

# Technological Factors Abd Coffee Consumption In Rukungiri District, Southwestern Uganda.

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**Abstract :** *This study adopted a cross-sectional survey research design and involved quantitative and qualitative methods which enabled the study to evaluate the relationship between the study variables in a snapshot. A sample of 123 respondents was selected using simple random and purposive sampling techniques. The quantitative data were analyzed using SPSS Version 23.0 and the thematic analysis method was used to analyze the qualitative data. Quantitative results in form of descriptive statistics, correlations, and regressions were presented in tables based on the study objectives. The study found that technological factors were positively and significantly related to coffee consumption there was a significant positive relationship between technological factors and coffee consumption with ( $r = .658, P \leq .01$ ). The Technological factors status in terms of Processing machinery, Value addition, and Brand image, and as such, coffee consumption is influenced by these factors. The study further concluded that embedded beliefs, that the people of Rukungiri District should go back to their tradition of coffee consumption since it was their own from the beginning*

**Keywords:** *Technological Factors, Coffee Consumption Rukungiri District*

## Introduction

In general, technological advancement has accelerated during the past 20 years. Less than 7% of people worldwide have regular access to the internet in 2000. In 2021, a little more than 20 years later, Statista estimated that 4.9 billion people, or more than 60% of the world's population, frequently utilized the internet. On the business-to-consumer (B2C) front, many of these shifts have already happened. The use of point of sale (POS) systems and digital signage in coffee shops, for instance, has been one of the most successful technical developments. It makes sense that as this has happened, coffee-related technology has also advanced. This includes modifications to everything from how coffee is roasted to how it is brewed. Finally, as the coffee industry has grown, technology has gained significance across the supply chain. The art of growing, roasting, and brewing superior coffee is at the center of the third wave of coffee Alperet[2]. In general, third wave coffee customers are putting more and more emphasis on the technical proficiency of farmers, roasters, and baristas. But as people's enthusiasm for the art of making coffee has increased, technology has also started to take on a bigger role. Buldak, [4] explains that, in order to learn more about the coffee they brew, roast, grow, and consume, baristas, roasters, producers, and consumers all rely on technology more than ever.

Cornelis, [10] posed this query. But why did it accelerate so quickly? What direction might it take in the future? I spoke with three professionals in the field of coffee to learn more about how technology has advanced rapidly over the past ten years. According to Chen, [5] who explains this, the majority of our coffee shops have screens in the kitchen to facilitate the usage of tickets. Gökçen, [11] "When a predetermined time limit for the order is reached, the screen flashes, which improves overall speed. We use displays in the kitchen to boost order accuracy and speed when customers also want coffee so that everything may be served at once. There has never been a more important time for food and coffee production to be coordinated Kamil, [18].

With the help of technology, baristas and kitchen staff may work together more productively to guarantee that orders are prepared expertly and served to consumers without delay. Ijanu, [16] claim that from the standpoint of operations, internet ordering technology advancements have been the most crucial. Mínguez-Alarcón[27] lameneted that, the current surge in internet coffee sales can be partially attributed to the pandemic. According to a webinar by the National Coffee Association titled "The impact of Covid-19 on coffee ecommerce," the yearly growth rate of the online coffee market would have surpassed 38% by 2020. Rashidinejad [32] When comparing available options for technological capabilities, technological elements are employed as variables Martínez-López[25]. Technology has an impact outside of the coffee shop as well since it enables growers to gather and share ever-more-detailed information on their crops With the introduction of the "Third Wave" of coffee, an increasing amount of focus is being focused on accurate origins, growth altitudes, precise harvest dates, moisture content, and much more, all of which are under the control of technology Meijer, [26]

