FACTORS AFFECTING COFFEE VALUE CHAIN IN COOPERATIVE UNION: THE CASE OF MULTIPURPOSE COOPERATIVE UNION KELLEM WOLLEGA ZONE

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ABSTRACT

Coffee sector has been contributing a substantial value to the livelihood of the rural people. Therefore, the aim of this study is to investigate the Factors Affecting the Coffee Value Chain in multipurpose Cooperative Union case of Kellem Wollega zone of Oromia region. The survey method is used here for the realization of this objective. The total population for the study is 1966 (selected primary cooperative) members found under kellem Wollega zone multipurpose cooperative union. For the study, data was collected from the members of the Union; a random sampling technique is employed in order to give equal chance for each union members/respondents. 332 questionnaires were collected for analysis purpose of the study. Collected data was analyzed by SPSS version 20 software/Python3 for elaboration of the basic objective or research questions different statistical tools of measurement were undertaken. The result of the study revealed that the related factors of infrastructure marketing, cooperative factors and financial roles are significantly affecting the coffee value chain of the cooperative union with model explaining .629 or 62.9% of variance in dependent variable by Independent variables. It is concluded that Market related factors have highest positive impact on Coffee value chain. Cooperative related factors have second highest impact on Coffee value chain. Infrastructure related factors have third highest impact on Coffee value chain. Financing related factors have fourth highest impact on Coffee value chain

Key words: Coffee, Value Chains, Factors, Role, Cooperative Union, Multipurpose, Python 3, Marketing.

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1. INTRODUCTION

In today's global market different commodities are provided to international market among them coffee is one of the most important commodities. It is produced and exported by different nations, ranks as one of the top cash crops in developing countries, and is critical to the economies of several of them. Agriculture is still the backbone of the economy in most developing countries. It is the largest source of employment; often two-thirds or more of the population are dependent for their livelihood on farming (Ahmedin, 2008). According to Diao (2010), since majority of sub-Saharan Africa's population lives in rural areas where poverty and deprivation are the most severe elements; almost all rural households depend directly or indirectly on agriculture, and the sector contribute high share to the overall economy and development of Ethiopia.

Ethiopia is a country of an agrarian economy characterized by high population growth, huge dependence on erratic rainfall, low agricultural productivity, structural bottlenecks and land-locked-ness as described at the Plan for Accelerated Sustainable Development to End Poverty (PASDEP) (MoFED, 2002). Agriculture; value added (% of gross domestic product, product, GDP) in Ethiopia was last reported at 41.87 in 2011 (Bank, 2012). The sector is characterized by low productivity partly due to low investment level in the sector (particularly in small scale farmers) backward farming technologies, low farm level capacity, land degradation and recurrent drought (Hagos, 2016).

According to Pratiwi (2015), although, coffee sector has been contributing a substantial value to the livelihood of the rural people; smallholder farmer in the coffee sector often finds barriers and challenges to elevate their situation in the worldwide market place. Referable to the market liberalization, the trader/middleman has enormous advantages, to reap the benefits of smallholder farmers. This unfavorable situation for smallholder farmers, therefore, became the driving force on the involvement of farmer cooperatives in the coffee value chain. Although Ethiopia is the birth place of Arabica coffee and filled with exemplary coffees, it is no surprise that cooperatives in the Ethiopian coffee sector are market leaders in response to the fast growing specialty coffee sector worldwide (Melorose, 2015).

In line with these realities, the research was attempted to analyze the functions of cooperatives Union in coffee product marketing through evaluating its performances, analyzing member's participation and identifying the constraints of cooperatives marketing. Besides, in the research, an attempt was made find out issues which require further research and investigations so that other researchers can easily come up with outstanding recommendations to enhance cooperatives' contribution in the economic development of the country (NIGUSIE, 2013).

According to Bijman (2014), cooperatives have been important institutions for strengthening the economic position of farmers throughout the world. They are engaged in collective bargaining with sellers of farm inputs or buyers of farm outputs. Reduction of transaction costs in the sales relationship between farmers and their customers is another major function of cooperatives. As quality control and quality assurance have become increasingly important, due to more strict public and private requirements, cooperatives also perform the role of coordinator in guaranteeing high quality in the supply chain.

