2.3583	3.2216
MgtCoop	.3872	.0544	7.1189	.0000	.2804	.4941
NumMem	.0051	.0165	.3059	.7598	-.0274	.0375
Int_1	.0392	.0390	1.0043	.3157	-.0375	.1158
BusEnvi	.1935	.0434	4.4560	.0000	.1082	.2788
EntChar	.1862	.0496	3.7567	.0002	.0888	.2836

Test(s) of highest order unconditional interaction(s):

R2-chng	F	df1	df2	p
X*W	.0011	1.0087	1.0000	496.0000
				.3157

Table 42 shows the moderation analysis for the dependent variable: business sustainability planet bottom line. Thus, overall, it moderates the effect of the relationship between independent variables on the dependent variable Planet (p value = 0.0210)



Table 42
Moderation Analysis for Dependent Variable: Business Sustainability – Planet Bottom Line
(Number of Members)

OUTCOME VARIABLE: Planet

Model Summary

	R	R-sq	MSE	F	df1	df2	p
	.6709	.4502	.2635	81.2166	5.0000	496.0000	.0000

Model	coeff	se	t	p	LLCI	ULCI
constant	2.0630	.3262	6.3237	.0000	1.4220	2.7039
Networks	.3406	.0709	4.8050	.0000	.2013	.4798
NumMem	.0132	.0220	.6023	.5472	-.0299	.0564
Int_1	-.1061	.0458	-2.3152	.0210	-.1961	-.0161
EntChar	.2857	.0681	4.1962	.0000	.1519	.4194
BusEnvi	.2349	.0566	4.1527	.0000	.1237	.3460

Test(s) of highest order unconditional interaction(s):

	R2-chng	F	df1	df2	p
X*W	.0059	5.3600	1.0000	496.0000	.0210

CONCLUSION

The conclusions from this research are presented in the following section in answer to the research objectives of the study: To determine the profile of agricultural cooperatives in the Northern Mindanao Region in terms of the province, number of years the agricultural cooperative is operating, size of the cooperative, number of employees, number of members, type of the agricultural cooperative, and affiliations/ membership. To determine the level of influence on the business sustainability (people, planet, and profit) of agricultural cooperatives in the Northern Mindanao Region in terms of management of cooperatives, enterprise characteristics, networks, and business environment. To determine which independent variable(s): management of cooperative, enterprise characteristics, network, and business environment, influence the business sustainability of the agricultural cooperatives in Northern Mindanao Region in terms of people, planet, and profit. To determine if the age of the cooperative, the number of members, and the type of cooperatives moderate the outcome of the independent variables on the dependent variables.

Recommendations

Based on the findings of this study, the following actions are recommended to achieve business sustainability of the agricultural cooperatives and their members:

The Local Government Unit (Regional, Provincial, City/ Municipal). LGUs play an important role in the sustainability of the agricultural cooperatives. They can use this baseline data on business sustainability to maximize the potential of the agricultural cooperatives and possible support from the Local Government Units. LGUs must enhance agricultural market information to complement other marketing strategies, design and craft mentoring and monitoring tools to measure the growth and development of the agricultural cooperatives, and preserve the natural resources, especially on the use of chemicals in farming, and lead in advocating people-oriented, economical, and environment-friendly agricultural cooperatives.

National Economic Development Authority. The agency should take the lead in preparing a comprehensive cooperative development plan in partnership with the Cooperative Development Authority that includes the introduction of advanced technology, access to finance, availability of raw materials, and addressing coordination failures of the different agencies to practically help the agricultural cooperatives.

Department of Trade and Industry. DTI should design an integrated cooperative education and training program focused on the business development area in terms of marketing, financing,



packaging, etc., and enhance agricultural market information systems to complement other marketing strategies.

Cooperative Development Authority. The agency should provide capability building, training, and seminars to promote the creation of a comprehensive development plan for the agricultural cooperatives, encourage and support research and development on agricultural cooperatives, and create a program for mentoring and monitoring their growth and development. CDA should also design an integrated cooperative education and training program that focuses on self-development and supports the agricultural cooperatives to contribute to the accomplishment of the United Nations Sustainable Development Goals.

Department of Agriculture. The agency should introduce advanced technological tools (or systems) to all farmers of agricultural cooperatives to improve services and production, conduct capability building/trainings to integrate advanced technological innovations to support production efficiency, provide enough abundant supply of high value raw materials available for agricultural cooperatives, introduce preservation of the natural resources especially on the use of chemicals in farming and alternative ways for safe farming for the people, profit and planet. The Department of Agriculture should actively pursue sustainability by enhancing practices concerning the health and safety of workers, labor and human rights, and protection of the environment.

Academe (The Administration, Faculty, and Students). Colleges and universities, especially those that have agriculture-related courses, should seek partnerships with the agricultural cooperatives for projects, training, and other support services. Schools should encourage agriculture-related courses to enhance community extension to help farmers in terms of community development. Business-related schools are encouraged to share their expertise in marketing and finance for product and service development and help promote an environment-friendly system in farming and production.

Trade Organizations/ Chamber of Commerce and Industry. Trade organizations should encourage agricultural cooperatives to join actively with other business organizations to increase their networks. Let the officers of the agricultural cooperatives understand the importance of networks and linkages. They should provide a venue for exposures and exhibits to showcase agricultural cooperative members their products and services as well as to create markets for them, strengthen programs on policy advocacy, training and capability building, business consultancy and advisory services, and sustainability adoption, and work closely with LGU, non-government agencies and private sectors to foster an environment conducive to the growth and development of agricultural cooperatives and its members.

Investors/ Supporters of Agricultural Cooperatives. Investors/supporters. They should persuade financial institutions to offer special interest rates to the financing order to sustain the growth of the agricultural cooperatives and their members, so that they can consider financial institutions in the region as funding channels for the improvement of the cooperative and offer financial products that suit and fit the needs of the agricultural cooperatives.

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