## Theoretic Review

This study was guided by the Consumer culture theory (CCT) which was proposed by Arnold and Thompson. The theory is premised on the view that a social arrangement in which the relations between lived culture and social resources, and between meaningful ways of life and the symbolic and material resources on which they depend, are mediated through markets. Consequently, consumption phenomena can be understood only through inscription in the sociocultural context in which they exist and they must

be seen concerning the full consumption cycle, including acquisition, possession, consumption, and disposition. The aim is to theorize the dynamics driving such consumption cycles as well as the social logic at stake on a micro, meso, or macro level. According to Rothwell [35] study and other studies, consumer choice of coffee processes show how information inputs are processed to reach a particular decision. Santos [38] explained that whereas decisions are simpler and include choosing the most favored option, judgments are dependent on consumers' evaluations of the alternatives that are provided and their opinions of those alternatives. According to Shi[40], culture influences consumer behavior because it establishes what the public wants and needs. Consumer culture is a social arrangement in which markets serve as a medium for relationships between lived culture and social resources, as well as between meaningful ways of life and the resources on which they depend. A coffee consumption location or shop, according to Taylor[43], is a type of restaurant that sells coffee, tea, cakes, and occasionally sandwiches and small meals. The theory assumption is that, Their wants and needs outweigh their money. When purchasing items, consumers try to acquire the most usefulness or satisfaction. Consumers will behave rationally, which means that if they see two identical products in two separate stores, they will choose the product that is less expensive. Nibret, [34]. The theory's main selling point is that consumerism boosts employment and economic growth, enhances corporate wealth, encourages business competition, makes a wide range of goods and services available, and raises people's quality of life Veronese[46]. The theory weakness is that Natural resource depletion and environmental contamination are two drawbacks of consumerism Turyasingura [45]. The consumer society is not sustainable in its current state. More than 70% of Earth's natural resources are currently being overused.. this study was based on the strength of the theory.

## **2.Related Literature**

Processing machinery and coffee consumption

Turyasingura [44] compiled data on the distribution of Uganda's coffee production by kind and quality, which showed a decrease in the percentage of low-quality beans produced. According to Spence, [41] as the majority of the machinery is imported, most businesses do not employ a significant quantity of local labor in the production of equipment such artificial driers, wet pulping, and coffee wasters/separators.

At around 3 to 5% of Uganda's annual production, domestic coffee consumption is still incredibly low Park, [29] . The domestic roasters confront severe competition for the good graded coffee, which can be exported for higher earnings, due to the traditional fears against coffee consumption. Low promotion on the domestic market to counteract these fears Turyasingura [46] . The roasters thus resort to cheap, lesser quality coffee, which does not give a very palatable powder; there are also inadequate roasting equipment and packaging materials. An overview of novel technologies, such as the application of starter cultures in fermentation and the exploitation of industrial enzymes in accelerating the process of flavour development in coffee beans, is given Ngango, [28].

### **Value addition and coffee consumption**

Since roasters and instant coffee companies will pay the same price as exporters, pursuing value-added activities in coffee is unlikely to have any impact on the welfare of coffee growers Lafranconi, [22] . Farmers are therefore unlikely to earn a greater price only because their coffee will be transformed locally Komorita, [20]. As previously mentioned, domestic coffee processors will pay the same price as exporters, so producers will receive the same price whether their coffee is consumed in Kampala, Rome, or Beijing. If the goal of increasing domestic consumption (currently estimated at 100,000 bags) is to increase rural incomes, this is unlikely to be achieved Pereira, [30]

### **Product Image and coffee consumption**

Hernandez-Aguilera [14] pointed out that product image and related information gathered from the environment will affect consumers' assessments of products they are considering buying and eventually serve as the foundation for their decisions. Consumer perceptions of a product's identity and qualities are influenced by this Hameed[12] . Because consumers use the linked product image to differentiate between the brand's qualities and use them as a reference for purchasing decision-making, it will affect consumers' perceptions of the physical characteristics of the product Hang, [13]. This study divides subjective consumer image in choosing budget coffee brands and the influence on related consumption elements into the following four categories: personal preference of brand, personal taste of the brands pursued, personal consumption experience and quality selection, and the shop's reputation Gemechu [10] . Consumers may now evaluate food safety, health risks, and environmental friendliness with the use of sustainability certification labels. From the standpoint of environmental concerns, few research have examined the characteristics of consumers' environmental consciousness .