Moreover, the role of cooperative in creating efficient and competitive agricultural marketing can be plausible through effective involvement in the marketing system. This enables to reduce the existing excessive trading chain and high transaction costs in the markets which neither benefit the farmer in surplus producing areas nor consumer in the food deficit areas (Gabre-Madhain, 2002). As cooperative take part in the market, it can allow to add some values to the farmers' output and by creating effective and efficient agricultural marketing system. Cooperative could help the farmers in terms of sales of agricultural products, provide market information, and offer technical services during production, financial assistance, government subsidies and provision of affordable production material.

Cooperatives are expected to play an effective role in supporting coffee farmers by supplying the price information, capital and transportation those small-scale farmers often lack. In addition, a cooperative as a representative of coffee farmers can be a stronger negotiator than an individual farmer in the international market. Coffee cooperatives have become more market-oriented; have provided higher profits to coffee farmers than have private traders and brought benefits to coffee farmers by providing a new marketing channel. So, the dividends are appreciated by farmers and have encouraged farmers to improve the quality of their coffee (Kodama, 2007).

Farmer cooperatives are the actor which enables the farmer to develop their production and processing system via value chain development, such as: access to financial resources; provision of farm input, knowledge, and market information; and networking access. It also improves the value chain through process and product marketing. Therefore, farmer cooperatives can be a central player in order to maintain the coordination system in the coffee value chain development (Pratiwi, 2015).

Out of 6 multipurpose cooperative Union in Kellem Wollega Zone, 4 Cooperatives Union has high level of coffee production and supply highest coffee output in the Zone. Torban Anfilo Cooperative Union, Gudatu Gidami, Melka Gudina and Gawo Dale that found in Kellem Wollega has good potential to market the members output and provides different service to their members (KWZOoARD, 2020).

However, factors affecting the coffee value chain in cooperatives union were not clearly identified in their study. In general, the above reviewed articles and research papers have the following major gaps; failure too much emphasis on infrastructure, Financial, Marketing, cooperative related factors and Government Regulation that affect the coffee value chain of the coffee cooperatives. Therefore, depending upon the reality this research identified the overall "Factors Affecting the coffee value chain in case of Kellem Wollega zone multipurpose Cooperative Union" in the study area.

2. RESEARCH METHODOLOGY

2.1. Research Design

The study employed Explanatory research design to meet the objective. It was used to find facts about the study such as the relationship of study variables. The study also used survey design. Indeed, survey method facilitates the collection of original data which was necessary for realizing the research objectives. It is also appropriate for collecting useful data that reports as a representation of the real situation or characteristic in the study population for the investigation of actors that affect selected multipurpose Cooperatives union faces in coffee value chain.

2.2. Sampling Procedure

Multipurpose cooperative union was purposively selected for the fact that the union is operating in kellem Wollega zone which is the highest coffee producers and high participator in coffee markets, where multipurpose cooperative union is organized and operated with affiliated 6 multipurpose cooperatives union are performing marketing function. The stages random sampling procedure was adopted in the selection of PCs sample in the study area. Multipurpose Cooperative Union is purposively selected for the fact that the Union is the highest Participate coffee process where highly performing primary Cooperatives are found. In the second stage, a total of seven PCs are randomly selected of which 3 PCs from Torban Anfilo Cooperative Union, 2 PCs from Gudatu Gidami, 1 from PCs from Melka Gudina and 1 from PCs from Gawo Dale multi-purpose cooperatives Union to ensure adequate representation all PCs of the Kellem Wollega Zone. In the third stage, using a list of PC members collected from their representatives.

Focus group discussion (FGD): This was conducted in such a way that after having the necessary data from the key informants through interview, unclear ideas and information related to the subject under study were further reviewed. The researcher conducted one focus group discussion with participants from (Employees of multipurpose cooperative union and management of cooperative promotion agency of the kellem Wollega zone) to gather relevant and updated data towards the subject under study. Therefore, 32 participants were selected for the focus group discussion because of the closeness to the issue under study. The participants were selected through judgmental method because of their closeness to execute the issues and day to day activities of the organization was supervisor by employees of union and management of cooperative promotion agency.