## **4. Materials and Methods**

A research design is a given framework for the collection and analysis of data Cordoba, [6] It is a master plan specifying the methods and procedures for collecting and analysing data, Agaba & Turyasingura[1]. This study used a cross-sectional survey research design

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adopting quantitative and qualitative approaches. The quantitative approach helps to describe the current conditions and to investigate cause and effect relationships between the study variables (Agaba& Turyasingura [2] . On the other hand, the qualitative approach helps to gain insight, and explore the depth, richness and complexity inherent in the phenomenon under investigation. The case study approach was used because it exposes the participants to real-life situations and simplifies complex concepts . The quantitative approach sought to quantify and establish the relationships while the qualitative approach helped the researcher gain in-depth explanations of factors influencing the consumption of coffee in the Rukungiri District

Sample size and procedure

According to Turyasingura [44], a sample is a small group of the universe taken as the representative of the whole population. The study sample covered 123 respondents as guided by Krejcie and Morgan's (1970) sampling estimations in Table 1.

Table 2 Sample size determination

Respondent Category	Total Population	Sample Size	Sampling Technique
Cafes/Restaurants	55	38	Simple random sampling
Hotels	18	12	simple random sampling
Supermarkets	12	08	Simple random sampling
Road Side Consumers	95	65	Convenience sampling
<b>Total</b>	<b>180</b>	<b>123</b>	

Source: Primary data, 2019

4.1. Questionnaire

This instrument contained close-ended questions inform of a 5-point Likert scale where 5 was for strongly agree, 4 for agree, 3 for neutral, 2 for disagree, and 1 for strongly disagree. They were self-administered from which the respondents were ticked according to the instruction therein. The self-administered questionnaire provides freedom and enough time for respondents to complete the instrument, Orikyiriiza et al [47]

3.7.2. Interview guide

This tool contained open-ended questions. The interview method has the advantage of flexibility unlike the questionnaire survey method (Agaba&Turyasingura [1] . The respondents were those who had stayed in Rukungiri District for 4 years and above; they were chosen because of their seniority and thus deemed knowledgeable on the study variables.

3.7.3. Document review checklist

This instrument contained reviewed documents that included; Rukungiri District strategic plans, Coffee Marketing Board, Coffee authority annual reports, Journals, and Newspapers

Measurement of variables

In the study, three levels of measures were used namely, the nominal scale, ordinal, and interval scale (Turyasingura[44] . The nominal scale was used to group some subjects from the study into categories and frequencies were generated. The ordinal scale was used to measure responses to Likert statements and ranked them in order. The Likert Merit scale is the most common measure that was used to assess the strength of respondents' feelings or attitudes towards the subject Samoggia[38]. A coding system was used where numbers were assigned to characteristics to operate and define the variables. The Likert 5 scale measurement of Strongly Disagree (5) and the lowest extreme of Strongly Agree (1) were used to develop an index for measurement.

**Validity and Reliability**

Validity and reliability of research instruments were done as follows:

**Validity**

The validity of the study questionnaire is a measure that ascertains the relevancy of items in measuring the specific variable Turyasingura (45). For this study, the expert judgment Content Validity Index (CVI) with cut off of 0.70 was used Rasouli, ( 33). The Content Validity Index (CVI) was arrived at using Rasouli,(33) formula:

$$\text{Content Validity Index (CVI)} = \frac{\text{Number of items rated relevant}}{\text{Total number of items in the instrument}}$$

Summary of the validity statistics

Judge 1. = 116/123=0.943

Judge 2. =114/123= 0.927

Judge 3. = 118/123=0.959

Judge 4. = 117/123=0.951

Therefore  $0.943+0.927+0.959+0.951=3.78 /4=0.945$

These results implied that the research instruments were valid to be used for the data collection on factors influencing coffee consumption in Rukungiri District. Agaba& Turyasingura(45) proposes that for instruments to be accepted as valid, the average content validity index (CVI) no. of items declared valid divided by the total No. of items should equal to at least 0.7.

**Reliability**

Reliability tells the consistency in measuring the study variables usually by way of a pre-test Samoggia, (36). Although there are many reliability test techniques such as including test-retest, this study used the SPSS generated Cronbach’s Alpha coefficient, given its scientific approach used to compute it and its wide use in research Rasouli, [33].