2.3. Sampling Size Determination

The sample size is determined from the total population 1,966 members of PCs who are involved in Coffee Value chain with PCs at least once in the past 12 months in the study area. The research is conducted with 5 percent marginal error and 95 percent confidence interval and none response rate of 5 percent. Based on this assumption, the actual sample size for the study is determined using (Yemane, 1970) methods of sample size determination formula to reach at the required sample size. The motive behind using this formula is that it provides the appropriate sample size by clearly applying the possible variation that exists among coffee producers in the study areas.

$$n = \frac{N}{1 + N(e)^2}$$
$$\frac{1966}{1 + 1966(0.05)^2} = 362, \text{ Members of cooperatives samples}$$

Where:

n is the sample size,

N is the population size, and

e is the level of precision (5%).

In general, using the above sample size and the total number of cooperative union of coffee producers selected 4 multipurpose cooperatives Union, the number of sample Primary cooperative from four unions seven primary Cooperatives purposively selected based on the activities of coffee value chain in the study area.

Table 1 Sample distributions of selected Primary Cooperatives (coffee producers) in selected study area

No	Name of Cooperative Union	Number of sample cooperative	Name of Selected Primary Cooperatives	Members of sample Primary Cooperative			Sample Size
				Male	Female	Total	
1	Torban Anfilo	3	Dolla	283	45	328	55
			Lalisa Hara	263	32	295	50
			Yeti konfi	222	29	251	42
2	Melka Gudina	1	RehobotMaxa	237	16	253	43
3	Gudatu Gidami	2	ButujiWelketuma	338	86	424	72
			Marartu Bata	229	43	272	46
4	Gawo Dale	1	KuniBosona	122	21	143	24
	Total	7		1693	272	1966	332

Source: Own computation from Kellem Wollega Zone Cooperative promotion Agency data, 2020

There are 874 members selected from members of PCs found in Torban Anfilo multipurpose cooperative union. Also 253 members selected from members of PCs found in Melka Gudina, 696 members selected from Gudatu Gidami and 143 members selected from members of primary cooperative found of Gawo Dale multipurpose cooperative union.

2.4. Method of Data Collection

Closed-ended questionnaire was used to collect primary data from respondents. This was in the form of structured interview schedule in which set of prepared questions designed to be asked exactly as worded in same manner to all responds by data collector. In this case the data collector only assists the respondents to understand the question and only write the response of the respondents. This data collection method was used indeed, most of the respondents are farmers and they may be with low or no education to understand the question if distributed and allowed to fill by themselves.

To ensure the understanding of the data collector and to equip with research data collection skill one-day training was given on the objective of the study, relevance of the study, confidentiality of information, respondent's right, informed consent and techniques of interview in the process of data gathering. For checking the relevance, the research instrument was tested with small representative for the sample whether the tool would collect the necessary data to facilitate the realization of the research objectives

2.5. Methods of Data Analysis

The data collected was sorted and checked for completeness of the responses, coded and then entered in Statistical Package for Social Science (SPSS) version 20 software. Descriptive analysis, correlation and regression analysis was employed in data analysis. The descriptive

parts analyzed using mean, standard deviation, frequency, percentages and cross tabulation was used to check the significance of association between dependent and independent factors. Following figure shows the Conceptual Framework.

Figure 1 Conceptual Framework

Source: Source: Own modification based on (Girma Bayu, 2017) (Jabareen, 2009), by (Asfaw, 2016) and literature review.

2.6. Model specification

The regression model can be extended to include multiple explanatory variables by simply adding additional variables to the equation. The form of the model is the same as above with a single response variable (Y), but this time Y is predicted by multiple explanatory variables (X_1 to X_n).

$$Y_i = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_n X_n \quad 2$$

Where, Y_i = the outcome variables as defined above

α = constant Term

β_i = coefficient terms : $\beta_1, \beta_2, \beta_3 \dots \beta_n$ are coefficient terms .

X_i = independent variables: $x_1, x_2, x_3 \dots x_n$ are multiple explanatory independent variables

The summation from the results of variables found in five point likert scale question of each independent variables of the survey tool is used for analysis. The model specified takes the following specific form:

$$CVC = a_0 + b(IRF) + \sum c(GRF) + \sum d(MRF) + \sum e(CRF) + \sum f(FRF) + \dots + \varepsilon \quad (3)$$

Where: CVC: coffee value chain and the independent variables includes the following:

- IRF: is Infrastructure
- GRF: is Government related factor
- MRF: is Marketing Related factor
- CRF: is cooperative related factors

- FRF: is financial related factors

The α_0 is the constant values of the effect of dependent variables on CVC. The coefficients b, c, d, e, f and g are estimated values of each factor and ϵ is the stochastic error of the study.