It is a measure of the degree to which a research instrument yields consistent results/data after repeated trials. The reliability of the research instrument was studied using the Cronbach alpha coefficient. The reliability of the instruments will be computed using SPSS to determine the Cronbach Alpha Coefficient. The closer it is to 1, the higher the consistency Rasouli, [33] . The questionnaire was pre-tested in the areas not intended for research using Test/re-test because it permits the instrument to be compared with itself, thus avoiding the sort of problems that could arise with the use of another instrument Rahn,& Yeretizian [31]

**Table 3: showing the Cronbach’s Alpha**

Variable	Reliability statistics
Processing machinery	0.879
Value addition	0.958
Brand image	0.848
Coffee consumption	0.894
Total	3.579
Average	$3.579/4=0.894$

Source: Primary data 2021

**Pretesting of the questionnaire and Cronbach alpha test**

To determine the Cronbach alpha, the questionnaire was pretested through a pilot study conducted in Kanungu District found in South Western Uganda which is neighbouring Rukungiri District in the north, and the Kabale District in the west. Therefore, the population is likely to have similar characteristics to those of the intended study participants. A total of 15 respondents took part in the pilot study. The data collected from the pilot study/ test was entered in SPSS version 23 and analyzed for reliability using the Cronbach alpha test, SPSS version 23. Analysis of data was done based on the demission of the independent variable as below.

**Table 3. 1: The Demission of the Independent Variables**

Variable	Reliability statistics
Processing machinery	0.871
Value addition	0.980
Brand image	0.978
Coffee consumption	0.977
Total	3.806
Average	$3.806/4=0.952$

Source: Field data 2021.

Cronbach’s Alpha was 0.879. a reliability coefficient (alpha) of 0.7 range is considered acceptable and those above 0.9 are considered good. Orikyiriiza et al, [47]. Therefore, the questionnaire had good reliability.

**4.2. Data Processing and Analysis.**

After the fieldwork, the data were input into Statistical Package for Social Science (SPSS) version 21 and exposed to a systematic cleaning before hypothesis testing Samoggia, & Riedel, [37] . Two statistical software packages were applied for dissecting the data collected. Specifically, SPSS version 21 was used for preliminary data analysis.

**Technological factors and coffee consumption in Rukungiri District**

The third objective was aimed at determining the effect of technological factors on coffee consumption in Rukungiri District Mbarara District. The data to address this objective was obtained from the primary sources (staff) and secondary data (documented work). A summary of the responses is presented in table 15.

**Table 17: Findings on technological factors influencing coffee consumption in Rukungiri District**

Key: Strongly Agree (SA) 5, (Agree (A) (4), Undecided (UD) 3, Disagree (D) 2 and strongly Disagree (SD) 1

Statements on stakeholder participation.	Agree		Undecided		Disagree		Mean	Standard deviation
	F	%	F	%	F	%		
I process coffee myself	87	70.7%			36	29.3%	4.0479	21421
I have a modern coffee making machine	98	79.8%	-	-	25	20.2%	3.9281	49781
I have been trained in making coffee	98	77.2%	-	-	25	20.8%	3.8982	68226
I trade-in more than one well-known brand of coffee	120	97.6%	-	-	03	2.4%	3.8024	83766
Customers Keep changing brands	98	79.8%	-	-	25	20.2%	3.9281	49781

Source: Primary data 2021

Table 17 above indicates analyses of the four statements that were subjected to the respondents to measure technological factors to coffee consumption in Rukungiri District. The descriptive statistics from the table above are explained as follows;

Respondents were asked whether they process coffee myself 70.7% agreed with the statement mean deviation was 4.0479, with a standard deviation of 21421. The result showed that most respondents had participated in coffee processing. Respondents were also asked whether they have a modern coffee making machine 79.8% agreed with the statement, with a mean deviation of 3.9281 and a standard deviation of 49781. The response gives a general picture that the majority of study participants had taken part in coffee value addition.

Moreover, respondents were also asked whether they have been trained in making coffee, 77.2% agreed with the statement with a mean deviation was 3.8982 and a standard deviation was 68226. It is clear from the trend of responses that the majority of study participants had taken part in coffee branding. When respondents were asked whether they trade in more than one well-known brand of coffee, 97.6% agreed with the statement with a mean deviation of 3.8024 and a standard deviation of 83766. This shows the critical role of branding lastly respondents were asked whether Customers Keep changing brands, 79.8% agreed with the statement with a mean deviation of 3.9281 and standard deviation of 49781

On the whole, responses on technological factors and their effect on coffee consumption showed that such factors influenced coffee consumption since all respondents agreed to the statements that had been set to measure technological factors. The study also sought the views of key informants through the interview process. Related results are further explained.

In one of the interviews, a key informant was quoted as follows;

*Technology is not only helping within the walls of the coffee shop; technology is also having an impact at the source by helping growers collect and share increasingly detailed information on their crops. With the arrival of the "Third Wave" of coffee, an ever-greater emphasis is being*

*placed on precise origins, growing altitudes, exact harvest date, moisture content, and much more which are all being controlled by technology.*

From the view of the key informant, it was noted that technological factors are critical for coffee consumption, echoing what had been recorded in the quantitative results.

### Hypothesis Testing;

To verify the alternative hypothesis that there is a strong relationship between technological factors on coffee consumption in Mbarara District, the Pearson's product-moment correlation coefficient was used to determine the magnitude of the relationship as shown in Table 18:

**Table 18: Correlation analysis for technological factors and coffee consumption in Rukungiri District**

		Coffee consumption	Technological factors
Coffee Consumption	Pearson Correlation	1	.658**
	Sig. (2-tailed)		.000
	N	123	123
Technological factors	Pearson Correlation	.658**	
	Sig. (2-tailed)	.000	
	N	123	123

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

### Source: Field Data 2021.

**Table 18** above shows a correlation coefficient of 658\*\* which is significant at 0.01 level, implying a very strong significant positive relationship between technological factors and coffee consumption in Rukungiri District. The positive correlation meant that improving technological factors would result in an improvement in coffee consumption. Likewise, poor technological factors would lead to reduced coffee consumption in Rukungiri District.

### Regression analysis

A regression analysis was run to determine the contribution of technological factors to coffee consumption in Rukungiri District Mbarara District. This indicates how much of the variance in the independent variable would affect the dependent variable.

**Table 19: Model summary of technological factors and coffee consumption in Rukungiri District**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.658 <sup>a</sup>	.159	.154	.14749

a. Predictors: (Constant), Technological factors

### Source field data 2021

The coefficient of determination of 0.159 implies that technological factors affected coffee consumption in Rukungiri District Mbarara District by 15.9%. The result meant that any change in technological factors would contribute to the variation in coffee consumption in Rukungiri District by 15.9%.

**Table 20: Regression coefficients on the effect of technological factors on coffee consumption in Rukungiri District.**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.941	.219		13.460	.000

1	Strategy control	.299	.054	.658	5.593	.000
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a. Dependent Variable: Coffee consumption

**Source: Field data 2021**

Findings revealed a regression coefficient of 658 at a 0.01 significant level, hence a significant relationship. Results further confirm that technological factors contribute toward Coffee Consumption in Rukungiri District Mbarara District with a Beta value of 0.658 at 95% of confidence. Therefore, the researcher upholds the research hypothesis; “Technological factors have a significant effect on Coffee Consumption in Rukungiri District Mbarara District”

**Discussion of the fundings**

The third objective was to determine the effect of technological factors on coffee consumption in Rukungiri District . Findings on this objective looked at three dimensions of technological factors as Processing machinery, Value addition and Brand image. On the three dimensions of technological factors, descriptive statistics indicated that technological factors affected coffee consumption in Rukungiri District with an average of 95.2% response. The relationship between the two variables was positive and significant with r of .658 at a P value of 0.01. The qualitative findings from key informant interviews also indicated that technological factors were vibrant towards coffee consumption in Rukungiri District

This study identified the effect of technological factors on coffee consumption in Rukungiri district and discovered that there was a positive and significant relationship between the two variables. Qualitative findings from key informant interviews confirmed and reinforced the quantitative findings. These findings are confirmed and supported other researchers and scholars that technological factors are positively and significantly related coffee consumption. For instance, argues that Ijanu[16] Technology is not only helping within the walls of the coffee shop; technology is also having an impact at the source by helping growers collect and share increasingly detailed information on their crops Alperet[2]

In the same respect and in agreement with the study findings, proposes that Jhee[17] Machinery such as artificial driers, wet pulping, and coffee waster/separator are already adopted and most companies do not use large amounts of local Labour force since most of the machinery is imported. This serves to explain the critical role of technology towards coffee consumption.