3. RESULTS AND DISCUSSIONS

3.1. Role of Cooperative Union in the Coffee Value Chain

Multipurpose Cooperative union is recently established cooperative union by the kellem Wollega zone cooperative promotion office. Selected multipurpose cooperative union is a fully licensed organization for purchasing any types of agriculture commodity, including coffee from its primary cooperative members and supplies to where there is scarcity of products. With regarding coffee, it has a strong link with primary coffee cooperative established in each coffee producing Primary cooperatives. It provides training service on coffee production and quality management, credit service and input supplies to all primary cooperatives working in all union. It directly buys dried coffee from the primary cooperative members in bulk, makes value addition practice such as hulling/processing, clearing, sorting and packaging, and takes samples to ECX quality control and quality inspection centers for getting grading and certifying and directly export to international buyers currently working in France and Germany. Cooperative has responsibility for maintaining and improving quality of coffee. Therefore, they mostly focus on purchasing high-quality coffee prepared by using all good agricultural practices.

Table 2 Mean Score of items related to Coffee Value Chain

Coffee Value Chain	N	Mean	Std. Deviation
Coffee value chain is fully integrated and performing well due to support Provided by cooperative union	332	4.51	.657
Farmers, primary cooperatives, cooperatives union , processors and exporters of Coffee are introduced to Innovative farming, distribution and marketing of coffee	332	4.47	.656
There is lack of awareness about duties and responsibilities of Cooperatives leaders	332	4.55	.678
Coffee trading market channels enhance its value chain	332	4.52	.594
Average mean score	332	4.51	.645

Source: Own survey, 2020

The result shows that the cooperative union of the case strive its effort in stabilizing market in its operational area through planning towards member needs, mobilize capital to perform marketing function and provide fair price which assumed to benefit its members. The views of the key informant and focus group discussion agree with the results in such a way that the cooperative union was established to serve member in coffee value chain.

3.2. Factors of coffee value chain

3.2.1. Infrastructure related factors

The finding of the study indicates that, the total mean values of infrastructure related issues which represent. Based on the finding the nature of transport facility and services affect coffee value chain have high 4.43 mean score on enhancing the coffee value chain of kellem Wollega zone multipurpose Cooperative union. The finding of the study also reveals that, Access to agricultural production input is affect for coffee value chain with mean score values of 4.43 which is above the average. In addition, the finding of the study tells us, lack of standard road determinants union participate in of coffee value chain, Poor storage facility affect union participate in coffee value chain with mean score values of 4.39 & 4.42 respectively, other related issues of infrastructure related factors was having high roles which are above the average. In addition data obtained from the key informant interview indicated that limitation in the knowledge and environmental aspects are some hindering factors to engage in the coffee value chain. From this finding one concludes that infrastructure issue affect the coffee value chain cooperative union.

Table 3 Mean Score Values of infrastructure related items.

No	Infrastructure Related issues	N	Mean	Std. Deviation
1	The nature of transport facility and services affect coffee value chain	332	4.48	.666
2	Access to agricultural production input is affect for coffee value chain	332	4.43	.836
3	Lack of standard road determinants union participate in of coffee value chain	332	4.39	.818
4	Poor storage facility affect union participate in coffee value chain	332	4.42	.857

Source: Own survey, 2020

3.2.2. Government Related factors

The findings of the study indicates that , there is a supportive policy in place to improve the volume and quality of Coffee 3.78 mean score and 1.023 Std. deviation values. Also regarding the proper government regulation in place that contributes to adequate supply of inputs 4.50 mean score value, There is favorable regulation in place that improves market efficiency at the output side 4.38 mean score value and Coffee growing areas have full attention and support from concerned Government body 4.11 mean score value and the other elements of Government regulation factors related factors of cooperative union respectively. The existence of weak a legal and regulatory environment makes cooperatives vulnerable to exploitation by deceitful businessmen (Nyoro, 2007). The life and work of a cooperative business are governed by these cooperative values and cooperative principles (Asfaw, 2016). In order to assess the perception of respondents on the effect Government regulation issues on Coffee Value chain, the required information is gathered through structured questioner on four relevant variables using five point likert scales. The data gathered by interview from key informant indicated that government regulation having some hindering factors for farmers to engage in the coffee value chain.

Table 4 Mean Score Values of Government regulation related items.

Government Regulation Factors	N	Mean	Std. Deviation
There is a supportive policy in place to improve the volume and quality of Coffee in Ethiopia	332	3.78	1.023
There is proper government regulation in place that contributes to adequate supply of inputs	332	4.50	.653
There is favorable regulation in place that improves market efficiency at the output side	332	4.38	.655
Coffee growing areas have full attention and support from concerned Government body	332	4.11	.905
Average	332	4.19	.89

Source: Own survey, 2020.

3.2.3. Marketing Related factors

There are many reasons that may confront cooperatives to carry out coffee value adding activities along the chain. It's found that the most serious impediments are lack of market, government policy, lack of finance, absence of competition, lack of human and physical resources, etc.

Table 5 Descriptive Statistics of Market Related items

Market Related Factors	N	Mean	Std. Deviation
Coffee is sold with price that benefits all actors	332	4.18	.879
Farmers get market information at the right time	332	4.27	.844
Farmers updated with the prices of coffee	332	4.33	.842
Farmers choose cooperative market outlet choice	332	4.34	.943
Average	332	4.28	0.877

Source: statistical output of the questionnaires, 2020

According to the study, some of the items scored above the average score 4.28. The price of the coffee sold to benefits all actors, farmers get market information at the right time, farmers updated with the prices of coffee, farmers choose cooperative market outlet choice, are performing well that representing the mean score values of 4.18, 4.27, 4.33 and 4.34 respectively. The data obtained from key informant interview support the respondent's idea on the issue. A study by Margaret (Njeri Gathura, 2013). Therefore based on this finding one can

conclude that market is one of the factors that affect the effective achievement of the factors in the coffee value chain performance.

3.2.4. Cooperative Related Factors

Like ways, the finding of this study shows that the total mean score values of Cooperative related factors have high impact on enhancing the development of coffee value chain which representing 4.47 average mean score values and Std. Deviation is 0.72. The finding of the study also indicates that mean score value of Cooperative related factors such as, Cooperatives leaders are elected by members vote ,board members are transparent and accountable, cooperative union effectiveness Cooperatives members participate in approving annual plan and budget attention of cooperative union on supporting development of the coffee value chain have greater factors on increasing the coffee chain of the union with their mean values of 4.42, 4.47, 4.50 and 4.50 respectively. According to different study, the researcher explain under chapter two of this study governance and coordination are two main elements in the value chain, (Kaplinsky, 2000)stated that governance determines the interaction between actors in the value chain. On the other hand, coordination is needed because of the mutual dependencies (or interdependencies between different activities and different transactions in the value chain (Bijman, 2014). The mean score values items covered under the role of Cooperative is presented in the following table.

Table 6 Descriptive Statistics of Cooperative related issues

Cooperative Related Factors	N	Mean	Std. Deviation
Cooperatives leaders are elected by members vote	332	4.42	.860
Board members are transparent and accountable	332	4.47	.657
Cooperative union leaderships are effective	332	4.50	.719
Cooperatives members participate in approving annual plan and budget	332	4.50	.648
Average	332	4.47	0.72

Source: Own Questionnaire, 2020

Key informant interview with the officials of primary cooperatives and executes of union confirmed that cooperatives improve understanding of members about market and strengthen the relationship among the members. Therefore, cooperative membership is expected to have positive impact on Coffee value chain development.

3.2.5. Financial Related Factors

The findings of the study indicates that except, financial institutions that encourage modern farming of coffee by providing the necessary loan 4.21 mean score values, Cooperative members have the experience of using credit 4.30 mean score value, Farmers have credit access for coffee production and marketing 4.37 mean score value, the timing of the credit for cooperative members 4.29 mean score value, Financial institutions like Banks and Credit and Saving Institutions provide enough credit to run the business 4.51 mean score value and

the other elements of financial related factors of cooperative union respectively. The mean score of items covered under the role of financial related elements is presented in the following table.