Literature revealed that the domestic coffee consumption in Uganda was still very low at about 3 – 5 % of Uganda’s total annual production. Low promotion on the domestic market to combat the traditional misgivings against coffee consumption; the domestic roasters face fierce competition for the good graded coffee, which can be exported for higher revenues. The roasters thus resort to cheap, lesser quality coffee, which does not give a very palatable powder; there are also inadequate roasting equipment and packaging materials. All these are linked to technological factors and further lend credence to the fact that technological factors affect coffee consumption in Mbarara City. An overview of novel technologies, such as the application of starter cultures in fermentation and the exploitation of industrial enzymes in accelerating the process of flavour development in coffee beans is given Veronese[48]. This confirms the findings of this study that technological factors affect coffee consumption in Rukungiri District

**Summary**

Technology is a driver of many things, from production to marketing and preparation. Improved technology can lead to better production and preparation of coffee, as well as better marketing, branding, and presentation, all of which can boost consumption.

**Conclusion**

After conducting qualitative data analysis, the study confirmed that there was a linkage between quantitative and qualitative findings. There was an agreement between the two data sets and it was clear that qualitative data reinforced quantitative data.

**References**

[1] Agaba M& Turyasingura J.B (2022) Effects of Management Factors on Project Implementation in Government Aided Secondary Schools in Kabale District, Uganda. *Journal of Research in Business and Management* Volume 10 ~ Issue 4 (2022) pp: 66-73

[2] Alperet, DJ, Rebello, SA, Khoo, EYH, Tay, (2020). The effect of coffee consumption on insulin sensitivity and other biological risk factors for type 2 diabetes: a randomized placebo-controlled trial. ... *American journal of ...*, academic.oup.com