Table 7 Descriptive statistics of financial related items

Financing Related Factor	N	Mean	Std. Deviation
Financial institutions encourage modern farming of Coffee by providing the necessary loan and subsidy	332	4.21	.958
Cooperative members have the experience of using credit	332	4.30	.888
Farmers have credit access for coffee production and marketing	332	4.37	.945
The timing of the credit for Cooperative members is just on time	332	4.29	.947
Financial institutions like Banks and Credit and Saving Institutions provide enough credit to run the business	332	4.51	.666
Average	332	4.33	.88

Source: Questionnaires output, 2020

The data gathered by interview from key informant indicated that financial constraints are some hindering factors for farmers to engage in the coffee value chain. Finance is one of essential resources for the value adding process of coffee. Findings of (Bezabih, 2012) indicated that lack of finance is one of the constraints cooperatives faced such as lack of finance lending policy of the commercial banks is not suitable for cooperatives, one cooperative bank which is limited by region and capacity and low saving by the members (poverty and awareness of benefits and confidence) Thus one can conclude that the financial issues is one of factors in enhancing coffee value chain.

Heat Map below shows that highest correlation in Dependent Variable (CVC) that is-role of cooperative in Coffee value chain is with TMRF and TCRF (Independent Variable) - 'market related and cooperative related factors'.

Figure 2 Correlation Analysis between Dependent and independent Variable.

3.2.6. Reliability Statistics

Cronbach's alpha coefficient. We are looking for a score of over .7 for high internal consistency. In this case, $\alpha = .75$, which shows the questionnaire is reliable.

Validity-We have used natural validity. We had done pilot study and our results matched with the expected acceptable results.

Table 8 Reliability StatisticsResult

Cronbach's Alpha	N of Items
.75	5

3.3. Regression analysis

In order to make the study complete, regression analysis of independent variables on the role of cooperative union in coffee value chain was paramount important as the relationship between dependent and independent variables can successfully be explained with regression analysis. In addition to this, the regression is a powerful tool for summarizing the nature of relationship between variables and for making predictions of likely values of the dependent variable (Bryman & Cramer, 2005). Accordingly, the result of the regression analysis on table 4.8 shows that the adjusted R^2 of 0.629 implies that all the explanatory variables used in the study explain for about 62.9percent of the variations level of affecting cooperatives union in coffee value chain.

Table 9 Model Summary of regression

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.797	.635	.629	.20743

Source: Research output, 2020

Also, the result of the study on table 4.9 shows that the values of the degree of freedom df (5,332) with the F value of 113.467 has significant level of $p < 0.000$ which implies that all the independent variables are jointly significant in explaining variation of factors that affect coffee value chain in the study area.

Table 10 ANOVA table for the regression analysis

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	688.927	5	137.785	113.467	.000 ^b
Residual	395.868	326	1.214		
Total	1084.795	331			

a. Source: Research output, 2020

Coefficients of Regression Analysis

According to the result, Infrastructure Related issues is statistically significant in contributing to coffee value chain (beta =.215 and p-value =.000). Among the statistically significant variable, market related factors (beta=.292 and p-value =.000) is the highest to influence coffee value chain, regarding with cooperative related factors beta value of .263 and p-value of lower

than 0.000. Also, the result of financing related factor effect on the coffee value chain (beta value =.163 and p- value 0.002). Finally, the result of government regulation related factor effect on the coffee value chain (beta value =.033 and p- value .260). From the five independent variables factors of coffee value chain government regulation factors is insignificant. The reason is cooperative are having their own regulations in Ethiopia and are therefore not affected by overall government regulations.

Table 11 Coefficients of regression analysis

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.618	.995		.622	.535
	Infrastructure Related issues	.215	.057	.180	3.761	.000
	Government Regulation Factors	.033	.030	.038	1.128	.260
	Market Related Factors	.292	.053	.313	5.495	.000
	Cooperative Related Factors	.263	.058	.264	4.527	.000
	Financing Related Factor	.163	.052	.152	3.135	.002

Dependent Variable-Coffee Value chain

Note: * shows the variables are significant at 1 percent significance level

Source: regression output, 2020

The regression equation formulated from the result of regression model is explained as:

$$CVC = .618 + 0.215IRF + 0.292MRF + 0.263CRF + 0.163FRF$$

Where; CVC is the role of cooperative in Coffee value chain that used as dependent variable of the study and the explanatory variables used in regression analysis includes, IF is infrastructure, MRF is market related factors, CRF is cooperative related factors and FRF is Financing Related Factor that affects the cooperatives coffee value chain which are described one by one in the following manner. Out of five independent variables four independent variables are shows significant level, but government regulation factors is not significant. We can also remove government regulation factor (TGRF) and run the model again for better Model fit. TGRF P value (0.260) is >Alpha (.05) so we F.T.R (Fail to Reject) null hypothesis Confidence intervals are of the form “point estimate” plus/minus the “margin of error”. A government regulation factor is insignificant. One unit change in TMRF:(cooperative related market factors) leads to 29.2% change in CVC(Role of cooperative in coffee Value chain) keeping all other Explanatory variables constant, which is the maximum positive impact among all Independent variables. Pvalue (0.000) is <Alpha (.05) so we reject null hypothesis and accept alternate (Claim) hypothesis. So we accept all alternate hypothesis except Government Regulation Factors.

3.4. Assumption of Linearity-

Below plot shows Linearity between Dependent variables and Z value of all Independent Variables collectively (Also known as standardized values). The graph is also showing confidence interval bands.

Figure 3 Linearity between Dependent variables and independent variable-The band around the line shows Confidence Interval. Confidence interval Band is Narrowest around its Mean.

3.5. Assumption of-Homoscedasticity of errors-

Distribution of error term should be Homogeneous. All the error terms of our regression model in the below plot are evenly distributed above the line and below the line of fit. So, we can say that error terms in our model meet the assumption of Homoscedasticity.

Figure 4 Assumption of-Homoscedasticity

3.6. Assumption of-Multi-collinearity tests of cooperative union in the Coffee Value chain.

Variable inflation factor (VIF) test has been conducted to check multi-collinearity of independent variable. For all independent variables VIF is between 1 and 10 shows there is no multi-collinearity effect among the independent variables. Consequently, it is possible to go for regression analysis to the challenges on the role of cooperative Union in the coffee value chain. Table showing Variable inflation factor (VIF) test results-

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VIF - TABLE
Variable  VIF
const    270.611103
SER       2.052628
GRF       1.003421
WRF       2.905981
CRI       3.045878
FRF       2.090720

```

Figure 5 Variable inflation factor (VIF) test results

3.7. Assumption of Multivariate Normality-

Following plot shows residuals of our model plotted on qq plot. As most of the residuals are approximating the line we can conclude that Assumption of Multivariate Normality is met by our regression model.

Figure 6 Assumption of Multivariate Normality

Other Diagnostics-

Following plot show standardized residuals. We can see that 95% of the residuals lie within 2 standard deviations. More than 3 standard deviation is an indication of outliers.

Figure 7 Standardized Residuals Result

4. CONCLUSION

It is concluded that Market related factors have highest positive impact on Coffee value chain. Secondly, Cooperative related factors have second highest impact on Coffee value chain. Thirdly, Infrastructure related factors have third highest impact on Coffee value chain. Fourthly, Financing related factors have fourth highest impact on Coffee value chain.

5. RECOMMENDATION

This study tried to identify factors of cooperatives in coffee value chain which can be solved by strong effort and commitment of cooperative organization and their unions along with government sector. In order to enhance the role of cooperatives union in coffee value chain, researcher recommends that management of cooperatives union, management of cooperative promotion agency and Kellem Wollega rural sector has to work hard to facilitate the ground for improving marketing factors, minimize cooperative related factors, improve access to finance, enhance infrastructure and foster the government regulation issues of cooperatives. The union should provide adequate modern processing machines that increase efficiency of productivity. This may improve the value adding process of coffee as a result increase income of their members. The cooperative and other actors should have accessible market information, and increases the near place market centers for free flow of differentiated coffee products and participated farmers along the chain. Finally, there are different constraints and opportunities across the coffee value chain. These factors constrained the performance of cooperative union on coffee value chain in general and actors in particular which need to be taken under a series

consideration by concerned body for those opportunities need to be enhanced and promoted for further benefits.

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