- [3] Angeloni, G, Guerrini, L, Masella, P, Bellumori, M, & ... (2019). What kind of coffee do you drink? An investigation on effects of eight different extraction methods. *Food Research ...*, Elsevier
- [4] Bułdak, RJ, Hejmo, T, Osowski, M, Bułdak, Ł, Kukla, M, & ... (2018). The impact of coffee and its selected bioactive compounds on the development and progression of colorectal cancer in vivo and in vitro. *Molecules*, mdpi.com
- [5] Chen, MF (2020). ... on sustainability development: A theory of planned behavior purchase intention model of sustainability-labeled coffee and the moderating effect of climate change .... *Business Strategy and the Environment*, Wiley Online Library
- [6] Cordoba, N, Fernandez-Alduenda, M, Moreno, FL, & ... (2020). Coffee extraction: A review of parameters and their influence on the physicochemical characteristics and flavour of coffee brews. ... *Science & Technology*, Elsevier
- [7] Cornelis, MC (2019). The impact of caffeine and coffee on human health. *Nutrients*, mdpi.com
- [8] Cornelis, MC, Erlund, I, Michelotti, GA, & ... (2018). Metabolomic response to coffee consumption: application to a three-stage clinical trial. *Journal of internal ...*, Wiley Online Library
- [9] D'Elia, L, Fata, E La, Galletti, F, Scalfi, L, & ... (2019). Coffee consumption and risk of hypertension: a dose–response meta-analysis of prospective studies. *European journal of ...*, Springer
- [10] Gemechu, FG (2020). Embracing nutritional qualities, biological activities and technological properties of coffee byproducts in functional food formulation. *Trends in food science & technology*, Elsevier
- [11] Gökçen, BB, & Şanlıer, N (2019). Coffee consumption and disease correlations. Critical reviews in food science and ... , Taylor & Francis
- [12] Hameed, A, Hussain, SA, & Suleria, HAR (2020). “Coffee bean-related” agroecological factor affecting the coffee. *Coevolution of secondary ...*, Springer
- [13] Hang, D, Kværner, AS, Ma, W, Hu, Y, & ... (2019). Coffee consumption and plasma biomarkers of metabolic and inflammatory pathways in US health professionals. ... *American journal of ...*, academic.oup.com
- [14] Hernandez-Aguilera, JN, Gómez, MI, & ... (2018). Quality as a driver of sustainable agricultural value chains: the case of the relationship coffee model. ... *Strategy and the ...*, Wiley Online Library
- [15] Ho, TQ, Hoang, VN, Wilson, C, & Nguyen, TT (2018). Eco-efficiency analysis of sustainability-certified coffee production in Vietnam. *Journal of cleaner production*, Elsevier
- [16] Ijanu, EM, Kamaruddin, MA, & Norashiddin, FA (2020). Coffee processing wastewater treatment: a critical review on current treatment technologies with a proposed alternative. *Applied Water Science*, Springer
- [17] Jhee, JH, Nam, KH, An, SY, Cha, MU, Lee, M, & ... (2018). Effects of coffee intake on incident chronic kidney disease: a community-based prospective cohort study. *The American journal of ...*, Elsevier
- [18] Kamil, M, Ramadan, KM, Awad, OI, Ibrahim, TK, & ... (2019). Environmental impacts of biodiesel production from waste spent coffee grounds and its implementation in a compression ignition engine. *Science of The Total ...*, Elsevier
- [19] Kim, JW, Byun, MS, Yi, D, Lee, JH, Jeon, SY, & ... (2019). Coffee intake and decreased amyloid pathology in human brain. *Translational ...*, nature.com
- [20] Komorita, Y, Iwase, M, Fujii, H, Ohkuma, T, & ... (2020). Additive effects of green tea and coffee on all-cause mortality in patients with type 2 diabetes mellitus: The Fukuoka Diabetes Registry. *BMJ Open Diabetes ...*, drc.bmj.com
- [21] Kumera, G, Haile, K, Abebe, N, Marie, T, & Eshete, T (2018). Anemia and its association with coffee consumption and hookworm infection among pregnant women attending antenatal care at Debre Markos Referral .... *PLoS one*, journals.plos.org
- [22] Lafranconi, A, Micek, A, Paoli, PD, Bimonte, S, Rossi, P, & ... (2018). Coffee intake decreases risk of postmenopausal breast cancer: a dose-response meta-analysis on prospective cohort studies. *Nutrients*, mdpi.com
- [23] Loftfield, E, Cornelis, MC, Caporaso, N, Yu, K, & ... (2018). Association of coffee drinking with mortality by genetic variation in caffeine metabolism: findings from the UK Biobank. *JAMA internal ...*, jamanetwork.com
- [24] Loftfield, E, Rothwell, JA, Sinha, R, & ... (2020). Prospective investigation of serum metabolites, coffee drinking, liver cancer incidence, and liver disease mortality. *JNCI: Journal of the ...*, academic.oup.com
- [25] Martínez-López, S, Sarriá, B, Mateos, R, & ... (2019). Moderate consumption of a soluble green/roasted coffee rich in caffeoylquinic acids reduces cardiovascular risk markers: results from a randomized, cross-over .... *European journal of ...*, Springer
-



- [26] Meijer, GW, Lähteenmäki, L, Stadler, RH, & ... (2021). Issues surrounding consumer trust and acceptance of existing and emerging food processing technologies. *Critical reviews in food ...*, Taylor & Francis
- [27] Mínguez-Alarcón, L, Chavarro, JE, & Gaskins, AJ (2018). Caffeine, alcohol, smoking, and reproductive outcomes among couples undergoing assisted reproductive technology treatments. *Fertility and Sterility*, Elsevier
- [28] Ngango, J, & Kim, SG (2019). Assessment of technical efficiency and its potential determinants among small-scale coffee farmers in Rwanda. *Agriculture*, mdpi.com
- [29] Park, SY, Freedman, ND, Haiman, CA, & ... (2018). Prospective study of coffee consumption and cancer incidence in non-white populations. ... *Biomarkers & Prevention*, AACR
- [30] Pereira, GV de Melo, Neto, DP de Carvalho, & ... (2020). Chemical composition and health properties of coffee and coffee by-products. *Advances in food and ...*, Elsevier
- [31] Rahn, A, & Yeretizian, C (2019). Impact of consumer behavior on furan and furan-derivative exposure during coffee consumption. A comparison between brewing methods and drinking .... *Food chemistry*, Elsevier
- [32] Rashidinejad, A, Tarhan, O, Rezaei, A, & ... (2022). Addition of milk to coffee beverages; the effect on functional, nutritional, and sensorial properties. *Critical Reviews in ...*, Taylor & Francis
- [33] Rasouli, B, Ahlqvist, E, Alfredsson, L, Andersson, T, & ... (2018). Coffee consumption, genetic susceptibility and risk of latent autoimmune diabetes in adults: A population-based case-control study. *Diabetes & ...*, Elsevier
- [34] Roshan, H, Nikpayam, O, Sedaghat, M, & ... (2018). Effects of green coffee extract supplementation on anthropometric indices, glycaemic control, blood pressure, lipid profile, insulin resistance and appetite in patients .... *British Journal of ...*, cambridge.org
- [35] Rothwell, JA, Lofffield, E, Wedekind, R, Freedman, N, & ... (2019). A metabolomic study of the variability of the chemical composition of commonly consumed coffee brews. *Metabolites*, mdpi.com
- [36] Samoggia, A, & Riedel, B (2018). Coffee consumption and purchasing behavior review: Insights for further research. *Appetite*, Elsevier
- [37] Samoggia, A, & Riedel, B (2019). Consumers' perceptions of coffee health benefits and motives for coffee consumption and purchasing. *Nutrients*, mdpi.com
- [38] Santos, ÉM dos, Macedo, LM de, Tundisi, LL, & ... (2021). Coffee by-products in topical formulations: A review. ... *Science & Technology*, Elsevier
- [39] Saratale, GD, Bhosale, R, Shobana, S, Banu, JR, & ... (2020). A review on valorization of spent coffee grounds (SCG) towards biopolymers and biocatalysts production. ... *technology*, Elsevier
- [40] Shi, L, Brunius, C, Johansson, I, & ... (2020). Plasma metabolite biomarkers of boiled and filtered coffee intake and their association with type 2 diabetes risk. *Journal of Internal ...*, Wiley Online Library
- [41] Spence, C (2021). Sonic seasoning and other multisensory influences on the coffee drinking experience. *Frontiers in Computer Science*, frontiersin.org
- [42] Spence, C, & Carvalho, FM (2020). The coffee drinking experience: Product extrinsic (atmospheric) influences on taste and choice. *Food Quality and Preference*, Elsevier
- [43] Taylor, AE, Smith, G Davey, & Munafò, MR (2018). Associations of coffee genetic risk scores with consumption of coffee, tea and other beverages in the UK Biobank. *Addiction*, Wiley Online Library
- [44] Turyasingura JB, Agaba M, Orach-Meza FI, Zombire R, Kyabarongo B. (2022). Resourcing and the sustainability of Donor funded Potatoes Projects in Kabale District, Southwestern Uganda. *Special Journal of Politics and Economic Sustainability 2022*, 2(2): 1-17
- [45] Turyasingura JB, Agaba M, Orach-Meza FL & Regis Zombeire R. (2021) Project Design Implementation and Sustainability of Donor Funded Potato Projects in Kabale District South Western Uganda. *Special Journal of Politics and Economic Sustainability 2021*, 2 (1): 1-13
- [46] Turyasingura JB, Moses, M, Orach-Meza FI, Zombire2 R, Kyabarongo B (2022). Project Monitoring and Evaluation in the Sustainability of Donor-Funded Potato Projects in Kabale District, Uganda. *American Journal of Humanities and Social Sciences Research (AJHSSR)* e-ISSN :2378-703X Volume-6, Issue-3, pp-115-122
-

[47] Elli Orikyiriza1 , **Agaba Moses** , Kanyesiime Alex, Task-Oriented Leadership and Employee Performance: A Case Study of Buhoma Mukono Community Development Association (BMCDA) in Kanungu, Uganda, (2022), *Science Journal of Business and Management* 2022; 10(3): 151-160 doi: 10.11648/j.sjbm.20221003.13 ISSN: 2331-0626 (Print); ISSN: 2331-0634

[48] Veronese, N, Notarnicola, M, Cisternino, AM, & ... (2018). Coffee intake and liver steatosis: a population study in a Mediterranean area. *Nutrients*, mdpi.com